



preADJUST

Housing adjustment
to handle natural hazards

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Proactive urban development planning for an effective response to natural hazards and to 'build back better' in recovery, rehabilitation, and reconstruction.

– *on the case of Banda Aceh, Indonesia*

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“A visionary – regards difficult situations, not just as problems to solve, but as opportunities for creation and collaboration. To present a challenge that calls forth the best in people and brings them together around a shared sense of purpose, leading to a community united around an inspiring goal.” (Anon.)



Abstract

Natural hazards, including climatological, meteorological, hydrological, and geophysical hazards can have a devastating impact on human life, the built environment, urban development and economy. Some of these hazards are amplified by climate change. The vulnerability of a region, dependent on the socio-economic conditions and on the coping and adjustment capacity of the affected community, determines to a large extent whether loss or damage occurs and whether a natural hazard turns into a disaster. A lack of money and resources, inadequate planning laws and regulations as well as a lack of effective monitoring strategies, are reasons why people in developing countries are particularly vulnerable to the impact of natural hazards. Furthermore, in the urban planning process, natural influences are often not sufficiently taken into account. In many cases, there is a lack of information and knowledge about what can be done to appropriately adjust housing, comprising the immediate physical environment, both within and outside of buildings where people live, and which serve as a shelter from external influences.

There are many reasons why after a disaster there is limited time for careful planning which can lead to the following problems: replacement housing projects are often poorly adjusted to local conditions, frequently worse than their original state. Ninety percent of international aid funds are distributed *after* a natural disaster has occurred, namely for emergency aid and reconstruction. (cf. Kellett and Caravani 2013). These often large amounts of money, available after a disaster, could offer the possibility to 'build back better' in the sense of adjustment of housing to natural hazards and protection from future disaster. The goal of reconstruction should not be to restore the status quo ante but to improve housing to reduce future vulnerability. This is seldom accomplished due to time pressure that comes with the funding as well as a deficiency of a strategy, regulations and preparation. 'Build back better' is a concept of long-term risk reduction which originated after the Indian Ocean tsunami 2004 and is a defined goal within the Sendai Framework for Disaster Risk Reduction¹. The idea behind the concept is to link immediate relief with longer-term processes of recovery and development, where humanitarian assistance in disaster response should go beyond saving lives and alleviating suffering in order to break an ongoing cycle of loss and responding. This concept yet tends to lack adequate tools for a meaningful contribution to reduce communities' vulnerability regarding future shocks. The response time after a disaster is unlikely to be the ideal moment to tackle underlying problems of vulnerability and sensible reconstruction can only be achieved if the manifold project activities of different local, national and international organisations are sufficiently coordinated. A shift in focus from emergency aid to preventive adjustment of housing can save lives as well as other resources such as time or money and avert a closing off of urban development options.

The present thesis investigates the need for pre-disaster housing adjustment strategies as a necessary contribution of urban development planning at a local level. This was achieved through systematic interviews and field studies in the post disaster study area Banda Aceh, Indonesia. A thorough analysis of the reconstruction process after the Indian Ocean tsunami in 2004 as well as

¹ Voluntary, non-binding agreement endorsed by the UN General Assembly following the 2015 Third UN World Conference on Disaster Risk Reduction (WCDRR). It is aiming for substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.

the current planning process for housing identified the following strategic elements for urban development planning:

- cooperation between local planning institutions
- community involvement
- lessons learned from previous reconstruction projects
- assessments on natural hazards
- long-term adjustment to natural hazards
- knowledge sharing

The strategy of enhanced reconstruction ideally comes from local planning agencies. For aforementioned reasons, planning must happen beforehand, pre-disaster, which requires an instrument on two different levels that has hitherto been neglected. First, a systematic risk management approach, before a disaster strikes as part of the everyday planning process introduced as 'proactive urban development planning as pre-disaster protection'. Second, preparing for the worst-case scenario in developing a 'reconstruction template'. This template includes rules and regulations for possible reconstruction. In both elements it is crucial to involve the community in all planning steps and incorporate lessons learned from previous reconstruction projects. Hence, both instruments need to be developed from within the city by relevant stakeholders, possibly together with experienced national or international planners and stakeholders in the field of housing adjustment.

With these two instruments, not only the quality of reconstruction projects can be improved but, in long-term urban development planning, housing can be adjusted to natural hazards. This approach is based on the UNISDR (United Nations International Strategy for Disaster Risk Reduction) Sendai framework for Disaster Risk Reduction 2015-2030 and forms a bridge between post-disaster reconstruction and long-lasting urban development. With sixty percent of places that are forecast to be urbanised by 2030 yet to be built, these suggested planning instruments can present an important approach in both reducing disaster risk as well as safeguarding developmental gains.

Zusammenfassung

Naturgefahren, klimatologischer, meteorologischer, hydrologischer und geophysikalischer Art, können verheerende Auswirkungen auf das Leben von Menschen, die gebaute Umwelt, die Stadtentwicklung und die Wirtschaft haben. Einige dieser Gefahren werden durch den Klimawandel verstärkt. Die Verwundbarkeit einer Region, abhängig von sozioökonomischen Bedingungen sowie Bewältigungs- und Anpassungskapazitäten der betroffenen Bevölkerung, bestimmt maßgeblich, ob Verlust oder Schaden entstehen und aus einer Naturgefahr eine Katastrophe wird. Geld- und Ressourcenknappheit, unzureichende Planungsregeln und -vorschriften sowie das Fehlen wirksamer Überwachungsstrategien sind Gründe dafür, dass Menschen in Entwicklungsländern besonders anfällig für die Auswirkungen von Naturgefahren sind. Darüber hinaus werden im städtebaulichen Planungsprozess natürliche Einflüsse oft nicht ausreichend berücksichtigt. Häufig fehlt es an Informationen und Wissen darüber, was getan werden kann, um Siedlungen² angemessen anzupassen, sodass sie Schutz vor Naturgefahren bieten.

Nach einer Katastrophe ist die Zeit für eine sorgfältige Planung meist begrenzt, was oft dazu führt, dass die Anpassung von Siedlungen zu kurz kommt. Ersatzsiedlungen sind oft schlecht an die örtlichen Gegebenheiten angepasst, häufig schlechter als die ursprüngliche Siedlung. Das Ziel eines Wiederaufbaus sollte nicht darin bestehen, den Status quo ante wiederherzustellen, sondern Siedlungen zu verbessern, um langfristig die Verwundbarkeit zu verringern. Dies wird unter anderem aufgrund des Zeitdrucks, der mit internationalen Hilfgeldern verbunden ist, sowie fehlender Strategien, Vorschriften und Vorbereitung selten erreicht. Neunzig Prozent internationaler Hilfgelder werden *nach* einer Naturkatastrophe ausgegeben, für Soforthilfe und Wiederaufbau (vgl. Kellett und Caravani 2013). Diese oft umfangreichen Finanzmittel, die nach einer Katastrophe zur Verfügung stehen, könnten die Möglichkeit bieten, „besser wiederaufzubauen“ (build back better) im Sinne einer Anpassung der Siedlungen an Naturgefahren als Schutz vor zukünftigen Katastrophen. „Build back better“ ist ein Konzept zur langfristigen Risikominderung, das nach dem Tsunami im Indischen Ozean 2004 entstand und ein definiertes Ziel innerhalb des ‚Sendai-Rahmenwerk für die Katastrophenvorsorge‘³ ist. Die Idee hinter dem Konzept besteht darin, Soforthilfe mit längerfristigen Wiederherstellungs- und Entwicklungsprozessen zu verknüpfen. Dabei sollte humanitäre Hilfe im Bereich der Katastrophenhilfe über die Rettung von Menschenleben und die Linderung von Leiden hinausgehen, um einen kontinuierlichen Zyklus aus Verlust und Reaktion zu durchbrechen. Bisher fehlen jedoch in der Regel geeignete Instrumente, um durch dieses Konzept einen sinnvollen Beitrag zur Verringerung der Verwundbarkeit der Bevölkerung gegenüber zukünftigen Schocks zu leisten. Ein sinnvoller Wiederaufbau kann nur erreicht werden, wenn die vielfältigen Projektaktivitäten verschiedener lokaler, nationaler und internationaler Organisationen ausreichend koordiniert werden. Der Verwundbarkeit zugrunde liegende Probleme müssen allerdings im Vorhinein angegangen werden, die Phase des Wiederaufbaus unmittelbar nach einer Katastrophe ist hierfür meist kein geeigneter Zeitpunkt. Eine Schwerpunktverlagerung von der Soforthilfe hin zur präventiven Anpassung von Siedlungen kann Leben retten sowie Ressourcen, wie Zeit oder Geld

² Housing

³ Freiwillige, nicht bindende Vereinbarung, die von der UN-Generalversammlung im Anschluss an die Dritte UN-Weltkonferenz zur Reduzierung des Katastrophenrisikos (WCDRR) 2015 bestätigt wurde. Sie zielt auf eine wesentliche Verringerung des Katastrophenrisikos und der Verluste an Menschenleben, Existenzgrundlagen und Gesundheit sowie an wirtschaftlichen, materiellen, sozialen, kulturellen und ökologischen Gütern von Personen, Unternehmen, Gesellschaften und Ländern ab.

einsparen und dazu beitragen, langfristige städtebauliche Entwicklungsmöglichkeiten nicht zu verbauen.

Die vorliegende Dissertation untersucht die Notwendigkeit von präventiven Anpassungsstrategien an Naturgefahren für den Siedlungsbau als notwendigen Beitrag der Stadtentwicklungsplanung auf lokaler Ebene. Den Kern dieser Betrachtung bilden systematische Interviews und Feldstudien im Untersuchungsgebiet Banda Aceh, Indonesien. Durch eine eingehende Analyse des Wiederaufbauprozesses nach dem Tsunami im Indischen Ozean 2004 sowie des aktuellen Planungsprozesses für den Siedlungsbau wurden im Rahmen der Arbeit folgende strategische Elemente der Stadtentwicklungsplanung identifiziert:

- Kooperation zwischen lokalen Planungsinstitutionen
- Einbindung der Bevölkerung
- Lehren aus früheren Wiederaufbauprojekten
- Risikoanalysen zu Naturgefahren
- langfristige Anpassung⁴ an Naturgefahren
- gemeinsame Nutzung von vorhandenem Wissen

Die Strategie für einen verbesserten Wiederaufbau kommt idealerweise von lokalen Planungsbehörden und die entsprechende Planung hierfür sollte, aus oben genannten Gründen, bereits im Vorfeld einer Katastrophe erfolgen. In der Arbeit wird als Ergebnis ein Instrument auf zwei Ebenen für diese Art von Stadtplanungsstrategie eingeführt. Zum einen die „proaktive Stadtentwicklungsplanung als vorsorglicher Katastrophenschutz“⁵, ein systematischer Risikomanagementansatz als integraler Bestandteil des täglichen Planungsgeschehens. Zum anderen die „Vorlage für den Wiederaufbau“⁶, die parallel dazu als Vorbereitung für den ungünstigsten Fall entwickelt wird. Darin enthalten sind Regulierungen für einen möglichen Wiederaufbau von Siedlungen. Bei beiden Instrumenten ist es entscheidend, die Bevölkerung in alle Planungsschritte einzubeziehen und Erfahrungen aus früheren Wiederaufbauprozessen einfließen zu lassen. Die Ausgestaltung der Instrumente muss daher auf Stadtebene durch relevante Akteure, bestenfalls zusammen mit erfahrenen nationalen oder internationalen Planern und Akteuren im Bereich der Siedlungsanpassung erfolgen.

Mit diesen beiden Instrumenten lassen sich nicht nur die Qualität von Wiederaufbauprojekten verbessern, sondern in der langfristigen Stadtentwicklungsplanung auch Siedlungen an Naturgefahren anpassen. Dieser Ansatz basiert auf dem UNISDR (United Nations International Strategy for Disaster Risk Reduction) Sendai Framework for Disaster Risk Reduction 2015-2030 und verknüpft den Wiederaufbau nach einer Katastrophe mit einer nachhaltigen Stadtentwicklung. Da sechzig Prozent der Orte, die bis 2030 voraussichtlich urbanisiert sein werden, noch nicht gebaut sind, könnten diese vorgeschlagenen Planungsinstrumente einen wichtigen Ansatz darstellen, Katastrophenrisiken zu reduzieren und Entwicklungserfolge zu sichern.

⁴ Adjustment, umfasst Schutz-, Minderungs- und Anpassungsmaßnahmen

⁵ 'proactive urban development planning as pre-disaster protection'

⁶ 'reconstruction template'

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Contents

Abstract	1
Zusammenfassung	3
Acknowledgement.....	5
List of figures	10
List of tables.....	13
Acronyms.....	14
1 Introduction	19
1.1 Relevance of the topic and problem statement.....	20
1.2 Objective of the work.....	22
1.3 Approach and structure of the work	22
2 Concepts and instruments to handle natural hazards in the context of housing	27
2.1 Definitions and principles	27
2.1.1 Natural hazard.....	27
2.1.2 Natural disaster.....	31
2.2 Link between post-disaster recovery and long-term risk reduction.....	37
2.2.1 Hazard paradigms.....	37
2.2.2 Vulnerability.....	42
2.2.3 Risk	45
2.3 Post-disaster recovery	48
2.3.1 Disaster timeline.....	48
2.3.2 Disaster financing.....	52
2.4 Long-term risk reduction	54
2.4.1 Linking relief, rehabilitation and development LRRD.....	55
2.4.2 Pre-disaster planning.....	56
2.4.3 Disaster risk reduction DRR	59
Sendai framework.....	60
Disaster risk reduction financing.....	62
2.5 Conclusion.....	66
3 Housing in the context of protection, mitigation and adaptation	71
3.1 Housing.....	71
3.2 Maladjusted housing.....	73
3.3 Housing adjustment.....	74

3.4	Characteristics of well-adjusted housing.....	78
4	Planning.....	85
4.1	Planning approach	86
4.2	Theories of planning.....	88
4.3	Planner.....	89
4.3.1	The planner's role	93
4.4	Planning Instruments.....	96
5	Exogenous international influence	99
5.1	Criticism of modernity	99
5.2	Development	102
5.3	Actors involved in housing adjustment or reconstruction processes.....	105
6	Provisional conclusion of the theoretical framework	111
7	Empirical study	121
7.1	Characterisation of research design	124
7.2	Description of instruments.....	126
7.3	Sample structure.....	127
7.4	Implementation of investigation.....	131
7.5	Data analysis	132
8	Findings.....	137
8.1	Context in Banda Aceh.....	137
8.1.1	Tsunami 2004.....	140
8.1.2	Vulnerability to natural hazards.....	144
8.2	Reconstruction after the tsunami 2004	146
8.2.1	Shortcomings/problems in reconstruction after the tsunami 2004	152
Responsibilities [Who was involved?]	152	
Process [What was done?].....	157	
Quality of the results [How was it done?].....	168	
8.2.2	Success in reconstruction after the tsunami 2004	176
8.2.3	Influence of lessons learned on current planning process	180
8.3	Current state of planning in Banda Aceh	188
8.3.1	Construction.....	188
8.3.2	Planning process.....	188
8.3.3	The role of traditional architecture.....	189
9	Discussion	193

9.1	Proactive urban development planning as pre-disaster protection.....	193
9.1.1	Knowledge input from reconstruction process.....	195
9.1.2	Instruments focusing on housing.....	197
9.2	Overview of the challenges and recommended action in the form of a 'Reconstruction template' embedded in proactive urban development planning	202
9.2.1	'Reconstruction template'	202
9.2.2	Instruments of the 'reconstruction template'.....	204
10	Conclusions.....	209
10.1	Implementation and institution in charge.....	209
10.2	Further research demand and outlook.....	211
	List of references	215
	Appendix	227
	Appendix A - Areas of investigation.....	228
	Appendix B - Evaluation of interviews.....	232
	B1 Reconstruction process – Shortcomings	232
	B1.A: Unclear landownership	233
	B1.B: NGOs taking over control	235
	B1.C: Missing/unsuitable master plan	242
	B1.D: Lack of building code/regulations.....	249
	B1.E: Relocation did not succeed	256
	B1.F: No time for planning.....	261
	B1.G: Community was unprepared.....	267
	B1.H: Bad quality housing	268
	B1.I: Additions/modifications are made by the people	274
	B1.J: Houses were not occupied	275
	B1.K: The poor life in the dangerous coastal area.....	277
	B1.L: NGO shortcomings.....	278
	B1.M: More houses got built than houses destroyed	279
	B1.N: There were no assessments done afterwards.....	282
	B1.O: Limited experience of the institution in charge	283
	B1.P: Problems that came with international helpers.....	283
	B1.Q: Lack of institution/no preparation	285
	B1.R: Costs went up	286
	B1.S: All plots in the settlement area are privately owned	287
	B1.T: Expensive temporary shelters.....	287

B2 Reconstruction process – Success	288
B2.A: Community/local actor involvement	289
B2.B: Houses were built earthquake resistant.....	293
B2.C: Escape roads and buildings implemented	294
B2.D: Raising disaster awareness	295
B2.E: New know-how.....	296
B2.F: One agency with full authority for coordination and implementation	296
B2.G: Monitoring	297
B2.H: Everyone received a house	298
B3 Reconstruction process – Lessons learned	298
B3.A: Changes in planning triggered by lessons from reconstruction.....	299
B3.B: Unaltered issues following reconstruction	311
B3.C: Assessments on reconstruction	320
B3.D: Exchange of knowledge.....	322
B3.E: Recommendation concerning handling planning	328
B4 Current state of planning	333
B4.A: Adjustment of housing.....	334
B4.B: Monitoring of construction and materials	342
B4.C: Traditional architecture	347
B4.D: Re-interpreting traditional building methods	348
B4.E: Performance of traditional buildings in natural hazards	352
Appendix C - Observations	356
C1 Banda Aceh.....	356
C2 Nias.....	366

List of figures

FIGURE 1. INVESTIGATION ELEMENTS OF THE WORK AS ORGANISATIONAL CHART; OWN DIAGRAM.	23
FIGURE 2. IMPACTS OF HAZARDS; OWN DIAGRAM.	30
FIGURE 3. NUMBER OF DISASTERS WORLDWIDE AND BY CONTINENT OVER THE PERIOD 1994-2013. SOURCE: CRED (2009, 11); MODIFIED.	32
FIGURE 4. NATURAL DISASTERS REPORTED 1900-2009. SOURCE: WALCH (2010, 7); MODIFIED.	33
FIGURE 5. SHARE OF OCCURRENCE OF NATURAL DISASTERS BY DISASTER TYPE 1994-2013. SOURCE: CRED (2015B, 16); MODIFIED.	34
FIGURE 6. HOUSES DAMAGED PER DISASTER TYPE 1994-2013. SOURCE: CRED (2015B, 32); MODIFIED.	34
FIGURE 7. NUMBER OF PEOPLE AFFECTED & KILLED ANNUALLY BY NATURAL DISASTERS WORLDWIDE 1994-2013. SOURCE: CRED (2015B, 14); MODIFIED.	35
FIGURE 8. TOP 10 COUNTRIES REPORTING ECONOMIC LOSSES FROM NATURAL DISASTERS IN ABSOLUTE VALUES (USD) 1994-2013. SOURCE: CRED (2015B, 41); MODIFIED.	36
FIGURE 9. ECONOMIC LOSSES IN ABSOLUTE VALUES AND COMPARED TO GDP. SOURCE: CRED (2015B, 40); MODIFIED.	36
FIGURE 10. ENGINEERING PARADIGM; OWN DIAGRAM.	39
FIGURE 11. ENGINEERING PARADIGM INSTRUMENTS; OWN DIAGRAM.	39
FIGURE 12. BEHAVIOURAL PARADIGM; OWN DIAGRAM.	40
FIGURE 13. BEHAVIOURAL PARADIGM INSTRUMENTS; OWN DIAGRAM.	40
FIGURE 14. DEVELOPMENT PARADIGM; OWN DIAGRAM.	41
FIGURE 15. DEVELOPMENT PARADIGM, ROOT CAUSES; OWN DIAGRAM.	41
FIGURE 16. COMPLEXITY PARADIGM; OWN DIAGRAM.	42
FIGURE 17. PRESSURE RELEASE MODEL. SOURCE: BLAIKIE, AT AL. (1994, 47).....	43
FIGURE 18. IMPACT BY TOP 10 COUNTRIES 1992-2012, PEOPLE AFFECTED. DATA SOURCE: UNISDR (2012); OWN DIAGRAM.	45
FIGURE 19. IMPACT BY TOP 10 COUNTRIES 1992-2012, PEOPLE KILLED. DATA SOURCE: UNISDR (2012); OWN DIAGRAM.	45
FIGURE 20. GLOBAL MORTALITY AND LOSSES ARE CONCENTRATED IN INTENSIVE DISASTERS. SOURCE: UNISDR (2015B, 48); MODIFIED.	46
FIGURE 21. THE DISASTER RISK-POVERTY NEXUS. SOURCE: JHA ET AL. (2010, 343); MODIFIED.	47
FIGURE 22. DISASTER MANAGEMENT CYCLE. SOURCE: AGUIRRE-AYERBE ET AL. (2018, 2244); MODIFIED.	48
FIGURE 23. DISASTER MANAGEMENT PHASES. SOURCE: KHAN, VASILESCU AND KHAN (2008, 47F); MODIFIED.	49
FIGURE 24. IMPLEMENTATION PHASES OF POST-DISASTER RECONSTRUCTION. SOURCE: FENGLER ET AL. (2008, 5); MODIFIED.	50
FIGURE 25. MOBILISING AND EXECUTING RECONSTRUCTION FINANCE, A PROTOCOL OF EVENTS. SOURCE: FENGLER ET AL. (2008, 6); MODIFIED.	51
FIGURE 26. ACEH RECONSTRUCTION NEEDS - WORLD BANK. SOURCE: FAN (FAN 2013, 8); MODIFIED.	55
FIGURE 27. PRE-DISASTER PLANNING. SOURCE: LEWIS (1975, 35); MODIFIED.	57
FIGURE 28. DISASTER MANAGEMENT CYCLE 1975. SOURCE: BAIRD ET AL. (1975, 42); MODIFIED.	57
FIGURE 29. ACTIVITY AND INFORMATION FLOWS SURROUNDING AND INCLUDING DISASTER OCCURRENCE, SHOWING THEIR INTER-RELATIONSHIP. SOURCE: BARD ET AL. (1975, 43); MODIFIED.	58
FIGURE 30: A SYSTEMS MODEL FOR THE STAGES OF A PRE-DISASTER PLAN. SOURCE: BAIRD ET AL. (1975, 45); MODIFIED.	59

FIGURE 31. DRR COMPARED WITH OTHER INTERNATIONAL AID INVESTMENTS, 2010. SOURCE: KELLETT AND CARAVANI (2013, 8); MODIFIED.	63
FIGURE 32. FINANCING FOR DRR FROM DEVELOPMENT BANKS, FINANCING MECHANISMS AND IMPLEMENTING AGENCIES, 1991-2010, USD MILLIONS. SOURCE: KELLETT AND CARAVANI (2013, 38); MODIFIED.	65
FIGURE 33. FINANCING FOR DRR DIRECT FROM DONORS, 1991-2010, USD MILLIONS. SOURCE: KELLETT AND CARAVANI (2013, 39); MODIFIED.....	65
FIGURE 34. DISASTER FINANCING AS A PROPORTION OF TOTAL INTERNATIONAL AID, 1991-2010. SOURCE: KELLETT AND CARAVANI (2013, 6); MODIFIED.	68
FIGURE 35. STILT HOUSE IN CAMBODIA AFTER A STORM I. SOURCE: LUCAS, 2013.	74
FIGURE 36. STILT HOUSE IN CAMBODIA AFTER A STORM II. SOURCE: LUCAS, 2013.....	74
FIGURE 37. ELEMENTS OF ADJUSTMENT; OWN DIAGRAM.	76
FIGURE 38. DISASTER REDUCTION STRATEGY. SOURCE: SMITH (2013, 98); MODIFIED.	77
FIGURE 39. COMPLEXITY PARADIGM; OWN DIAGRAM.....	77
FIGURE 40. KEY PERFORMANCE CRITERIA FOR HOUSES. SOURCE: DA SILVA (2010, 57); MODIFIED.	78
FIGURE 41. AREA OF ACTIVITY. SOURCE: LOO AND REIJEN (1997, 32); MODIFIED.	101
FIGURE 42. THE TENDENCY TOWARDS INCREASING DISASTER PRONENESS. SOURCE: BAIRD ET AL. (1975, 35); MODIFIED.	103
FIGURE 43. DIFFERENT TYPES OF DEVELOPMENT AGENCIES, POTENTIAL PARTNERSHIPS AND FLOW OF RESOURCES. SOURCE: GARDNER AND LEWIS (1996, 9); MODIFIED.	106
FIGURE 44. MODEL ILLUSTRATING THE CONCEPT OF PRE-DISASTER HOUSING ADJUSTMENT. SOURCE: LIZARRALDE ET AL. (2014, 5); MODIFIED.	115
FIGURE 45. RESEARCH DESIGN; OWN DIAGRAM.	123
FIGURE 46. RESEARCH AREA ACEH AND NIAS; OWN DIAGRAM.	137
FIGURE 47. ORGANISATIONAL STRUCTURE BAPPEDA BANDA ACEH. SOURCE: WHITE ET AL. (1989, 67); MODIFIED.	139
FIGURE 48. ORGANISATIONAL STRUCTURE OF BPBA. SOURCE: BPBD QANUN No.3/ 2011 (2011); MODIFIED.	140
FIGURE 49. 2004 INDIAN OCEAN TSUNAMI WAVE HEIGHT. SOURCE: JACOBSEN (2014).....	141
FIGURE 50. TSUNAMI 2004, COUNTRIES AFFECTED. SOURCE: DA SILVA (2010, 8); MODIFIED.....	141
FIGURE 51. MAP OF ACEH AND NIAS. SOURCE: DA SILVA (2010, 28).	143
FIGURE 52. TSUNAMI RISK MAP BANDA ACEH. SOURCE: MEILIANDA (2014, 13); MODIFIED.	145
FIGURE 53. BRR ORGANIGRAMME. SOURCE: UNEP (2007, 53); MODIFIED.	148
FIGURE 54. CATEGORIES SHORTCOMINGS; OWN DIAGRAM.	152
FIGURE 55. COASTAL AREA BANDA ACEH. SOURCE: MEILIANDA (2014, 12); MODIFIED.	165
FIGURE 56. SETTLEMENT WITH PANELS CONTAINING ASBESTOS, BANDA ACEH. SOURCE: LUCAS, 2016.	171
FIGURE 57. PANEL CONTAINING ASBESTOS ON THE GROUND, BANDA ACEH. SOURCE: LUCAS, 2016.	171
FIGURE 58. ESCAPE BUILDING BANDA ACEH. SOURCE: LUCAS, 2016.	183
FIGURE 59. ESCAPE BUILDING BANDA ACEH. SOURCE: LUCAS, 2016.	183
FIGURE 60. PROACTIVE URBAN DEVELOPMENT PLANNING. SOURCE: SMITH (2013, 43,98); MODIFIED.	194
FIGURE 61. KNOWLEDGE INPUT FROM RECONSTRUCTION PROCESS IN PROACTIVE URBAN DEVELOPMENT PLANNING. SOURCE: SMITH (2013, 43,98); MODIFIED.	195
FIGURE 62. COMPONENTS OF PROACTIVE URBAN DEVELOPMENT PLANNING. SOURCE: SMITH (2013, 43,98); MODIFIED.	197
FIGURE 63. RECONSTRUCTION TEMPLATE GENERATED FROM URBAN DEVELOPMENT PLANNING. SOURCE: SMITH (2013, 43,98); MODIFIED.	203
FIGURE 64. PROTOCOL OF EVENTS MOBILISING AND EXECUTING DISASTER FINANCE. SOURCE: FENGLER ET AL. (2008, 6).	203

FIGURE 65. RECONSTRUCTION TEMPLATE AS BASIS OF RECONSTRUCTION STRATEGY. SOURCE: FENGLER ET AL. (2008, 6); MODIFIED.	204
FIGURE 66A-B. LAMBUNG VILLAGE, BANDA ACEH. SOURCE: LUCAS, 2016.....	356
FIGURE 67A-D. LAMBUUK VILLAGE, TURKISH VILLAGE, BANDA ACEH. SOURCE: LUCAS, 2016.....	356
FIGURE 68A-H. GAMPUNG PANDE, BANDA ACEH. SOURCE: LUCAS, 2016.....	358
FIGURE 69A-F. SYIAH KUALA VILLAGE, BANDA ACEH, KNOCK-DOWN HOUSES WITH ASBESTOS SHEETS. SOURCE: LUCAS, 2016.	359
FIGURE 70A-D. ULEE LHEUE VILLAGE, BANDA ACEH, UPLINK STILT HOUSES. SOURCE: LUCAS, 2016.	359
FIGURE 71A-F. RUMAH ACEH, TRADITIONAL ACEHNESE HOUSES. SOURCE: LUCAS, 2016.	360
FIGURE 72A-F. ESCAPE BUILDINGS BANDA ACEH. SOURCE: LUCAS, 2016.	361
FIGURE 73A-D. TSUNAMI SIGNAGE BANDA ACEH. SOURCE: LUCAS, 2016.	362
FIGURE 74A-D. RESETTLEMENT, CHACKIE CHAN VILLAGE ACEH. SOURCE: LUCAS, 2016.....	363
FIGURE 75A-H. ACEH COAST, MANGROVE REPLANTING. SOURCE: LUCAS, 2016.	364
FIGURE 76A-B. STRANDED SHIP IN LAMPULO VILLAGE, BANDA ACEH. SOURCE: LUCAS, 2016.	364
FIGURE 77A-B. TSUNAMI MUSEUM BANDA ACEH. SOURCE: LUCAS, 2016.....	364
FIGURE 78A-B. MASS GRAVE ULEE LHEUE. SOURCE: LUCAS, 2016.	365
FIGURE 79A-C. PLTD APUNG 1, AN ELECTRICITY-GENERATING VESSEL WEIGHING 2600 TONNES, CARRIED ABOUT 3 KM INLAND BY THE TSUNAMI 2004, BANDA ACEH. SOURCE: LUCAS, 2016.	365
FIGURE 80A-D. DAHANA TABALOHO, NIAS. SOURCE: LUCAS, 2016.....	366
FIGURE 81A-D. SONDRAGEASTI HOUSES AND SCHOOL, NIAS. SOURCE: LUCAS, 2016.	367
FIGURE 82A-D. TUMÖRI, NIAS. SOURCE: LUCAS, 2016.	367
FIGURE 83A-B. ABANDONNED HOUSES. SOURCE: LUCAS, 2016.....	368
FIGURE 84A-B. BOWÖGASALI, NIAS. SOURCE: LUCAS, 2016.	368
FIGURE 85A-F. BAWOMATALUO, KING'S VILLAGE, NIAS. SOURCE: LUCAS, 2016.....	369
FIGURE 86A-B. HILIAMAETANIHA, NIAS. SOURCE: LUCAS, 2016.....	369
FIGURE 87A-H. TUMÖRI, NIAS. SOURCE: LUCAS, 2016.....	370

List of tables

TABLE 2.1 HYDROMETEOROLOGICAL HAZARDS. SOURCE: JHA ET AL. (2010, 364); MODIFIED	28
TABLE 2.2 HYDROLOGICAL HAZARDS. SOURCE: JHA ET AL. (2010, 363); MODIFIED	28
TABLE 2.3 CLIMATOLOGICAL HAZARDS. SOURCE: JHA ET AL. (2010, 361); MODIFIED	29
TABLE 2.4 GEOPHYSICAL HAZARDS. SOURCE: JHA ET AL. (2010, 363); MODIFIED	29
TABLE 2.5 BIOLOGICAL HAZARDS. SOURCE: CRED (2009); MODIFIED	29
TABLE 2.6 EXTRATERRESTRIAL HAZARDS. SOURCE: CRED (2009); MODIFIED	30
TABLE 2.7. DISASTER LOSSES COMPARED TO DRR FINANCING, INDONESIA. SOURCE: KELLET AND CARAVANI (2013, 9); MODIFIED.....	37
TABLE 2.8. THE EVOLUTION OF HAZARD PARADIGMS. SOURCE: SMITH (2013, 15); MODIFIED.....	38
TABLE 3.1 PROTECTION MEASURES FOR WELL-ADJUSTED HOUSING. SOURCE: JHA ET AL. (2010); MODIFIED	80
TABLE 3.2 MITIGATION MEASURES FOR WELL-ADJUSTED HOUSING. SOURCE: JHA ET AL. (2010); MODIFIED	81
TABLE 3.3 ADAPTATION MEASURES FOR WELL-ADJUSTED HOUSING. SOURCE: JHA ET AL. (2010); MODIFIED	82
TABLE 4.1. TEAM AND LEADERSHIP REQUIREMENTS FOR THE MANAGEMENT OF SHELTER AND HOUSING PROJECTS. SOURCE: DAVIS AND ALEXANDER (2015, 149).....	94
TABLE 7.1 RESPONDENTS AND FIELD OF EXPERTISE; A=INVOLVED IN RECONSTRUCTION; B= INVOLVED IN CURRENT PLANNING PROCESS; C=PART OF THE EDUCATIONAL SYSTEM FOR PLANNERS; OWN TABLE.....	127
TABLE 8.1 DAMAGE ASSESSMENT IOM. SOURCE: DA SILVA (2010, 28); MODIFIED.....	144
TABLE 8.2 EVENT TIME FRAME. SOURCE: FENGLER ET AL. (2008, 16); MODIFIED.....	147
TABLE 8.3 INSTITUTIONAL ARRANGEMENTS FOR POST-DISASTER RECONSTRUCTION. SOURCE: FENGLER ET AL. (2008, 18); MODIFIED	147
TABLE 8.4. MAIN FINDINGS REGARDING ADJUSTMENT OF HOUSING; OWN TABLE	151
TABLE 8.5 SHORTCOMINGS OF RESPONSIBILITIES; OWN TABLE.....	152
TABLE 8.6. ACTORS; OWN TABLE.....	157
TABLE 8.7 PROCESS SHORTCOMINGS; OWN TABLE	157
TABLE 8.8 TOTAL AMOUNT OF HOUSES IN COASTAL AREA BANDA ACEH. SOURCE: MEILIANDA (2014, 18); MODIFIED	165
TABLE 8.9. PROCESS; OWN TABLE	167
TABLE 8.10 QUALITY SHORTCOMINGS; OWN TABLE	168
TABLE 8.11. QUALITY OF THE RESULTS; OWN TABLE.....	176
TABLE 8.12. SUCCESS IN RECONSTRUCTION; OWN TABLE	179
TABLE 8.13. INFLUENCE ON PLANNING; OWN TABLE	185
TABLE 8.14. RECOMMENDATIONS; OWN TABLE.....	187
TABLE 9.1 PROTECTION INTERVENTIONS REGARDING ADJUSTMENT OF BUILDINGS TO NATURAL HAZARDS; OWN TABLE	198
TABLE 9.2 ADAPTATION INTERVENTIONS REGARDING RELOCATION OF FISHERMEN; OWN TABLE	200
TABLE 9.3 COMPONENTS OF A RECONSTRUCTION TEMPLATE CONCERNING HOUSING; OWN TABLE.....	205

Acronyms

ADB	Asian Development Bank
AHA Centre	ASEAN Coordinating Centre for Humanitarian Assistance
Bapedal	<i>Badan Pengendalian Dampak Lingkungan</i> – Aceh Environmental Agency
Bappeda	<i>Badan Perencana Pembangunan Daerah</i> – Regional Body for Planning and Development
Bappenas	<i>Badan Perencanaan Pembangunan Nasional</i> – Indonesian Ministry of National Development Planning
BNPB	<i>Badan Nasional Penanggulangan Bencana</i> – National Disaster Management Board
BPBA	<i>Badan Penanggulangan Bencana Aceh</i> – Aceh Disaster Management Agency
BPBD	<i>Badan Penanggulangan Bencana Daerah</i> – Regional Disaster Management Agency
BRR	<i>Badan Rehabilitasi dan Rekonstruksi</i> – Agency for the Rehabilitation and Reconstruction of Aceh and Nias
CCA	Climate Change Adaptation
CRED	Centre for Research on the Epidemiology of Disasters
DEC	Disaster Emergency Committee
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
GAM	“Gerakan Aceh Merdeka”, the Free Aceh Movement; separatist group seeking independence for the Aceh region of Sumatra from Indonesia
GFDRR	Global Facility for Disaster Reduction and Recovery
HFA	Hyogo Framework for Action
ICAIOS	International Centre for Aceh and Indian Ocean Studies
IPCC	International Panel on Climate Change
LDC	Least Developed Country
LDCF	Least Developed Country Fund
NAPA	National Adaptation Programme for Action
NGO	Non-governmental organisation
OECD	Organisation for Economic Co-operation and Development
PU	<i>Pekerjaan Umum</i> – Ministry of Public Work – national, provincial and regional level
TDMRC	Tsunami and Disaster Mitigation Research Center
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
UNDRO	United Nations Disaster Relief Organization
UNISDR	United Nations Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
WMO	World Meteorological Organization



1 Introduction

Natural hazards can have a devastating impact on human life and the built environment, leading to natural disasters. A disaster event where houses, settlements and livelihoods get destroyed is commonly followed by a phase of housing reconstruction often involving a wide range of international, national, and local stakeholders. In Banda Aceh, Indonesia, the tsunami 2004 had a detrimental impact and led to a large reconstruction project. The process of giving victims a new home was managed within a relatively short period of time, however, due to inadequate planning laws and regulations, as well as a lack of monitoring, after the reconstruction as well as at the time of this investigation, people in Banda Aceh are still particularly vulnerable to the impact of natural hazards. This can be found as a common and repetitive outcome of reconstruction processes in low-income countries funded partially by the international community following natural disasters and is, amongst other reasons, closely linked to a lack of planning. Ninety percent of international aid funds are not allocated until *after* a natural disaster, namely for emergency aid and reconstruction.

However, after a disaster there is limited time for careful planning or to develop a master plan for the city which includes improvements regarding future natural hazard risk and this can lead to problems. In some instances, replacement buildings are less adjusted to local conditions than the original houses that were destroyed in the event, settlements get rebuilt in risk areas or people get relocated without possible livelihood options. This contradicts the idea of 'build back better' which was first set as a standard for housing reconstruction in the course of the United Nations' Sendai framework for Disaster Risk Reduction 2015-2030: "In the post-disaster recovery, rehabilitation and reconstruction phase, it is critical to prevent the creation of and to reduce disaster risk by "Building Back Better" and increasing public education and awareness of disaster risk." (UNISDR 2015c, 14) Every disaster is different, and every setting or context of a disaster is different. Therefore, there cannot be a general planning process for housing reconstruction. By experience, in the aftermaths of a disaster, international organisations step in and commonly each of them follow their own processes and regulations. This can also result in negative impacts, the opposite of what they first set out to achieve. For example, opportunities to adapt new settlements to current and future hazards are missed or local building traditions and methods get lost. As a result of the time pressure, "all-weather measures" as termed by Schönwandt et al. (2013, 39) get pulled out of the drawer, these are suitable for nearly every situation but at the same time barely provide a suitable solution for a specific planning context. In this case, planners start providing solutions without having a thorough look at the particular situation and present problem. In addition, this situation leads to a waste of international funding as well as misdirected development aid and creates a perpetuum mobile of destruction and reconstruction. Why is this and how can planning help to change this situation?

In November 2017 the World Bosai Forum took place in Sendai, Japan bringing together government representatives, international organisations, scientists, and practitioners working in the field of disaster risk reduction, emergency response, reconstruction and recovery. One essential topic across all sessions was a shift in emphasis from post-disaster to pre-disaster operations to allow a more efficient use of financial resources and offer maximum support for communities affected. This topic is at present also discussed in scientific discourse as well as in practical approaches and recommendations for action of organisations being active in this field.

1.1 Relevance of the topic and problem statement

In the aftermath of a disaster there is usually no time for problem-oriented planning as described above. Conversely, in an emergency situation, stress and disorder are coupled with limited resources. According to Lizarralde et al. (2014, 1) “rushed by the urgency of attending to immediate needs, reconstruction projects rarely develop into sustainable solutions in long term”. In addition to this, Duyne Barenstein (2014, 151) declares that states are not prepared for reconstruction through clearly defined pre-disaster policies which means “reconstruction policies are generally only designed following specific disasters”. She analysed numerous reconstruction outcomes, for example, projects in different regions of India and provides some sobering findings. She indicates that some states seem to be unprepared for reconstruction by lacking precisely determined pre-disaster policies. Reconstruction policies are usually only designed in the aftermath of a disaster and, additionally, the participation of the community is often limited to only a few consultations periods during the design process. Many residential reconstruction projects are developed using outside contractors with industrial materials and therefore local masons and artisans are not included in the building process (cf. Duyne Barenstein 2014, 151). At the same time, in many cases there is a significant amount of money, for instance, international aid, government funding or donations which must be used in a relatively short period of time. This lack of time during the reconstruction process, combined with a short availability of financial resources, leads to consequential problems such as uncoordinated help and maladjusted housing. According to Lizarralde et al. (2014, 8) “houses that are ill-adapted to local needs represent a second disaster (sometimes as dangerous as the original one).” An example of this would be the reconstruction of a settlement at the original unsafe site instead of a relocation. Moreover, Davis and Alexander (2015, 169f) state “severe costs are associated with overhasty reconstruction”. For instance, projects are built and finished but never get used, projects must be retrofitted because they are unsafe or unusable, and frequently, reconstruction projects interfere with or hinder future urban development. In that case, the monetary resources available after a disaster could be better invested more specifically, the accessible money provides opportunities that often cannot be used.

On the available evidence, natural hazards turn into disasters if people or societies fail to adjust to and to cope with the impact of the hazard. The adjustment of housing poses an especially important indicator in this regard and therefore is one of the main targets to put into focus. This is underlined by a commonly used quote, here from Cameron Sinclair, founder of Architecture for Humanity (McCay 2013): “It isn’t earthquakes that kill people, but badly designed and constructed buildings.” Erdelen (2005, 1) underlines this statement stating that “we may not be able to predict natural hazards but we do know how to minimize loss of life and property, through building codes, zoning, early warning systems and other forms of disaster preparedness and prevention. Yet, so often, the temptation is to wait until disaster strikes to act”. Natural hazards and the related consequences are jeopardizing poverty reduction in less developed countries. Societies hit by disasters get thrown back in their development to a greater or lesser extent. Strengthening precaution, adjustment, and self-help capacities in developing countries would contribute to alleviate poverty and to a socially just development of society (cf. GIZ 2012, 8). “Adaptation has therefore to be integrated into development planning in order to reach the development goals.” (Halsnaes and Laursen 2009, 86) So far, there is a gap between emergency response and long-term development, an issue discussed in detail in the work of Nina Svanda (2013).

There are many studies on reconstruction projects, often carried out by social scientists or planners⁷, on the quality and performance of the results. These investigations are completed for different disasters, in different places and over a long period of time with often very similar outcomes showing how seemingly the same mistakes are constantly made. This can be put down, in part, to the time pressure and lack of planning in the reconstruction phase after a disaster. For instance, resettlements are repetitively failing, usually with the same outcome. The new houses are either being abandoned, sold, or subleased while self-constructed houses are being re-built back in the original risky zones. Lessons learned hardly flow into subsequent reconstruction processes which leads to a situation of constant repetition of the same mistakes over again. As it is hardly possible to develop a working strategy for each single place, most findings end up leading to international standards which again are rather vague when it comes to actual implementation in the field.

According to Schönwandt et al. (2013, pp. 7-9) the core activity for planners is to solve complex problems, while planning is the conceptual anticipation of actions and therefore ultimately primary serves solving problems of different complexity. The adjustment of housing to existing and future expected natural hazards can be classified as a complex problem. Impulse for a planning process is a desire for change either to alter a situation or to prevent alteration in order to retain an initial state. For both alternatives, appropriate steps must be determined to solve the problem. A disaster, however, poses a different trigger where something must be done immediately, leaving insufficient time to develop a planning process specifically tailored to the problem context. The analysis of unsuccessful planning indicates an insufficient investigation of the initial situation. Schönwandt et al. (2013, p. 10) state, a vague formulation of the problem likely leads to the proposal of ineffective measures dissipating resources such as money and time. The result of planning here is still a change of the starting situation but potentially for the worse. A disaster event tends to move the focus on one particular problem while overseeing others, for instance, after the tsunami in Banda Aceh houses were rebuilt in the coastal area which encompasses the tsunami risk zone. The main goal set was the earthquake resistance of these new buildings with no consideration of the tsunami risk. Although, most Acehnese houses withstood the earthquake triggering the tsunami 2004 but were wiped out by the tsunami wave. Other natural hazards such as floods, landslides, or heat waves were not put into consideration. "Successful problem solving requires finding the right solution to the right problem. We fail more often because we solve the wrong problem than because we get the wrong solution to the right problem." (Ackhoff 1974, 8) A precise problem formulation implies to invest an adequate amount of time on the starting position rather than providing a quick solution. In the course of reconstruction after a disaster there is no time for this precise problem formulation, so instead of 'housing must be adjusted to natural hazards' the problem is determined as 'the people affected need houses'. To achieve a more problem oriented approach the focus must be put on pre-disaster urban development planning including indispensable preparation for a worst-case scenario. Numerous institutions and organisations address the issues of reconstruction after disaster, disaster risk reduction as well as the interface between both topics. The literature contains various approaches and notions linking reconstruction and disaster risk reduction mostly with general principles for different types of projects, however, they do not specifically deal with housing adjustment as part of urban development planning offering a precise planning process or planning instruments.

⁷ See for example, Davis and Alexander (2015), Davis (1978), Duyne Barenstein (2014), Lizarralde (2002, 2014), Tauber (2014).

1.2 Objective of the work

The aim of this work is a scientific reflexion on the implementation of pre-disaster housing adjustment to natural hazards in the course of urban development planning using the example of Banda Aceh, Indonesia as a selected study area. Lessons learned from post reconstruction processes and a preparation for a potential future reconstruction process pose important elements of these considerations. The objective of this research is to develop recommendations for action for an improvement of housing adjustment in situ and a better preparation for a potential reconstruction process in the near or distant future. These recommendations are outlined for the research area Banda Aceh and addressed to funding bodies as well as stakeholders intervening directly on the ground such as project managers and planners for an effective alignment of their activities concerning housing. The intended aim is to establish housing adjustment to natural hazards as an integrated component in everyday urban development planning and to develop an instrument for reconstruction processes following disasters incorporating this housing adjustment. This instrument enables the governmental institution to regulate the reconstruction process and control the direction of NGOs and exogenous help. Initially generated for the research area Banda Aceh, a possible application of the concept of this planning process to other locations can be investigated. Every planning context and every disaster is different, and yet there are still parallels, which is why certain measures and procedural steps can be applied to different areas, presenting an opportunity to share and exchange knowledge and experience. This requires a governmental institution that is set up on the ground and the inclusion of local community in planning, assessments, and regulations.

A focus on preventive adjustment of housing to natural hazards over subsequent reconstruction is more valuable for many reasons such as providing additional time for comprehensive planning, better integration of stakeholders and the community, possibility of knowledge sharing and incorporation of cultural characteristics. For this, a renewed planning process and adjusted planning instruments are needed. Further, it is important to consider the particular role and involvement of stakeholders as well as the components of the planning process. A lot of answers can be derived from experiences of reconstruction and lessons learned, therefore this thesis is largely based on examples and findings from reconstruction. The major concern of the work is to analyse the application of lessons learned from reconstruction processes concerning housing adjustment to natural hazards in urban development planning, to explain the opportunities and show possible future directions.

1.3 Approach and structure of the work

The arguments in this thesis are based on empirical research and literature review and can roughly be structured into general investigations and investigations on the city of Banda Aceh, Indonesia as presented in Figure 1 below.

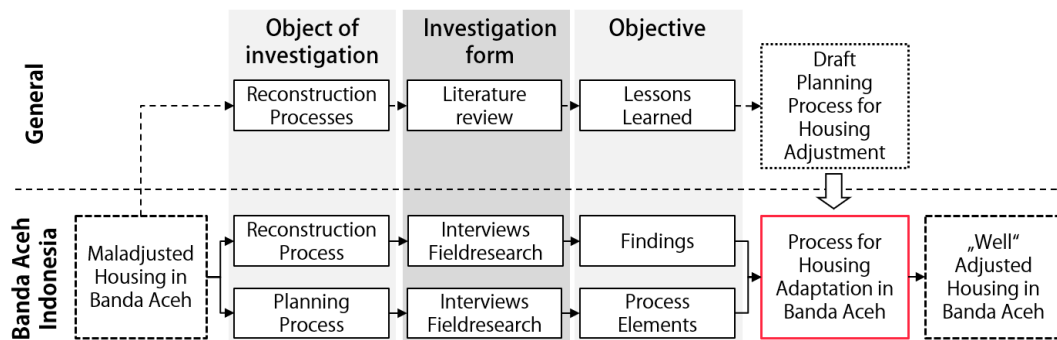


Figure 1. Investigation elements of the work as organisational chart; own diagram.

The work is built up in three parts, theoretical foundations (Chapter 2 - Chapter 6), field examination (Chapter 7 and Chapter 8), and outcomes (Chapter 9 and Chapter 10). Part one is based on a literature review including primary and secondary literature. In Chapter 2 fundamental concepts and theories are introduced in order to create a basis for further discussion. This demonstrates the results of a long and extensive underlying process of mapping out the problem statement within the fields of post-disaster recovery and long-term risk reduction. According to Bunge, terms are defined in the context of their scientific systems and hold knowledge. The designation of terms lifts them to the conceptual level where they develop into concepts. Concepts must be defined from within the problem statement which opens a process of clearance between the definition of concepts and the specification of the problem (cf. Bunge 1998, 121,132). Chapter 3 to 5 provide a further containment of the thematic field through discussing relevant theories and clarifying perspectives from various disciplines and subject areas. The topic of this work concerns, amongst others, the areas of planning, engineering, social science, political science, and development financing. With a background in architecture and urban planning the author of this work writes primarily from the point of the planner, hence the concepts 'housing' and 'planning' represent an important element in this first part. Here Smith's (2013) disaster reduction strategy, characteristics of well-adjusted housing as well as the idea of planning instruments based on Heidemann (1996) and Jung (2008) are introduced providing the foundation for the discussion in part three. Chapter 4.3 also discusses the role of the planner regarding housing adjustment as it is defined in this work. Chapter 5 puts a special focus on the subject matter development aid and actors involved in housing adjustment or reconstruction projects in low-income countries. This discussion is held inter alia on the basis of Kessler (2014, 81) who states, "the availability of money for urban development come laden with cultural values and development standards of the lenders". Here, the challenges, benefits, and possible difficulties of exogenous international influence on low-income societies are critically examined due to the fact that international stakeholders tend to have a significant influence when it comes to reconstruction after a disaster and since the author herself writes from the perspective of an external observer. Chapter 6 acts as a resume subsuming the main points of the theoretical framework leading over to the field examination.

The second part of the work concentrates on the field study in Banda Aceh, Indonesia conducted within the framework of this thesis. After an analysis of several reconstruction projects at different sites such as Cambodia, Sri Lanka, India, Indonesia through literature reviews, contacts or site visits, Banda Aceh on the Island of Sumatra was selected as the main area of investigation. The research

concentrates on the handling of housing reconstruction after the Indian Ocean tsunami experienced in December 2004 as well as the everyday planning concerning housing within the municipality. The exact procedure of the empirical study is explained in Chapter 7 followed by an introduction to the characteristics and context of the research area Banda Aceh. The main focus of this part lays on the findings derived from the interviews supplemented by observation of the author and data analysis. This material is supplemented by materials published by international organisations, departments and public authorities as well as documents of the city of Banda Aceh, primarily for a description of the starting situation in Banda Aceh and the details of the tsunami event including the subsequent procedures. Personal sojourns, on-site experience, and a collaboration with the local research institute International Centre for Aceh and Indian Ocean Studies ICAIOS in the role of a guest researcher complete the picture. The study included 33 semi-structured in-depth interviews with actors of the current planning process for housing development and of the previous housing reconstruction from 2005 to 2009. During reconstruction, actors were involved in the process either through the city of Banda Aceh, the national reconstruction and rehabilitation agency BRR or local respectively international organisations. Actors involved in the current planning process are either within the city planning authority or through their role as planners. This is complemented with actors of the educational system, training future planners. Most interview partners are or were involved in both processes. The first issue of examination is the reconstruction process after the tsunami, looking at stakeholders involved, results, lessons learned, shortcomings and success with a focus on housing adjustment to natural hazards. The second issue assessed is the current planning process for housing in Banda Aceh, again looking at stakeholders and procedures. By comparing both issues the aim is to identify direct links between reconstruction and current planning for housing. The influence of natural hazard vulnerability and lessons learned from both, failures and success in reconstruction is analysed. Additionally, the handling of a potential future reconstruction process for Banda Aceh is investigated. In addition to the findings, lessons learned from other reconstruction projects are briefly reviewed to emphasise the subject of repetition within this field.

A proactive urban development planning for anticipatory adjustment of housing to natural hazards as well as a “reconstruction template” as post-disaster strategy are compiled in the final section. These act as recommendations of action along with an abstract of planning instruments representing an essential component of these planning processes. The work concludes with a reflection of the implementation of the suggested processes of planning and planning instruments, commanding institutions in Banda Aceh and a brief examination of the consequences for international institutions and external planners regarding their potentially altered roles.

2 Concepts and instruments to handle natural hazards in the context of housing

In the following section, fundamental concepts which are used in this work are defined within the context of the research field. Further, the theoretical framework is outlined, theories are introduced, and approaches are presented to differentiate the subject.

2.1 Definitions and principles

The following explanations of key concepts have been derived from common definitions and adapted to the central question addressed in this work. Concepts in this thematic field are often assigned with disparate meanings in the academic literature. In the context of this work, the application of concepts is based exclusively on the definitions hereinafter.

2.1.1 Natural hazard

The term natural hazard used in this thesis is based on the definition of Jha et al. (2010, 364) where it is described as a “natural process or phenomenon that may cause loss of life, injury and other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental degradation”. This definition is widely used in the literature and is suitable for hazards such as earthquakes and volcanic eruptions with a ‘natural’ origin of damaging processes however it neglects the anthropogenic influence effecting the severity of the hazard. “Although all ‘natural hazards’ are triggered by physical forces, certain events and their outcomes may be influenced by human actions, whether deliberate or unintended.” (Smith 2013, 5) Therefore, some types of natural hazards become quasi-natural-hazards. For instance, tidal flood events in coastal areas may be unintentionally worsened by deforestation of an existing mangrove belt. Another term that is occasionally used is socio-natural hazard. This occurs when “an increase in either the frequency or severity of hazardous physical events can be attributed to degraded land or over-exploited resources”. (Smith 2013, 5) However, for the purpose of simplification in the following, the term ‘natural hazard’ will be used without the outlined differentiation.

A: Hydrometeorological hazards

Meteorological hazard

“short-lived/small to meso-scale atmospheric processes (in the spectrum from minutes to days)” (Jha, et al. 2010, 364)

Table 2.1 Hydrometeorological hazards. Source: Jha et al. (2010, 364); modified

Main type	Sub-type	Sub-sub-type
Storm	Extra-tropical storm	
	Tropical storm	
	Convective storm	Derecho Hail Lightning/thunderstorm Rain Tornado Sand/dust storm Winter storm/blizzard Storm/surge Wind
Extreme temperature	Cold wave Heat wave	
	Severe winter conditions	Snow/ice Frost/freeze
Fog		

Hydrological hazard

“deviations in the normal water cycle and/or overflow of bodies of water caused by wind set-up” (Jha, et al. 2010, 363)

Table 2.2 Hydrological hazards. Source: Jha et al. (2010, 363); modified

Main type	Sub-type	Sub-sub-type
Flood	Coastal flood Riverine flood Flash flood Ice jam flood	
Landslide	Avalanche (snow, debris, mudflow, rockfall)	
Wave action	Rogue wave Seiche	

Climatological hazard

“long-lived/meso- to macro-scale processes (in the spectrum from intraseasonal to multi-decadal climate variability)” (Jha, et al. 2010, 361)

Table 2.3 Climatological hazards. Source: Jha et al. (2010, 361); modified

Main type	Sub-type	Sub-sub-type
Drought		
Glacial Lake Outburst		
Wildfire	Forest Fire Land fire: Brush, bush, Pasture	

B: Geophysical hazard

originating from solid earth

“Geological process or phenomenon that may cause loss of life, injury, and other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental degradation.”

“Seismic events [...] related to the motion of the earth’s tectonic plates.” (Jha, et al. 2010, 363)

Table 2.4 Geophysical hazards. Source: Jha et al. (2010, 363); modified

Main type	Sub-type	Sub-sub-type
Earthquake	Ground shaking Tsunami	
Mass Movement		
Volcanic activity	Ash fall Lahar Pyroclastic flow Lava flow	

C: Biological hazard

“A hazard caused by the exposure to living organisms and their toxic substances (e.g. venom, mold) or vector-borne diseases that they may carry. Examples are venomous wildlife and insects, poisonous plants, and mosquitoes carrying disease-causing agents such as parasites, bacteria, or viruses (e.g. malaria).” (CRED 2009)

Table 2.5 Biological hazards. Source: CRED (2009); modified

Main type	Sub-type	Sub-sub-type
Epidemic	Viral Disease Bacterial Disease Parasitic Disease Fungal Disease Prion Disease	
Insect infestation	Grasshopper Locust	
Animal Accident		

D: Extraterrestrial hazard

“A hazard caused by asteroids, meteoroids, and comets as they pass near-earth, enter the Earth’s atmosphere, and/or strike the Earth, and by changes in interplanetary conditions that effect the Earth’s magnetosphere, ionosphere, and thermosphere.” (CRED 2009)

Table 2.6 Extraterrestrial hazards. Source: CRED (2009); modified

Main type	Sub-type	Sub-sub-type
Impact	Airburst	
Space weather	Energetic particles Geomagnetic storm Shockwave	

The focus of the following concentrates on the natural hazard subgroups climatological, meteorological, hydrological, and geophysical hazards.

There are various impacts of natural hazards as shown in Figure 2, including health risks, loss of livelihood, direct mortality, loss of property, damage of homes and other damages, e.g. damages to infrastructure or services. These impacts are closely connected and therefore cannot be considered separately. For housing, all factors have an impact as discussed in the definition of the term in Chapter 3.1. Smith (cf. 2013, 11) states hazards can have threats to people – death, injury, disease, mental stress; to goods – property damage, economic loss; as well as to the environment - loss of flora and fauna, pollution, loss of amenity.

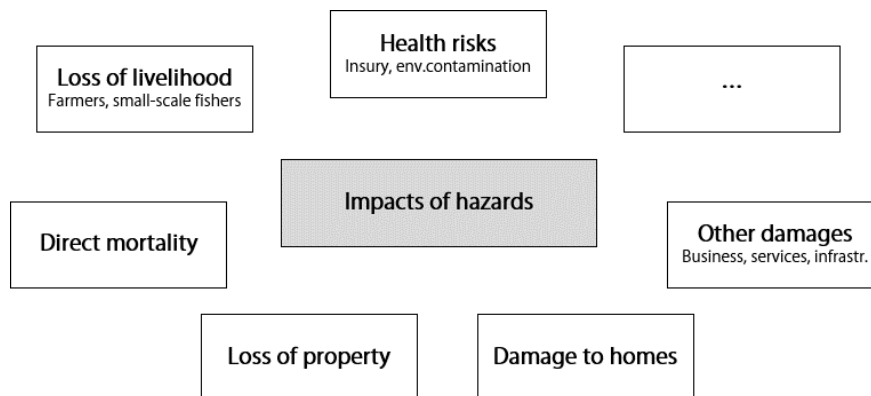


Figure 2. Impacts of hazards; own diagram.

Some natural hazards are influenced by climate change, for example droughts, sea-level related hazards, severe storms, heat waves, wildfires, and floods. Additionally, there are other hazards that are not directly linked to climate change such as volcanic eruptions, tsunamis and earthquakes, but they still offer important lessons concerning adjustment (cf. Glavovic and Smith 2014b, 2). Therefore, all the hazards defined above will be equivalent objects of investigation. Apart from natural hazards there are technological or anthropogenic hazards. Even though the focus in this thesis is put on natural hazards it is important to note that these natural hazards, through certain processes, can be coupled with or trigger technological or anthropogenic hazards. One example to

illustrate this correlation is the earthquake and tsunami in March 2011 in Tohoku, Japan which triggered the Fukushima Daiichi nuclear disaster (cf. Glavovic and Smith 2014b, 6).

2.1.2 Natural disaster

The United Nations International Strategy for Disaster Risk Reduction (UNISDR) defines a disaster as “a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources” (Lizarralde, Johnson and Davidson 2014, 3), a definition which is widely used and commonly accepted by international organisations. It is extended by the comment: “Disasters are often described as a result of the combination of: the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts may include loss of life, injury, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation.” (UNISDR 2017) Disasters that are triggered by natural hazards are defined as natural disasters. In the context of this thesis, damage and destruction due to disaster are primarily focused on housing, as defined in Chapter 3.

According to Glavovic and Smith (2014b, 6) it has been known for a long time that natural hazards or extreme events “do not always result in disasters (White 1936, 1945; Burton et al. 1968, 1993)”. On this basis and derived from the Intergovernmental Panel on Climate Change, IPCC (cf. IPCC 2012, 558) definition, in the course of this work, a natural disaster occurs when a natural hazard is interacting with vulnerable social conditions and therefore causes disruptive alterations in the normal functioning of a community or a society. This leads to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery if local coping capacity is overwhelmed. In the definition of EM-DAT, an event must meet at least one of the following criteria to be recorded as a natural disaster: “Ten or more people reported killed; 100 or more people reported affected; Declaration of a state of emergency or; Call for international assistance” (CRED 2015b, 9).

The impact of a disaster can be felt both nationally and locally. While on the one hand vast disasters with a sudden impact are likely to destroy communities immediately, on the other hand there are slow-onset disasters as for example droughts that gradually destroy the social and economic fabric of communities and nations little by little over a long period of time (cf. Kellett and Caravani 2013, 2). Between 1994 and 2013 globally 6,873 natural disasters were reported causing the loss of 1.35 million lives or 68,000 annually on average. Additionally, approximately 218 million people worldwide were affected by natural disasters per year. Affected, following the definition of CRED (2015b, 10), means “people requiring immediate assistance during a period of emergency, including displaced or evacuated people”. In terms of frequency and the number of people killed and affected, Asia tops the chart as shown in Figure 3. This is mainly due to its large landmass with a generally high risk from natural hazards and a high population density often living in disaster-prone regions. According to the Center of Research on the Epidemiology of Disasters (cf. CRED 2015b, 9f), the frequency of climate-related natural disasters such as storms and floods increased over these twenty years of data recording while the number of geophysical disasters has remained more or less the same.

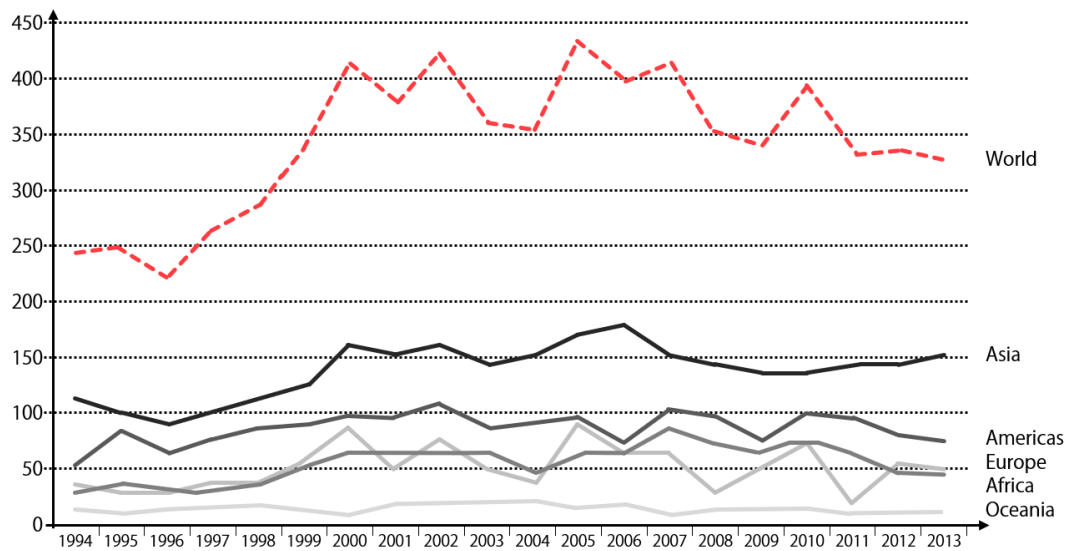


Figure 3. Number of disasters worldwide and by continent over the period 1994-2013. Source: CRED (2009, 11); modified.

Since the 1980s there has been a strong increase in the amount of disasters reported which can be explained with various reasons. Within this period of time there has been a remarkable development in media and telecommunication leading to more reporting of disaster events. Further, there is a closer international cooperation in this field. Closely related to this is that more disasters are reported as a result of recent increases in international funds. This is especially the case in regards to small disasters. Atop of this there has been an active data collection effort for example by CRED starting from 1971 (cf. CRED 2015, para.1). A rise in the number of disasters can also be explained by factors such as long-term anthropological impacts discussed in Chapter 2.2 as well as a growing population settling in risk prone areas. For example, socially segregated urban development can generate disaster risk when low-income households are forced to occupy hazard-exposed areas with high levels of environmental degradation (cf. UNISDR 2015, vii). However, in spite of all this, there is a noticeable rise in frequency and impact of certain types of natural hazards which can be linked to climate change. There is evidence that climate change has an influence on severity, frequency as well as spatial distribution of hydrometeorological – hydrological, meteorological, climatological – events (cf. Jha, et al. 2010, 343).

Climate is defined as “the average course or condition of the weather at a place usually over a period of years as exhibited by temperature, wind velocity, and precipitation” (Merriam-Webster 1982, para.2). Inspired by Hulme, the term climate change in this thesis is used to describe “a past, present or future change in climate, with the implication that the predominant – but not exclusive – cause of this change is human in origin” (Hulme 2009, xxxviiiif). The term can be prefaced with ‘natural’, which corresponds to the technical usage by the Intergovernmental Panel on Climate Change (IPCC) and means “climate change irrespective of cause” (Hulme 2009, xxxviiiif). It can also be prefaced with ‘anthropogenic’ which signifies that climate change is caused by human-induced emissions of greenhouse gases, commonly described by the term global warming (cf. Hulme 2009, xxxviiiif). There are a number of different consequences that anthropogenic and natural climate change is creating.

Changes in precipitation patterns lead to limited freshwater resources and can cause an increase in extreme weather events such as droughts, heavy rains and floods. Moreover, there are an increasing number of storms and hurricanes. The sea level is rising due to melting glaciers and polar caps as well as steadily warming oceans. This poses a threat to coastal areas and big river deltas, where millions of people live (cf. Parry, et al. 2007, 25). Changes in weather patterns are now occurring faster and extreme events are becoming stronger and more frequent (cf. Halsnaes and Laursen 2009, 83), and as climate change proceeds, there will be extreme weather events in areas and regions where they either did not exist before or did not occur to this extent (cf. GIZ 2012, 4). This means extreme weather events will increase in both intensity and regional expansion and additionally intensify in length and frequency. All of these factors lead to an enhanced risk of natural disasters. The number of weather related disasters has nearly tripled since 1980 (cf. GIZ 2012, 4) and there is a recognisable increase in the number of disasters since the beginning of record keeping as shown in Figure 4 (cf. Walch 2010, 7). This sharp increase in the number of natural disasters between 1900 and 2009, must be interpreted with care in the light of the foregoing considerations. Nevertheless, an increase in global natural disasters can be observed.

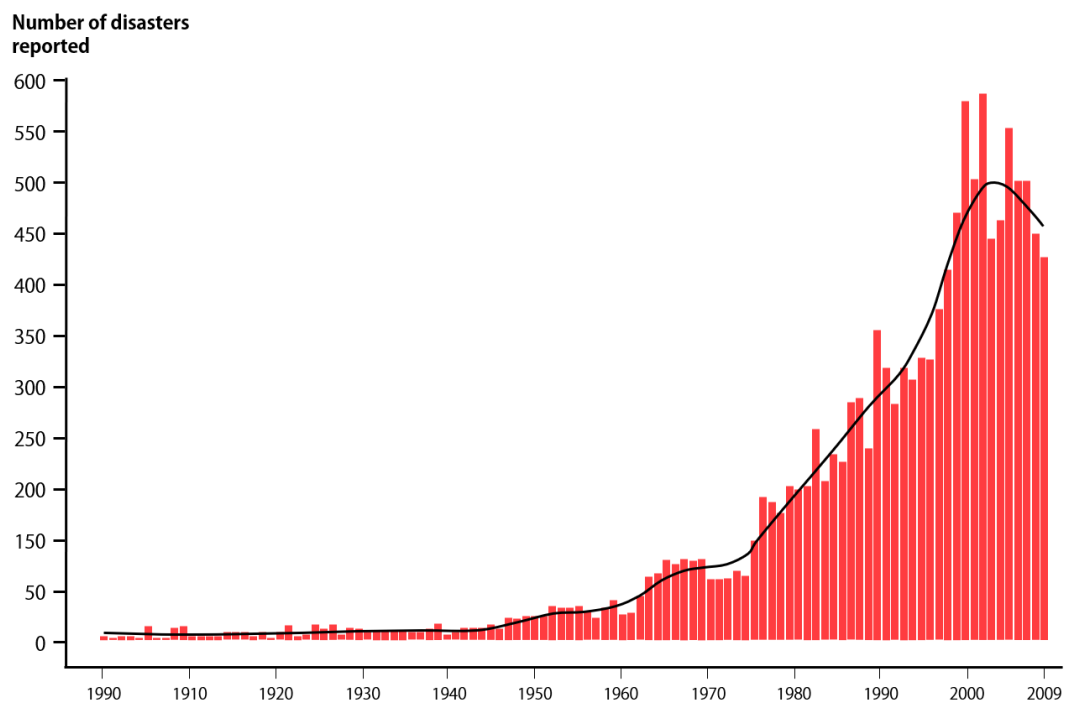


Figure 4. Natural disasters reported 1900-2009. Source: Walch (2010, 7); modified.

As presented in Figure 5, flooding caused the majority of disasters between 1994 and 2013 affecting 2.5 billion people. Storms were the most expensive disaster type costing USD 936 billion and the second most costly in terms of lives lost. Earthquakes caused the highest loss in lives between 1994 and 2013. In this period 750,000 lives were lost through this disaster type, primarily through its sub-type tsunami (cf. CRED 2015b, 16). Houses were mainly damaged through flood events, followed by earthquakes and storms, see Figure 6. In this 20 year period, 91 percent of all natural disasters reported were caused by climate related events, 71 percent of which by floods and storms (CRED 2015b, 15).

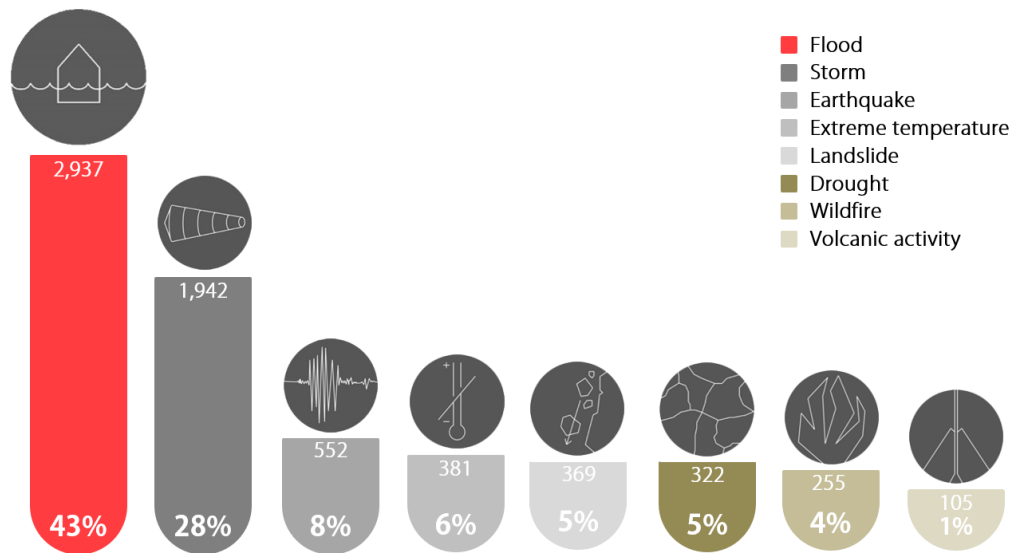


Figure 5. Share of occurrence of natural disasters by disaster type 1994-2013. Source: CRED (2015b, 16); modified.

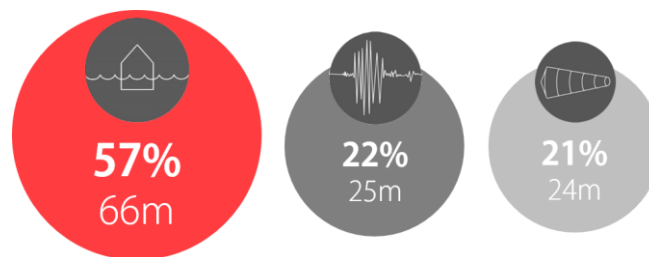


Figure 6. Houses damaged per disaster type 1994-2013. Source: CRED (2015b, 32); modified.

As Figure 7 shows, while the number of people affected is decreasing over these twenty years, the death rates increased. Three major disasters – Indian Ocean Tsunami 2004, Haitian Earthquake 2010, Cyclone Nargis 2008 – have a strong impact on the death toll. However, the trend remains upward even if these three events are excluded. Besides other determinants, national preparedness as well as efficiency of response have an impact on death tolls (CRED 2015b, 14). Further, there is a connection between disaster risk and poverty. In the recording time between 1994 and 2013, the death toll in low-income countries was more than three times higher as in high income countries, while the latter experienced the majority of natural disasters. For example, low and middle income countries suffered 91 percent of all deaths from storm events while experiencing only 34 percent of the global total of such events (CRED 2015b, 21,28). Both topics will be further discussed in Chapter 2.2.2.

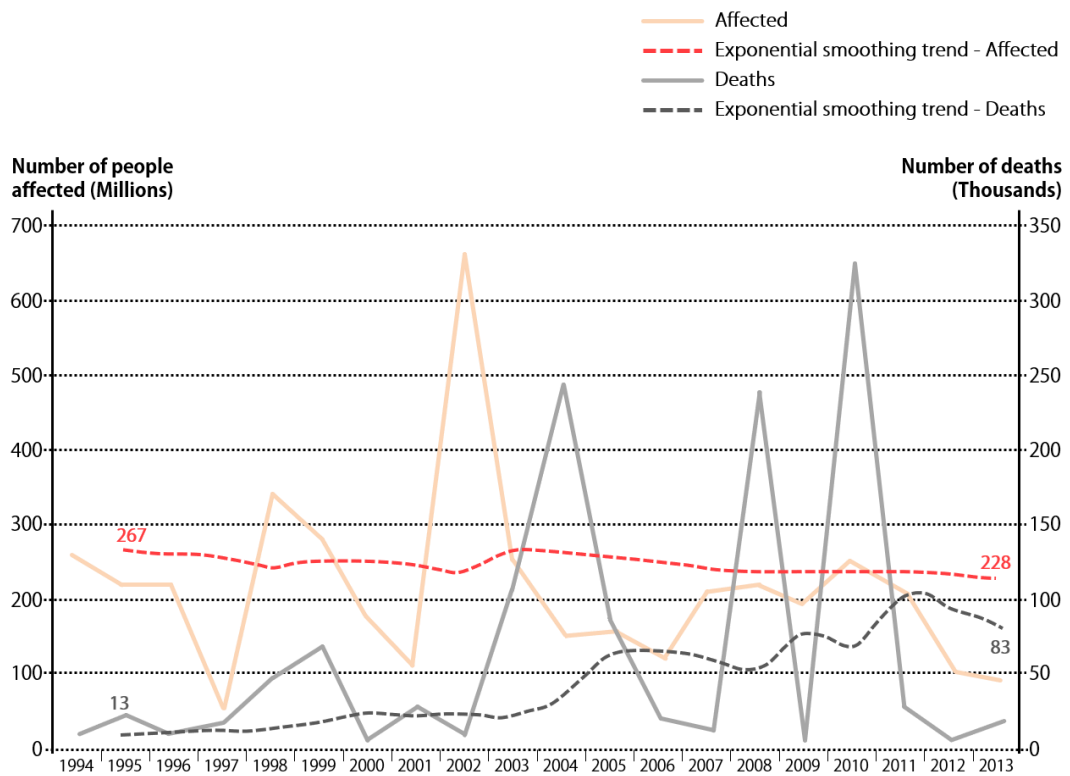


Figure 7. Number of people affected & killed annually by natural disasters worldwide 1994-2013. Source: CRED (2015b, 14); modified.

According to recent estimates of the World Bank (2018), “by 2030, climate change and natural disasters may cost cities worldwide \$314 billion each year, and push 77 million more urban residents into poverty”. Financial losses are more likely to occur in wealthier nations due to their greater probability of having assets to damage or lose combined with the probable greater value of those assets, see Figure 8. However, an extensive financial impact is also seen in low-income countries (cf. Kellett and Caravani 2013, 9). The ranking of economic losses is led by low and lower middle income countries as Figure 9 presents, if the losses are compared to the GDP.

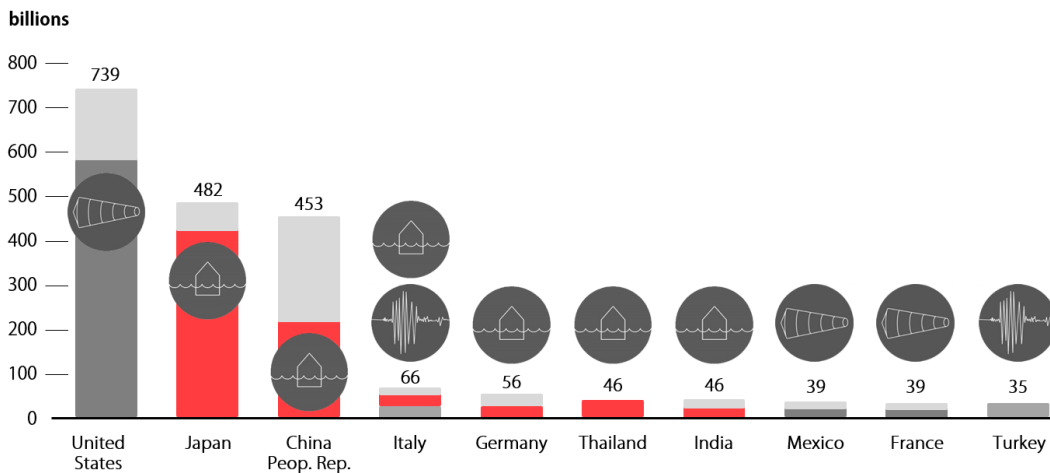


Figure 8. Top 10 countries reporting economic losses from natural disasters in absolute values (USD) 1994-2013. Source: CRED (2015b, 41); modified.

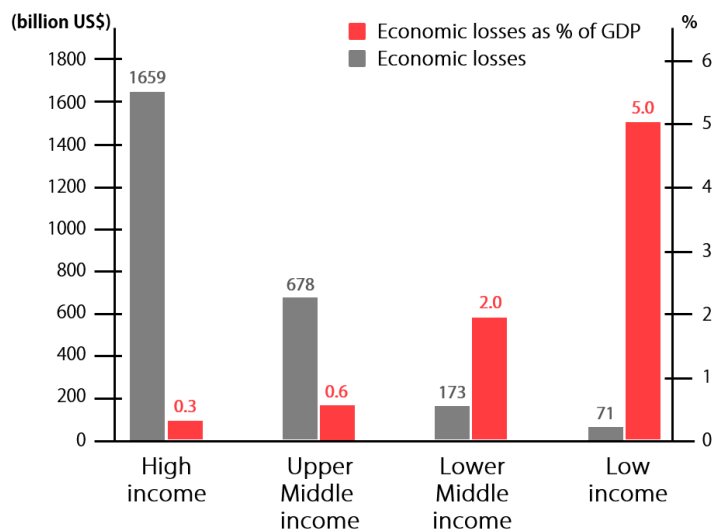


Figure 9. Economic losses in absolute values and compared to GDP. Source: CRED (2015b, 40); modified.

Disasters have a particular impact on international development. During the 20 years between the Earth Summit in Rio de Janeiro in 1992 and 2012 the overall damage caused by natural disasters came to USD 2.0 trillion and thus similar to 25 years of total Overseas Development Aid⁸. As an example, Table 2.7 shows the sum of total damage and losses compared to disaster risk reduction (DRR) financing between 1991 and 2010 in Indonesia. The amount of damage and losses caused by disasters greatly exceeds the amount spent on disaster prevention, constituting an instance of

⁸ OECD – <http://stats.oecd.org>: ODA from 1986-2010 totals approximately USD 1.7 trillion.

maladministration which will be discussed further in Chapter 2.2.2 - Vulnerability. In this context, it should not be disregarded that these traditional calculations of damage and losses (including the DaLA⁹ methodology used by Kellett and Caravani (2013, 10)) only include tangible costs. All the costs that do not have a market price, as for example psychological impacts of losing a house, or other social and cultural factors such as the loss of social ties are not included. These aspects have a significant influence on people's lives and turn recovery from a disaster into an even harder and more expensive process. This in turn has sparked an increase in literature that examines ways to integrate these intangible costs into the total cost assessments of disasters (cf. Kellett and Caravani 2013, 9).

Table 2.7. Disaster losses compared to DRR financing, Indonesia. Source: Kellett and Caravani (2013, 9); modified

Indonesia (1991-2010):

Sum of total damage and losses (USD millions): 10,166.0

DRR financing (USD millions): 1,439.2

6 Damage and Loss Assessments (DaLA) undertaken

2.2 Link between post-disaster recovery and long-term risk reduction

Post-disaster recovery and long-term risk reduction are in some respects closely connected. Recovery can have an impact on future risk reduction. While both approaches follow similar principles they usually are applied concurrently and independently. There are theories that attempt to link both approaches and thereby already incorporate risk mitigation in the reconstruction process. In the 1980s there was a paradigm shift where relief, rehabilitation, and development were no longer seen as separate steps that happen consecutive but as simultaneously connected, an idea which is discussed in more detail in Chapter 2.4. The following subchapters set a basis for an understanding by introducing the underlying theories and approaches.

2.2.1 Hazard paradigms

Historically, disasters often were seen as a punishment from God for moral misbehaviour and therefore were accepted as external inevitable events. Later, people learned to avoid settling in hazard-prone sites before efforts were made to reduce the harm of natural hazards. This approach led to the generation of the four hazard paradigms presented in Table 2.8. (cf. Smith 2013, 14).

⁹ "The Damage and Loss Assessment (DaLA) Methodology was initially developed by the UN Economic Commission for Latin America and the Caribbean (UN-ECLAC) in 1972. [...] The DaLA Methodology bases its assessments on the overall economy of the affected country. It uses the national accounts and statistics of the country government as baseline data to assess damage and loss. It also factors in the impact of disasters on individual livelihoods and incomes to fully define the needs for recovery and reconstruction." (GFDRR 2019).

Table 2.8. The evolution of hazard paradigms. Source: Smith (2013, 15); modified

Period	Paradigm name	Main issues	Main responses
Pre-1950	Engineering	What are the physical causes for the magnitude frequency of natural hazards at certain sites and how can protection be provided against them?	Scientific weather forecasting and large structures designed and build to defend against natural hazards, especially those of hydro-meteorological origin.
1950-70	Behavioural	Why do natural hazards create deaths and economic damage in the MDCs (More Developed Countries) and how can changes in human behaviour minimize risk?	Improved short-term warning and better long-term land planning so that humans can adapt and avoid sites prone to natural hazards.
1970-90	Development	Why do people in the LDCs (Least Developed Countries ¹⁰) suffer so severely in natural disasters and what are the historical and current socio-economic causes of this situation?	Greater awareness of human vulnerability to disaster and an understanding of how low economic development and dependency contribute to disaster.
1990-	Complexity	How can disaster impacts be reduced in a sustainable way in the future, especially for the poorest people in an unequal and rapidly changing world?	Emphasis on the complicated interactions between natural and human systems, leading to improvement in the long-term management of hazards according to local needs.

¹⁰ United Nations' criteria of LDCs: (a) a low income, as measured by the gross domestic product (GDP) per capita; (b) weak human resources, as measured by a composite index (Augmented Physical Quality of Life Index) based on indicators of life expectancy at birth, per capita calorie intake, combined primary and secondary school enrolment, and adult literacy; (c) a low level of economic diversification, as measured by a composite index (Economic Diversification Index) based on the share of manufacturing in GDP, the share of the labour force in industry, annual percapita commercial energy consumption, and UNCTAD's merchandise export concentration index (UN 2000, 1).

Engineering paradigm

The engineering paradigm roots from the construction of the first dams around 4,000 years ago. Correspondingly, for at least 2,000 years, buildings are being adapted to become earthquake resistant. The two principles of this paradigm are hardening of structures and evacuation of people, these root in the civil sciences and earth sciences (Figure 11). Later, at the end of the 19th century, weather forecasts and storm warnings were added as instruments and until today this paradigm is an important strategy (cf. Smith 2013, 14). Following this approach, settlements or people are harmed by hazards that result from a natural process and therefore need to be protected. The main focus lays on the hazard as presented in Figure 10.

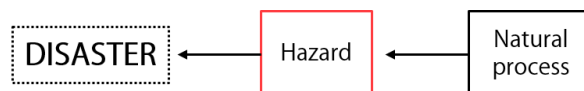


Figure 10. Engineering paradigm; own diagram.

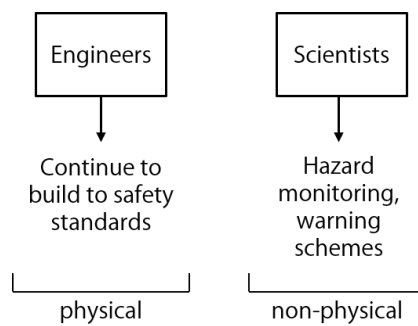


Figure 11. Engineering paradigm instruments; own diagram.

Behavioural paradigm

Gilbert White, an American geographer initiated the behavioural paradigm. He pointed out the link between natural disaster and societal decisions to settle and develop hazard prone land and with this introduced the social perspective of human ecology. “Human ecology links the physical and social sciences to provide a more balanced approach to resolving the conflicts that arise between human needs and the sustainability of the environment.” (Smith 2013, 14f) White suggests adapting human behaviour instead of trying to control natural hazards. This approach is based on the interactions between hazards and humans and adds societal decisions based on human needs to the approach as shown in Figure 12. These decisions are often rooted in economic reasons and include, for example, the choice of location to settle but also issues of human interventions such as deforestation.

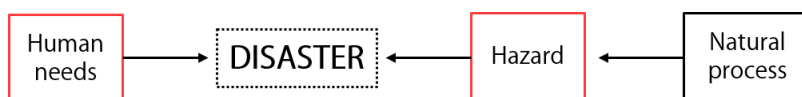


Figure 12. Behavioural paradigm; own diagram.

Following the paradigm, the interactive relation between humans and the environment defines the well-being of both. The definition of natural hazard is extended by quasi-natural hazards described previously. As shown in Figure 13, the behavioural paradigm leads to a mixed approach with both, control over nature or adjustment of behaviour. For instance, the introduction of insurances or an improved land-use planning. However, within this paradigm, technical solutions were still dominating and led to the belief that technology transfer, which is based on a general modernisation process, would fix the problem of disasters in less developed countries. Therefore, this paradigm is criticised as an “essentially Western interpretation of disaster” (Smith 2013, 16), being materialistic and putting inadequate faith in technology and capitalism which likely results in quick short-term measures (cf. Smith 2013, 16).

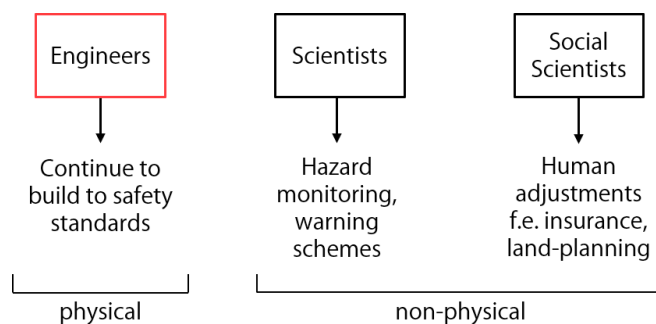


Figure 13. Behavioural paradigm instruments; own diagram.

Development paradigm

During the 1970s social scientists introduced the development paradigm. It was driven by the awareness that disasters create more severe impacts in less developed countries due to the mechanisms of global economy and the marginalisation of disadvantaged people. The approach recognises that the problem which triggers a disaster lays underneath and roots deeper, for example in poverty. Therefore, single projects or actions have little effect. Instead, a change in economic, social, and political systems is needed. In the model demonstrated in Figure 14, human vulnerability caused by socio-economic processes is introduced as another factor. This follows the approach that disasters are mainly caused by human exploitation which discriminates the poor. This phenomenon can be found in the economic and political system, both nationally and globally (cf. Smith 2013, 15,17).



Figure 14. Development paradigm; own diagram.

Disadvantaged people are forced to live and settle in dangerous areas while at the same time lack resources at all levels to effectively respond to local natural hazards. With this, so-called normality is an illusion. Following this paradigm, for a realistic disaster reduction, fundamental changes need to happen including a re-distribution of wealth and power. A modernisation process paired with the reliance on imported technologies is considered inadequate. As a result, a more sensible approach is seen in self-help, using traditional knowledge and locally negotiated solutions (cf. Smith 2013, 17).

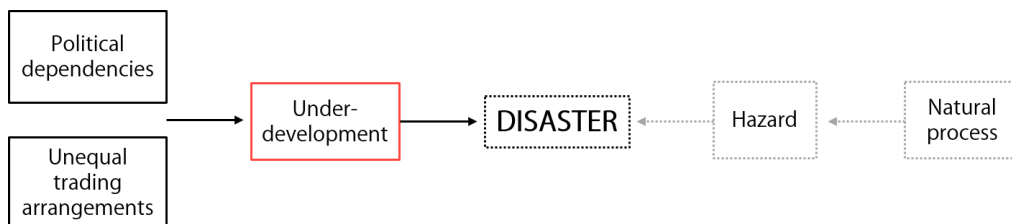


Figure 15. Development paradigm, root causes; own diagram.

In short, shown in Figure 15, disasters originate from underdevelopment in consequence of political dependency and unequal trading arrangements rooted in capitalism. The natural hazard itself fades into the background. This illustrates that humanitarian aid cannot be a permanent solution for low-lying socio-economic problems (cf. Smith 2013, 17). The question of development is discussed further in Chapter 5.

Complexity paradigm

More recently, both paradigms, the behavioural and the development paradigm, were seen as insufficient which opened the path for a new approach where disasters are the outcome of interactions between different variables. These variables may be physical, technological, societal, or institutional. The complexity paradigm “looks beyond local, short-term loss reduction in order to mesh disaster reduction with a realistic development agenda” (Smith 2013, 18f). The focus shifts from preparedness and emergency response towards mitigation. Mitigation here includes both long-term recovery and improvement as well as societal issues, for example vulnerability. Further, within this paradigm hazards and disasters are imbedded within global issues such as climate change. Humans are both simultaneously the victims and contributors to hazardous processes (cf. Smith 2013, 18f). Disasters occur at the interface between natural systems and human systems. In contrast to previous paradigms, the complexity paradigm gives both sides an equal emphasis as shown in Figure 16.

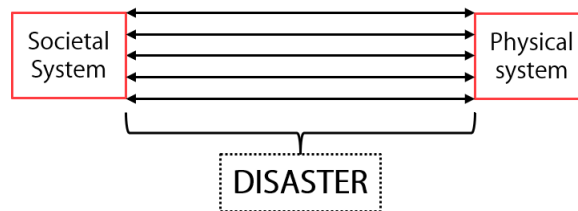


Figure 16. Complexity paradigm; own diagram.

Following this, the characteristics of the societal and physical system, and the interactions between both, define disaster impacts. This paradigm opens the platform for an interdisciplinarity in disaster reduction. According to this approach, a catastrophic chain of events leads to a disaster. Therefore, “intercepting events and breaking this chain could prevent, or reduce, the scale of evolving disasters” (Smith 2013, 47f).

2.2.2 Vulnerability

According to Lizarralde et al. (2014, 1), “natural disasters are not really natural (in the sense that they are not exclusively the result of natural phenomena; they are the result of the fragile relations between the natural and built environments)”. An example of this interrelationship, closely related to the quality of housing, is the earthquake 2010 in Port-au-Prince, Haiti. Here, a natural hazard turned into a disaster (as previously defined in Chapter 2.1.2) and officials who were engaged in relief and recovery characterised the event as “a construction disaster” that was “made worse by an earthquake” (Kessler 2014, 84). This shows the vulnerability of poorly built cities or communities towards natural hazards. The earthquake hit on January 12th, 2010 with a 7.3 magnitude and impacted an estimated 3 million people. Up to 300,000 people were killed and another 300,000 were injured while 1.5 million people lost their homes. A total of 50-80 percent of all residential and commercial buildings in Port-au-Prince and the surrounding areas were destroyed or were severely damaged. By comparison, the earthquake in Chile with a magnitude of 8.8, occurring on February 27th, 2010 caused only 300 fatalities. One explanation for this significant difference between these two earthquakes is the quality of construction since the Chilean government enforces a strict building code (cf. Kessler 2014, 76f). To further explain this situation, the concept of vulnerability has been introduced by geographers, anthropologists, and other specialists in social sciences (cf.

Lizarralde, Johnson and Davidson 2014, 3). One influential element is the failure of people to adapt to, and cope with, a natural hazard or an extreme event. This occurs during a hazardous natural event which is rare within its statistical reference distribution at a particular location.

There is no such thing as a 'natural' disaster, only a disaster caused by a natural hazard, as previously highlighted in Chapter 2.1.2. According to the transposed definitions, disasters happen because "there is a limit of destruction beyond which societies cannot cope with their own resources" (Lizarralde, Johnson and Davidson 2014, 3) which can be explained with the concept of vulnerability. The term vulnerability is defined by the United Nations International Strategy for Disaster Reduction (UNISDR 2017, para.106) as "the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards".

There are a number of different concepts for vulnerability; one of them is the pressure and release model by Ben Wisner, Piers Blaikie, Terry Cannon and Ian Davis presented in Figure 17. While the model shows that risk is the result of hazard exposure and vulnerability it also points out drivers of vulnerability. There are root causes, as for example, limited access to resources leading to dynamic pressures caused by social, political, economic, and cultural factors in the system. This results in unsafe conditions such as unprotected buildings and infrastructure or a lack of disaster preparedness and altogether accounts for the degree of vulnerability (cf. Lizarralde, Johnson and Davidson 2014, 3).

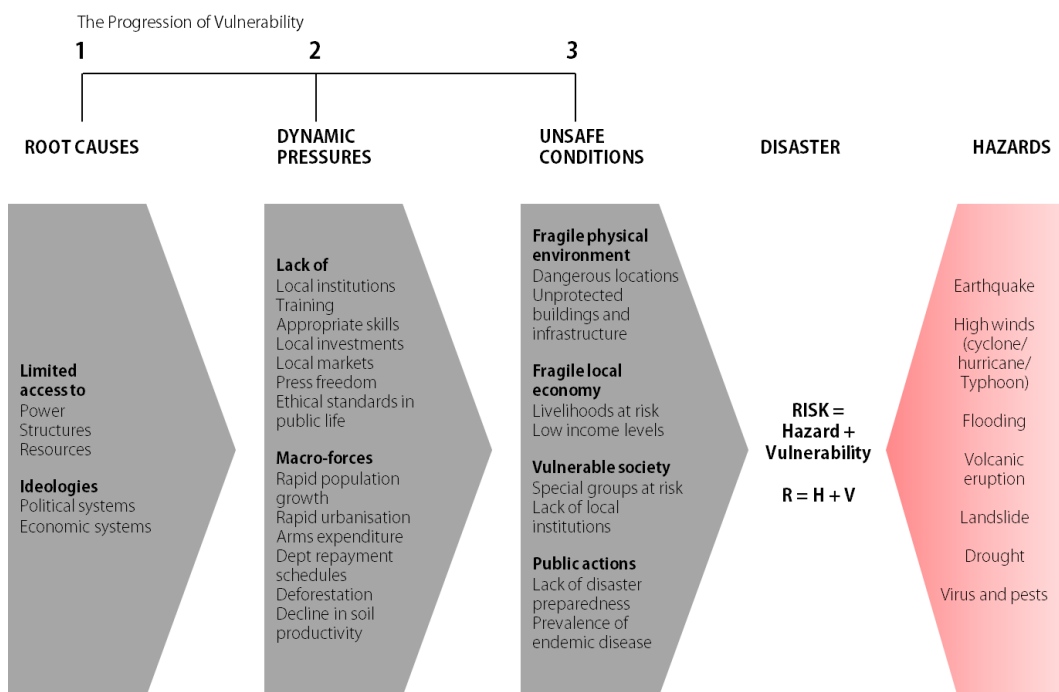


Figure 17. Pressure Release Model. Source: Blaikie, et al. (1994, 47).

In principle, every society is endangered by natural hazards. Only the vulnerability, depending on the socio-economic framework conditions as well as the coping and adaptive capacity of the affected

society, essentially determines whether loss or damage arises and whether the natural hazard turns into a disaster. In short, vulnerability to natural hazards is formed by a mix of both physical and socio-economic conditions. In this context “vulnerability is a function of the character, magnitude and rate of hazards, to which a system is exposed, its sensitivity, and its adaptive capacity” (McCarthy, et al. 2001, 6). Glavovic and Smith had a similar hypothesis stating that “vulnerability is related both to the differential exposure and sensitivity of communities to [hazards] and also to the particular adaptive capacities of those communities to deal with the effects or risks associated with the exposures” (Glavovic and Smith 2014b, 7).

Smith (cf. Smith 2013, 53) states that since vulnerability is not solely an economic condition it is difficult to measure it in ways suitable for practical intervention. A lot of research is done on this trying to render vulnerability quantifiable. Yet, vulnerability indices are being questioned due to their lack of scientific validity and usefulness in the policy sphere (cf. Smith 2013, 57). However, Smith names multiple factors that are known to raise vulnerability: Age, gender, disability, poverty, race, life expectancy, occupation, political system, education, food aid (cf. Smith 2013, 56f).

Poverty and the associated social disadvantages is a common factor for vulnerability (cf. Smith 2013, 52)¹¹. Therefore, communities in less developed countries are more likely to be vulnerable to the impacts of natural hazards. The term ‘less developed countries’ used in this thesis includes both, developing countries and least developed countries. According to the United Nations (2020), “there is no established convention for the designation of “developed” and “developing” countries or areas in the United Nations system, in 1996 this concept was introduced to the Standard country or area codes for statistical use. It is intended for statistical convenience and does not express a judgement about the stage reached by a particular country or area in the development process”. Until 2016, developing countries were defined by the World Bank according to their Gross National Income (GNI) per capita per year. The use of these terms is highly problematic and is being challenged today. Some organisations, including the World Bank, have discarded them from their data vocabulary. The main reason is that using this term and parameter to group countries together ignores the heterogeneous nature of the global community (cf. Fernholz 2016). Further motives are discussed in Chapter 5 of this thesis. However, these terms are still widely used in papers and statistics and therefore also in this thesis. Least developed and developing countries are more vulnerable to risks and therefore more threatened by natural disasters.¹² “Many people in the ‘less developed countries’ already experience insecure lives and livelihoods because of poverty, weak governance and dependence on a degraded resource base that makes them especially vulnerable to ‘natural’ hazards and other threats.” (Smith 2013, 3)

According to Glavovic and Smith (2014b, 1) “rural and urban livelihoods will be profoundly affected. Poor and marginalised groups will be especially hard hit”. In addition, poor countries with high exposures to risk find it difficult to fund hazard protection and to reduce exposure. The resulting high level of vulnerability means that their disaster losses are disproportionately high when compared with the damage inflicted on resource-rich nations (cf. Smith 2013, 9). Figure 18 and Figure 19 visualize the concept of vulnerability through comparing the number of people affected by disaster impacts worldwide between 1992-2012 with the number of people killed. According to Halsnaes and Laursen (2009, 91) “climate change and natural disasters are emerging as serious

¹¹ See also GIZ (cf. GIZ 2012, 8).

¹² See also IPCC 2007 (Parry, et al. 2007); Boyd et al. (2009), McBean and Rodgers (2010), Glavovic and Smith (2014,1).

stresses on development in some of the poorest parts of the world”. One-third of the world’s population is living in low-income countries and they suffer almost two-thirds of all disaster related deaths (cf. Strömberg 2007, 206).



Figure 18. Impact by top 10 countries 1992-2012, people affected. Data source: UNISDR (2012); own diagram.



Figure 19. Impact by top 10 countries 1992-2012, people killed. Data source: UNISDR (2012); own diagram.

2.2.3 Risk

Smith (2013, 11) states “risk is the combination of the probability of a hazardous event and its negative consequences”. According to Jha et al. (2010, 342) disaster risk may be distinguished in intensive and extensive disaster risk. Where intensive risks produce high mortality disaster events, for example the Indian Ocean tsunami in 2004 or the earthquake in Haiti in 2010. Global mortality and losses are concentrated in a few intensive disasters as shown in Figure 20. Between 1975 and 2008 alone, 78.2 percent of disaster mortality was concentrated in only 23 events. For the timeframe represented in the graph, between 1990 and 2013, more than 45 percent of total global disaster mortality was concentrated in the four events shown, namely the Cyclone Gorky in Bangladesh in

1991, the before mentioned Indian Ocean tsunami in 2004 and Haiti earthquake in 2010 as well as the Cyclone Nargis in Myanmar in 2008 (cf. UNISDR 2015b, 47f).

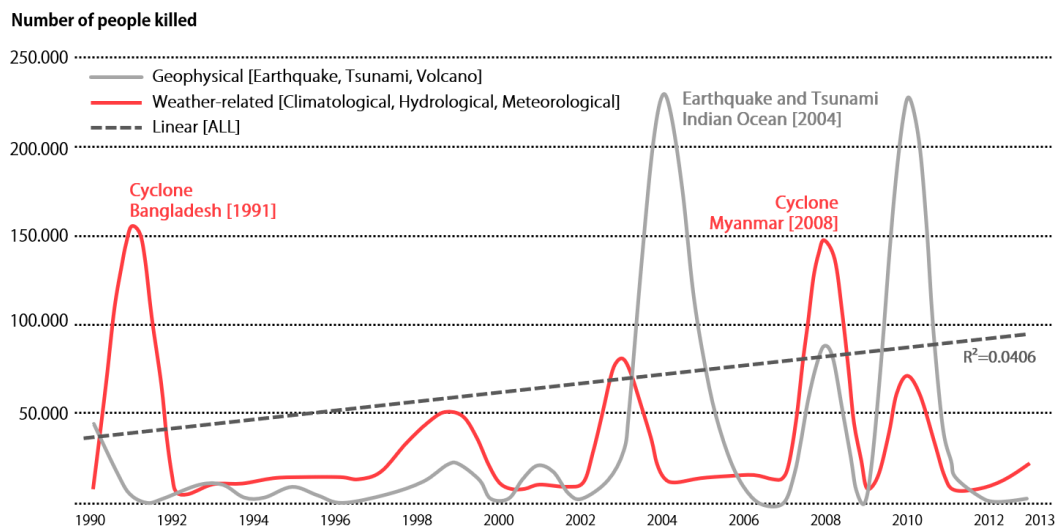


Figure 20. Global mortality and losses are concentrated in intensive disasters. Source: UNISDR (2015b, 48); modified.

Following the United Nations office for Disaster Risk Reduction (UNISDR), disaster risk is considered as “a function of the severity and frequency of the hazard, of the numbers of people and assets exposed to the hazard, and of their vulnerability or susceptibility to damage” (UNISDR 2015b, 26) where “risk is a function of likelihood (or probability) and consequence (or impact) (see e.g., Knight 1921)” (Glavovic and Smith 2014, 6). Therefore, intensive risk is characterised by both an intense hazard as well as vulnerability factors such as poverty and inequality. However, in the underlying conditions the UNISDR differentiates between intensive and extensive risk. While in intensive disaster risk, the risk equation is commonly dominated by the hazard and exposure, vulnerability plays a larger role in extensive risk. In the case of a tsunami, for instance, the disaster risk is mainly determined by the hazard and exposure while vulnerability is more likely to play a minor part (cf. UNISDR 2015b, 26).

In the UNISDR (2015b, 26) definition, “intensive risk refers to the risk associated with high-severity, mid to low-frequency events”. It implies an “exposure of large concentrations of people and economic activities to intense hazard events, which can lead to potentially catastrophic disaster impacts involving high mortality and asset loss”. Extensive risk on the other hand is defined as “the risk associated with low severity, high-frequency (persistent) events, mainly but not exclusively associated with highly localized hazards” and is often associated with weather-related hazards. Thus, extensive risk is typically less closely linked to exposure, for instance earthquake fault lines or cyclone tracks, here vulnerability dominates the risk equation (cf. UNISDR 2015b, 26).

Most countries have a various risk profile and include both intensive and extensive disaster risk. The UNISDR claims though that “in most contexts, disaster risk reduction has been approached through an interpretation of disaster [the impact of an infrequent and unexpected natural event of extraordinary magnitude outside of human agency opposed to the tragic finish to a long drama], as a set of practices to protect development against exogenous threats rather than to prevent or avoid

the generation and accumulation of risks within development” (2015b, 26). The UNISDR (2015b, 26) states that this shaped and accompanied the practice of disaster risk management and therefore influenced the effectivity of disaster risk reduction. This is further discussed in Chapter 2.4.

Jha et al. (2010, 342) state, poor households have a “limited capacity to buffer themselves against disaster losses, whether the risks are intensive or extensive”, pointing out a correlation between poverty and risk. Figure 21 presents some of these interactions between disaster risk and poverty. Next to global drivers such as climate change or an uneven economic and urban development there are underlying risk drivers that have an impact on the level of risk. These are for example poor urban and local governance, vulnerable livelihoods, ecosystem decline or a lack of access to risk transfer and social protection. On the other side, there are poverty outcomes as a consequence of disaster impacts described as short- and long-term impacts on income, consumption, welfare and equality. Thus, Glavovic and Smith (2014, 6) state “disaster risk is a function of a physical peril and the root cause and drivers of social vulnerability which are shaped by complex, socio-political and economic factors (Hewitt 1983; Alabala-Bertrand 1993; Hoffman and Oliver-Smith 2002; Pelling 2003; Wisner et al. 2004; CDRSS 2006; Haque and Etkin 2007)”.

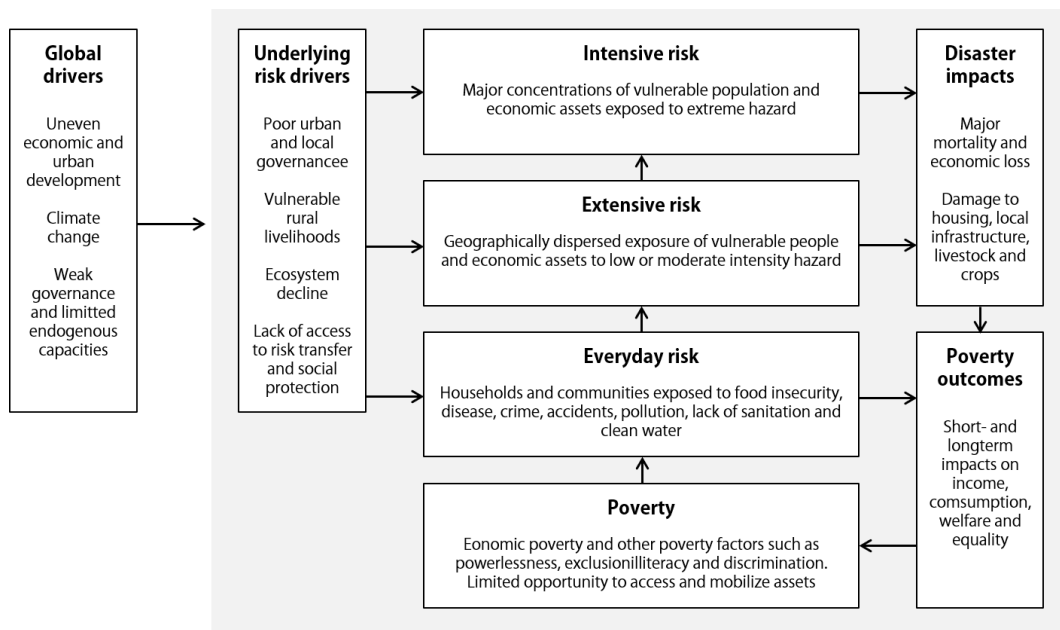


Figure 21. The Disaster Risk-Poverty Nexus. Source: Jha et al. (2010, 343); modified.

2.3 Post-disaster recovery

There are numerous existing manuals, guidelines and frameworks on reconstruction¹³ but according to Duyne Barenstein (2014, 149,151), “in spite of all these generally accepted principles, reconstruction practices and outcomes continue to differ distressingly from policy declarations”. This automatically leads to the response of international agencies to invest heavily in refining their policy instruments even though there is no proof that “the reason for discrepancies between intentions and outcomes is caused by policy deficiencies” (Duyne Barenstein, Who governs reconstruction? Changes and continuity in policies, practices and outcomes. 2014, 151). One explanation for this situation might be the circumstance that the pressure to spend money and to present quick results to their constituencies primarily dictates the reconstruction practices of most international NGOs (Duyne Barenstein 2014, 149,151). The following outlines the common steps of post-disaster recovery.

2.3.1 Disaster timeline

The activities, programmes and measures that can be conducted before or after a disaster to either avoid the event, reduce its impact, or recover from its losses are presented in the disaster management cycle in Figure 22. Pre-disaster activities can include awareness campaigns, strengthening existing structures, the preparation of disaster management plans, etc. They are focusing on capacity building as well as preparation for a possible disaster occurrence. Activities taken after the disaster take in emergency response and recovery activities later followed by reconstruction and possible mitigation options (cf. Khan, Vasilescu und Khan 2008, 46f). This disaster management cycle, also referred to as disaster risk management cycle (DRMC), draws on the theory of Baird et al. (1975) which is assessed in detail in Chapter 2.4.2.

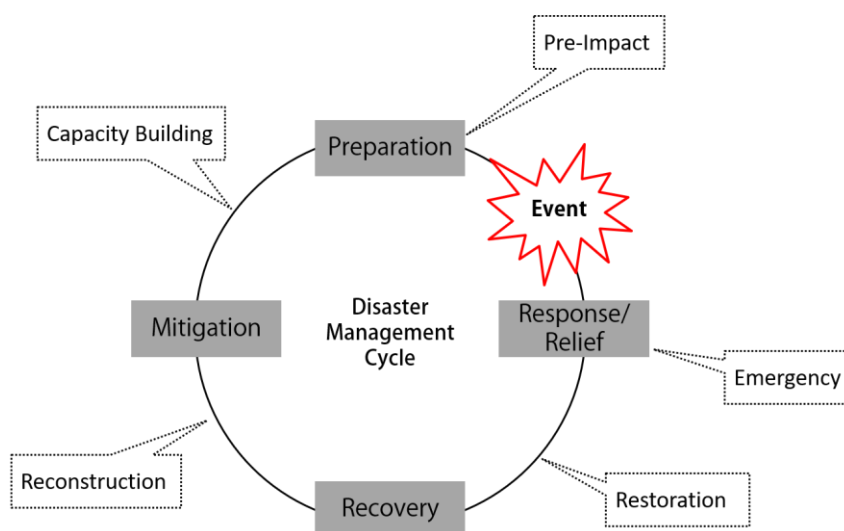


Figure 22. Disaster Management Cycle. Source: Aguirre-Ayerbe et al. (2018, 2244); modified.

¹³ See for example UN Disaster Relief Organisation (UNDRO various guidelines); Global Facility for Disaster Reduction and Recovery (GFDRR 2010); Jha et al. (2010); IFRC and OCHA (2015); UN Habitat (2015); IFRC (2010).

According to Kahn et al. (2008, 48), this cycle is most appropriate for rather sudden-onset disasters such as floods, earthquakes, cyclones, or tsunamis. This is opposed to slow-onset disasters without an apparent single event that provokes the starting point of the emergency response stage, as for example a drought. As illustrated below in Figure 23, the cycle consists of four disaster management phases comprising Response/Relief: Coping with the impacts of a disaster, for example search and rescue or emergency relief; Recovery, which can be divided into Rehabilitation and Reconstruction: Returning the community to the normal state via, for example, temporary housing or grants; Mitigation: Reducing the effects of natural hazards through building codes, zoning, vulnerability analysis, public education, etc.; Preparedness: Planning the response, for example developing preparedness plans, conducting emergency exercises and training, or implementing warning systems. These four phases are generally not carried out separately or consecutively but tend to interleave, while the respective length of each phase can vary a lot based on the severity level of each disaster.

Response/Relief	Recovery	Mitigation	Preparation
Search & rescue Security Food Water Shelter Sanitation Clothes Medical care Trauma care	<i>Rehabilitation</i> Restauration of basic services and functions. <i>Reconstruction</i> Full resumption of services, plus preventive measures.	[Risk assessment/Prevention] Hazard mapping, Hazard and vulnerability assessment, Structural and non-structural measures	Contingency planning, Warning and evacuation, Consolidate preparations for next disaster
Immediate intervention	Weeks to months Months to years	Long-term	Long-term

Figure 23. Disaster management phases. Source: Khan, Vasilescu and Khan (2008, 47f); modified.

Recovering from a disaster is usually a long process and “reconstruction projects can take years to repair the damage and even longer to deliver improved resilience” (Norling 2008, 2). For example, the reconstruction process in Aceh after the tsunami in 2004 took five years until completion. There are several issues that affect this required time. On the one hand, there are challenges in post-disaster reconstruction management and on the other hand a gap between short-term humanitarian relief and long-term reconstruction concerning funding, management and delivery (cf. Norling 2008, 2). In the case of Aceh, the time needed for the completion of housing reconstruction was initially projected with two years which later appeared unrealistic mainly due to poor availability of materials and a shortage of construction skills, although there was no shortage of funding or contributing organisations. Additionally, other reasons such as flooding caused by heavy seasonal rainfall, the capacity of the local government or religious holidays also influenced the delay (cf. da Silva 2010, 77f). Other possible challenges include funding, accountability, multiple actors, emergence of new organisations or communication and information between stakeholders. The aforementioned gap between humanitarian relief¹⁴ and agencies concerned with reconstruction as part of a development agenda roots in different interests and diverging types of organisation. Further, there are gaps

¹⁴ Immediate intervention such as medical care, food, water or shelter.

between the different institutions dealing with relief and reconstruction, namely international agencies and local or national governments. Lloyd-Jones (2006, 12) states, “gaps also exist within agencies, between departments concerned with humanitarian relief and those concerned with reconstruction as part of a development agenda.” Humanitarian relief usually has an international infrastructure with national, international, and inter-governmental organisations such as the United Nations, donor agencies, or international NGOs which often comes coupled with a media interest and public awareness immediately after a disaster event. A generated public and private response is often answered by national bodies, both civil defence and military coordinated through UN agencies. “Long-term recovery, however, is primarily a national, sub-national and local government-led matter. Capacity at local government level to plan and implement recovery strategies is usually very limited and often incapacitated as a result of the disaster. Local and international NGOs are needed to supplement these rehabilitation efforts.” (Lloyd-Jones 2006, 12) This gap is shown in Figure 24.

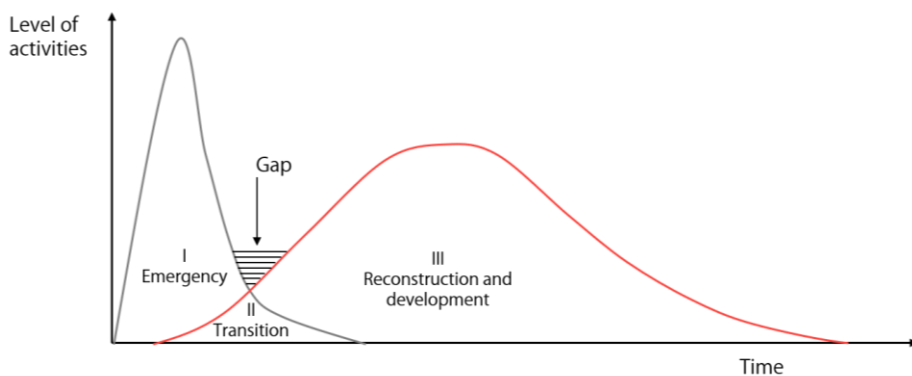


Figure 24. Implementation phases of post-disaster reconstruction. Source: Fengler et al. (2008, 5); modified.

The following is drawn from Fengler et al. (2008, 5):

“Phase I is characterized by the relief effort and is typically led by the national government (in some cases led by the military), together with UN agencies. During this phase, which usually lasts several weeks, planning for reconstruction begins.

Phase II presents the transition from emergency to a full-scale reconstruction program. Early reconstruction starts while emergency relief activities still continue. This is a critical phase for success of the whole reconstruction program. In many reconstruction programs the transition between emergency relief and reconstruction is poorly managed. This can create an unnecessary gap before reconstruction activities start and corresponding frustration among those affected. For example, frustration in post-tsunami Aceh ran high six months after the natural disaster when core relief activities were being phased out before most reconstruction activities had begun.

Phase III represents the fully-fledged reconstruction program of which each component has its own sequence. For instance, in India the focus of the first reconstruction year was on re-establishing livelihoods, particularly of affected fishing communities. By contrast, in Aceh and Nias the first year was dominated by housing reconstruction, followed by a focus on infrastructure.”

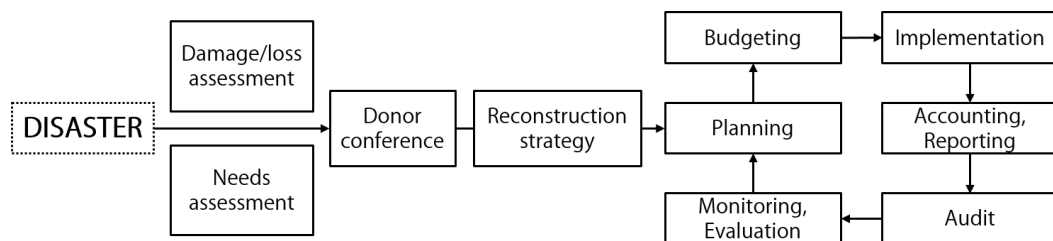


Figure 25. Mobilising and executing reconstruction finance, a protocol of events. Source: Fengler et al. (2008, 6); modified.

Immediately after a disaster, there are several stages taking place within a relatively short time period, as shown in Figure 25. A damage and loss assessment is followed by a donor conference which later leads to the development of a reconstruction strategy. This strategy then gets implemented and integrated into a budget cycle. A donor conference is necessary whenever a disaster “exceeds a [...] country’s capacity and resources to independently manage recovery” (Fengler, Ihsan and Kaiser 2008, 7). Thus, donor conferences are an important mechanism to mobilise financial assistance from international donors which is often needed to handle the disaster situation. The reconstruction strategy comprises of both institutional and financial arrangements of the reconstruction programme. In some cases, generally depending on the size of the disaster or the government’s capacity, a separate reconstruction agency is established during this stage. Another decision that needs to be taken at this stage is “reconstruction planning versus rapid project implementation” (Fengler, Ihsan and Kaiser 2008, 13) While a plausible plan including key policy decisions is crucial for reconstruction, time-consuming planning can pose a problem during this point in time as it can delay the start of the reconstruction process. A quick provision is important mainly to provide livelihoods and employment, therefore a continuous readjustment of a rough plan during the implementation time might present the better option (cf. Fengler, Ihsan and Kaiser 2008, 5f,13).

This need for speed in reconstruction is widely acknowledged¹⁵ and can also be found in other areas. Fengler et al. (2008, 11) claim “reconstruction is typically faced with significant time pressure and finite duration. Progress is measured on a month-by-month basis, not an annual basis as in regular projects. The need for a swift response means that the time periods for project preparation, budget approval and procurement need to be significantly shortened”. A reason for this time pressure can be found in the expectations of the media, donors or the community itself. In the example of Aceh mentioned above where a projection to complete the reconstruction process in two years was announced by the local reconstruction agency, implementing agencies got severely blamed to be slow which led to a pressure in scaling up their programmes as well as speeding up delivery over the four-year period it took (cf. da Silva 2010, 77f). Norling (2008, 3) alleges, “despite the fact that post-disaster reconstruction is an inherently long process, there is a competing need for rapid progress and a perception that speed equals success”. Governments are also generally judged by the speed of reconstruction. A return to normal condition in an ideally brief period is usually considered as a success which leads to a preference of fast and low-cost reconstruction (cf. Bun 2012, 16). Also, the media tends to emphasise time pressure with titles such as “Postquake reconstruction runs slow in

¹⁵ See Kulatunga (2011); Fengler et al. (2008); Lloyd-Jones (2006).

Japan” or “Haiti’s slow reconstruction” pointed out by Norling (2008, 3). Pressure rises as well with the dependence on funding from international donor agencies since they often “attach certain conditions to their funding agreements and governments implement processes as a safeguard to prevent the risk of mismanagement” (BBR, 2009). Agencies often have a mandate limited to short-term relief, hence they strive to perform their work and promptly move on to the next upcoming emergency elsewhere (cf. Lloyd-Jones 2006, 56). “The desire to build back quickly can be tempting, but supporting communities that are willing to take the extra time needed to imagine, and then work for, a more compelling alternative can make all the difference.” (Bun 2012, 16) This time pressure, coupled with a pursuit for quick results, can hardly be combined with planning or community involvement. Hence, a skimmed recovery period primarily based on top-down, technocratic solutions is conflicting with the concept of community participation to address the needs so as to aim at a more reasonable tenacious long-term recovery. Lloyed-Jones (2006, 56) concludes “win-win solutions involving the community and foreshortening the recovery period are hard to achieve and critical choices may need to be made”.

There are measures to react to this time pressure. Kulatunga (2011, 146) suggests a combination of effective project management and preparedness strategies to address time challenges resulting in a more efficient reconstruction process as well as better results. Norling (2008, 4) states “the scope or quality of work may be broadly defined by the amount of damage caused, combined with the rules (standards), guidelines (like-for-like replacement or betterment strategy) and engineering best-practices”. In this scenario time is a variable presenting a function of cost and scope, where cost is defined as resources available spent over time and scope includes repairing the damage and improving resilience. This is all underpinned by an effective time management which begins with planning. The concept of an increased efficiency of post-disaster reconstruction through well-considered planning prior to a disaster event is widely recognised¹⁶. Hence, “planning should be articulated clearly by preparing a disaster management plan in consultation with all relevant stakeholders. A disaster management plan can be a standalone document or a part of a wider planning policy that considers the risks of potential disasters, a strategy for mitigating such hazards and a process for responding to the impacts of such risks eventuating.” (Norling 2008, 4f)

2.3.2 Disaster financing

Disaster financing is split into three different sets defined by Kellett and Caravani (2013, 5). Disaster risk reduction is presented in the sub-set ‘disaster prevention and disaster preparedness’. The two other sets concern disaster aid and include ‘emergency response’ and ‘reconstruction and rehabilitation’. (cf. Kellett and Caravani 2013, 5) Disaster preparedness is situated in the ‘Mitigation’ and ‘Preparation’ phase of the disaster management cycle. Emergency response falls under the category ‘Response’, reconstruction and rehabilitation under the category ‘Recovery’.

Usually, funding for reconstruction is limited, hence the timeframe associated tends to be tight and immediate action is demanded. In addition, funding similar to the sum available in the aftermath of the Indian Ocean tsunami in 2004 is considered as unequalled and unlikely to be repeated. Instead, a reduction of funding for humanitarian assistance is predicted for the future (cf. Schilderman and Parker 2014, XV). A topic widely debated, associated with disaster financing, is whether disaster losses can be significantly reduced through spending money proactively before disaster strikes.

¹⁶ See also Sutton and Haigh (2011), Amin and Goldstein (2008).

Numerous cost-benefit values have been generated based on hazard types, vulnerability and more. Despite this, currently no general statement can be made due to a lack of data. Once simple measurements are implemented, expenses of measures tend to exponentially increase with diminishing effects on vulnerability reduction. Eventually, the limit of profitability is reached when the expenses for vulnerability reduction are equivalent to the value of damage avoided (cf. Davis and Alexander 2015, 71f). A concept of proactive mitigation widely implemented in the field is disaster risk reduction (DRR), previously mentioned and discussed in more detail in Chapter 2.4.2.

Peaks in disaster financing usually follow certain events which can be demonstrated in a number of case studies and, due to the huge impact and media attention, they usually also generate awareness for disaster risk reduction. According to Kellett and Caravani (2013, 7) “most such events have been earthquakes, where a very visible and sudden impact generates significant attention, pushing up financing of both response and reconstruction activities”. After the Marmara earthquake in Turkey in 1999, USD 1.1 billion of reconstruction aid was provided by the World Bank. In 2001, after the earthquake in Gujarat, India, two projects were launched, one by the Asian Development Bank (ADB) and one by the World Bank, with a total commitment of USD 1.4 billion of reconstruction aid. In 2005, following the Kashmir earthquake in October and the Indian Ocean tsunami in December, at least USD 3.3 billion was committed with USD 1 billion for response and USD 2.2 billion for reconstruction and rehabilitation. With this, the emergency response and reconstruction financing triggered by these two events equates a quarter of the total amount spent on DRR between 1991 and 2010 in all countries (USD 13.5 billion) (cf. Kellett and Caravani 2013, 7f,11). The second highest year on record of disaster financing after 2005 was 2010, primarily due to the Haiti earthquake. Here, according to Kellett and Caravani (Financing Disaster Risk Reduction. A 20 year story of international aid 2013, 7f,11) USD 1.7 billion of a total of USD 1.8 billion of post-disaster aid was spent on emergency response opposed to earlier earthquake contexts where the main focus of financial assistance was on reconstruction. For the first ten years, DRR financing was dominated by funding for flood prevention, mainly for large infrastructure projects. This made up over 80 percent of all disaster financing which poses 57.7 percent of the twenty-year total. However, since 2002 flood prevention financing dropped heavily. An explanation might be an overall shift from large-scale infrastructure projects to technical support to countries (cf. Kellett and Caravani 2013, 7f,11).

As described in Chapter 2.3.1 above, after a disaster there is usually a pressure for quick results due to various reasons. Besides the immediate urgent needs of people affected, time and other institutional factors act a part. Within this, particular emphasis is placed on the allocated funds brought in by diverse donors causing a need for rapid disbursement (cf. Lloyd-Jones 2006, 56). This aspect is displayed in the following example. The Disaster Emergency Committee (DEC) was formed by twelve aid agencies from UK and Ireland in February 2001 to mainstream their forces in reaction to the Gujarat earthquake in India. The total aid of 24 million pounds had to be spent within nine months with agency plans expected to be finalised after the first four weeks and the funds being spent by October 2001, nine months after the earthquake occurrence in January 2001. “But because some 40% of the funds remained unspent at the end of October, the DEC had little choice but to allow an extension, or to be more exact, an extremely long ‘period of closure’, with a final end to operations at the end of July 2002.” (DMI, HI and Mango 2001, 6)

Financing for reconstruction after a disaster is likely to come from multiple sources due to limited availability of national or local resources to meet financial and human needs. Therefore, recurrent

international donors as well as private contributors, in the case of larger scale disasters, step in to finance the reconstruction programme. As briefly addressed above, these international donors generally have own financing instruments tied to responding measures. If a lot of funds are spent in the beginning of the reconstruction process, inflation is likely to rise and thereby reduce the resources disposable for the following months or likely years of the process. Usually NGO funding tends to be depleted after the first two years. Therefore, the funds that need to be programmed by the government are directly related to the amount of NGO funding at the start (cf. Fengler, Ihsan and Kaiser 2008, 1,13,22,25). In addition, according to Fengler et al. (2008, 24) there is a common concern about a homogenous funding distribution. In the majority of cases locations most accessible receive the biggest amount of funding, generally more than needed while remote areas are often neglected. For example, “in Aceh, there has been a bias towards the areas closer to the capital city, Banda Aceh, which received double its needs”. (Fengler, Ihsan and Kaiser 2008, 24) Again, funding, especially international donor funding, is closely linked to strict timelines which might lead to worse results, an issue stressed in the previous section. Olshansky et al. (2012, 177) name two conditions associated with funding, one is concerning trust: “Accountability and transparency are crucial to maintain trust among those who provide reconstruction funds, those who manage funds, and those who use the funds in rebuilding.” The second condition addresses time pressure and says that “funders may need to pay now, audit later, or potentially accept a slower reconstruction speed”.

2.4 Long-term risk reduction

Long-term risk reduction roots in the complexity paradigm introduced in Chapter 2.2.1 where the emphasis is put on the complicated interactions between natural and human systems and disasters are described as the outcome of interactions between physical, technological, societal or institutional variables. Following this approach, the aim is to combine disaster risk reduction with a development agenda, focusing on mitigation rather than preparedness and emergency response. The concept ‘build back better’, which originates from the Indian Ocean tsunami 2004, is one of many attempts to reach this aim by linking immediate relief with longer-term processes of recovery and development. This is based on the idea that humanitarian assistance in disaster response “should somehow do more than ‘simply’ saving lives and alleviating suffering in advance of the next terrible event, over and over again” (Fan 2013, 1). Other concepts include ‘Linking Relief, Rehabilitation and Development (LRRD)’, ‘early-recovery’, ‘capacity-building’, ‘Disaster Risk Reduction (DRR)’, or the most recent one ‘resilience’ (cf. Fan 2013, 1). Two of these concepts, LRRD and DRR, are described in more detail in the following subchapters.

The ambition to ‘build back better’ “to use the opportunity of a disaster response to leave societies improved, not just restored” (Fan 2013, 2) seems obvious and sensible. For example, interventions that overlook structural problems are likely to perpetuate them. However, according to Fan (Fan 2013, 2), until now the humanitarian community did not suitably address the definition of ‘better’ which would be needed in order to translate the concept into a programme. Investing in ‘build back better’ channels both attention and money away from urgent needs such as food or shelter. “Is it better to build one earthquake-proof home, when for the same money we could build ten, 12 or 20 that meet people’s immediate need for a roof over their heads, but could be deathtraps when the next earthquake strikes.” (Fan 2013, 2) For instance in Aceh, as presented in Figure 26, the World Bank conceptualised ‘build back better’ as an extra set of activities outside of reconstruction undertakings and costs, a view shared by several international partners. Fan also raises the question

of responsibility and whether humanitarian agencies have the “skills, knowledge, organisation and experience to engage in the long-haul complexity of social, political and economic change” (Fan 2013, 2). While the idea that disasters and the associated reconstruction process may be an option for a transformation process, it is called into question if humanitarian assistance has a role to play. Post-disaster response might not be the right time to take action on underlying problems. Also, the ‘build back better’ concept does not provide adequate tools to consider in order to implicate the approach. Fan suggests, “the broader link between build back better, humanitarian concepts, humanitarian action and its impact needs to be better understood if humanitarian assistance is to make a meaningful contribution to reducing people’s vulnerability and increasing their resilience to future shocks (cf. Fan 2013, 2f,8).

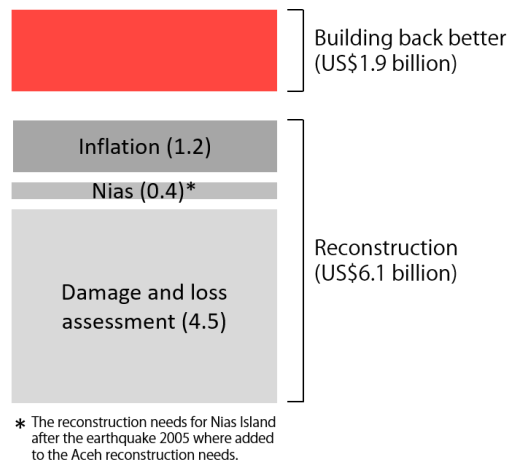


Figure 26. Aceh reconstruction needs - World Bank.
Source: Fan (Fan 2013, 8); modified.

2.4.1 Linking relief, rehabilitation and development LRRD

In the 1980s, in the context of the food crisis in Africa, a funding gap referred to as ‘grey zone’ became obvious between humanitarian assistance, rehabilitation and development activities. In 1996, the European Union Commission published a report with the title ‘Linking relief, rehabilitation and development (LRRD)’ which provided the banner ‘LRRD’ for the debate ever since (cf. Ramet 2012, 4). The main reason to link these different phases was based on the idea that “better development” can reduce the need for emergency relief; better “relief” can contribute to development; and better “rehabilitation” can ease the transition between the two. According to the European Commission, the sequence of short-term relief, rehabilitation and long-term development does not sufficiently account for the recurring nature of some disaster situations (cf. EC 1996, iii). The report suggests the need for a “strategic planning policy” for countries prone to natural hazards which includes political, developmental, societal and technical aspects. This framework should define (EC 1996, iv):

- *“the way in which disaster prevention and vulnerability analyses should be taken into account in development planning and operations;”*

- *“the way in which, once an emergency situation has erupted (either natural or man-made) relief actions should, apart from their primary objective of saving the lives of victims, take account of the longer term objectives of reconstruction and development;”*
- *“the way in which, for countries in a post-emergency phase, rehabilitation actions should be undertaken so as to ensure the most effective transition from emergency assistance to long term development.”*

These linkages between relief, rehabilitation and development depend on the specific situation of each country or region and therefore should be put into the current prevailing context (cf. EC 1996, v). With LRRD, the European Commission compiled a range of instruments and approaches for handling natural disasters, armed conflicts or structural crisis. Furthermore, they demanded a closer consistency and coordination between humanitarian and development actors in disaster response (cf. Fan 2013, 1f).

2.4.2 Pre-disaster planning

In 1975, the Disaster Research Unit, which was formed 1973 at the University of Bradford, prepared a ‘Pre-disaster Planning Manual’ in reaction to increasing disaster occurrence and scale as well as a rise in associated capital costs for assistance in relief, rehabilitation and reconstruction in developing countries (cf. Baird, et al. 1975, 37). Pre-disaster planning, also referred to as precautionary planning, is based on the premise that “a government has a responsibility to do all in its power to protect life and property of its people, to safeguard their health and welfare and to provide public services essential to the national well-being and commensurate to the nation’s capacity” (Baird, et al. 1975, 37). According to Lewis, precautionary planning should be undertaken from within each country, region or area either directly by local actors or with the assistance of external sources. For precautionary planning in a certain area, Lewis suggests analysing location, geography, climate, flora and fauna, history, social and cultural heritages, social structure, local and national government, non-government organisations, economic structure, economic development, communications, as well as services and utilities (cf. Lewis 1975, 4,12-21). Pre-disaster planning requires inevitable knowledge and experience of local actors, as for example, the government as well as sufficient funding. As analysed above, international funds are primarily put into relief work with only a small percentage invested in mitigation options, a situation already described in 1975 by Baird et al. (37).

The purpose of pre-disaster planning is not a prevention but mitigation. “The total prevention of disaster calls for the prevention of the causative natural phenomena or the removal of places of habitation from known vulnerability calling upon expertise, technology and resources beyond the capacity of the majority of disaster prone countries.” Lewis (1975, 27f) Figure 27 shows the components of pre-disaster planning divided into ‘contingency planning’ and ‘precautions’. Contingency plans “predetermine a group of actions and activities of unknown number, sequence and magnitude, but all of known likelihood in a disaster event” (Lewis 1975, 32). The disaster itself determines what happens in the aftermath and therefore the contingencies “cannot be known before except as a range of likely situations” (Lewis 1975, 35). Here, regulations can be made of what needs to be done after a disaster covering emergency, relief and rehabilitation. While precautions relate to the time before a disaster, mitigating the effects of a possible disaster occurrence. Lewis (1975, 27-36) defines two types of precautions:

(I) Social precautions: “precautions related to warning, transmission and dissemination of warnings

and the preparation of associated advice to accompany warnings to individuals, groups, neighbourhoods and communities”

(II) Physical precautions: “precautions related to the adequacy of building construction and consideration of the location for building and development purposes” (e.g. land use zoning and construction, development).

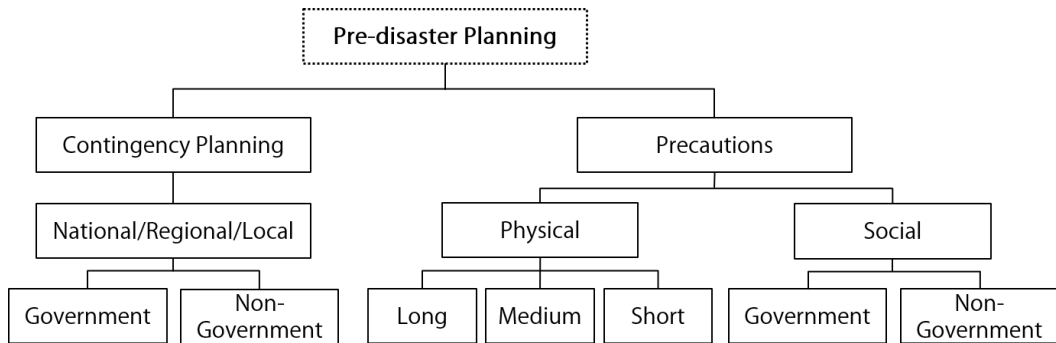


Figure 27. Pre-disaster planning. Source: Lewis (1975, 35); modified.

The approach is based on the disaster management cycle (Figure 28) introduced in 1975 by Baird et al. which presents the system within which disasters occur. According to Baird et al. (1975, Foreword), pre-disaster planning offers the possibility to reduce “losses of property, production and life” as a “product of a total comprehensive and encompassing strategy against natural disaster events”. However, if the context for disaster occurrence is not taken into account, the processes of pre-disaster planning become self-defeating. For successful disaster planning there is the necessity to plan within the environmental context.

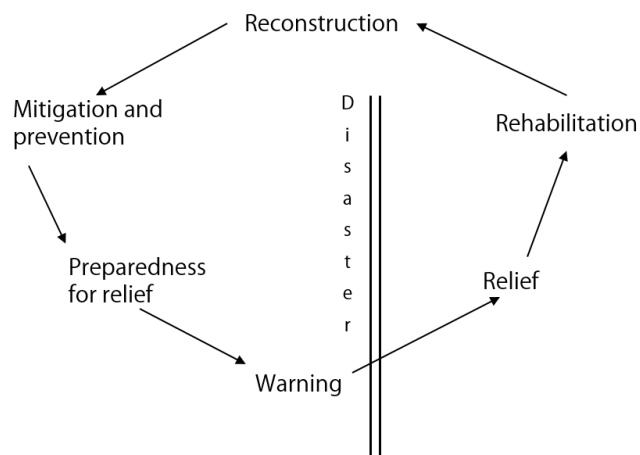


Figure 28. Disaster Management Cycle 1975. Source: Baird et al. (1975, 42); modified.

Baird et al. (1975, 40) argue, for pre-disaster planning to be successful in practice, the following guidelines must be followed:

1. Planning must be seen as a continuous process.
2. Planning must attempt to reduce the unknowns in a problematical situation.
3. Planning aims at evoking appropriate actions.
4. Planning should focus on probability.
5. Planning must be based on knowledge.
6. Planning is partly an educational activity.”

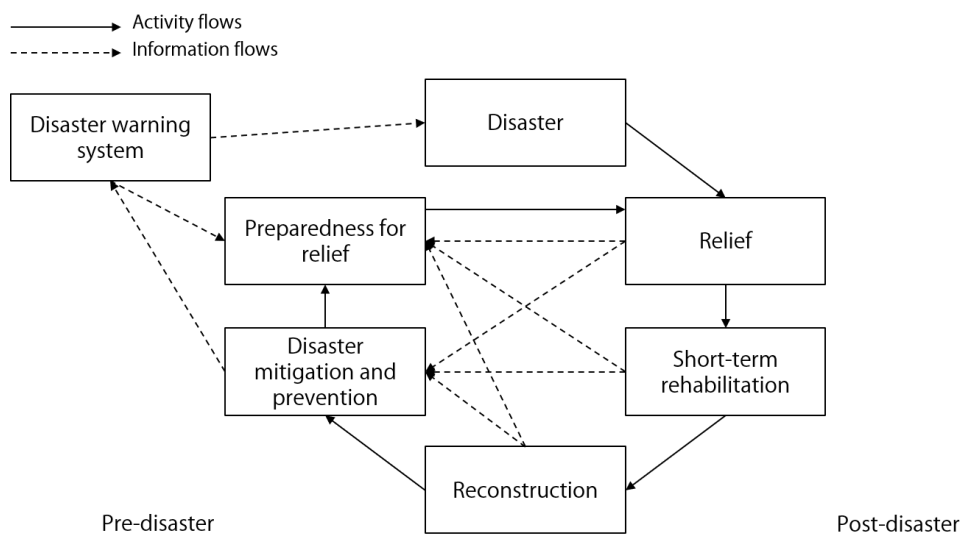


Figure 29. Activity and information flows surrounding and including disaster occurrence, showing their inter-relationship. Source: Bard et al. (1975, 43); modified.

While the system of activities shown in Figure 28 implies a linear causation, Figure 29 differentiates activity flows and information flows from and to this respective activity. Baird et al. (1975, 40) claim these inter-relationships are important in the context of pre-disaster planning. Unlike the pre-disaster planning approach presented above (Figure 27), which splits between what can be done before a disaster and what needs to be done in the aftermaths, here both sides are interlinked. Additionally to linking short-term rehabilitation to reconstruction, it is also linked to preparedness for relief as well as disaster mitigation and prevention. These relationships still represent a closed system since they do not relate disasters to the environment where they occur. This context is needed for a successful planning so that the process can deal with the causes and not just the symptoms of a disaster. Under certain circumstances it is also possible for relief activity to directly contribute to the reinforcement of the status quo. For successful pre-disaster planning, Baird et al. (1975, 44,50) conclude, two conditions must be satisfied to decrease the disaster potential of an area. First, indigenous resources of the society should be utilised; second, the process of increasing vulnerability, the process of increasing disaster proneness and the process of marginalisation must be taken into account. These processes are all further described in Chapter 5.1 of this thesis. Pre-disaster planning should also be included in the overall strategy of development planning which focusses on long term goals (cf. Baird, et al. 1975, 44,50).

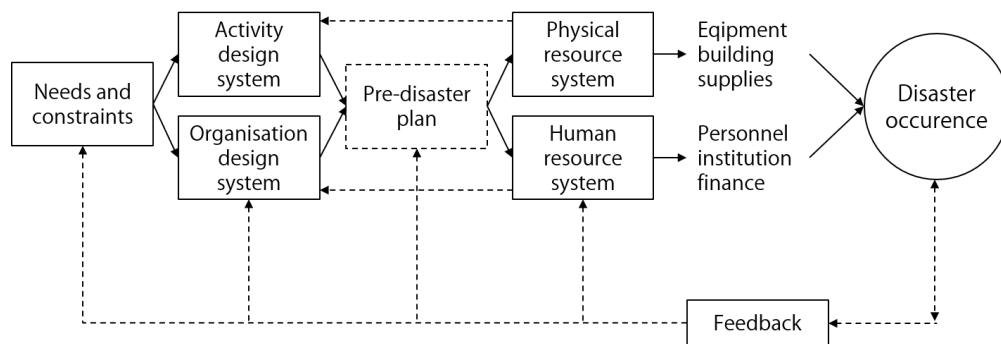


Figure 30: A systems model for the stages of a pre-disaster plan. Source: Baird et al. (1975, 45); modified.

Baird et al. (1975, 45f) introduce an approach to pre-disaster planning (Figure 30) describing the planning stages which can be used for local self-help planning as well as on the national planning level. “In addition to these planning stages, there must also be a continuous review system of the real purpose of the plan. The system must be flexible enough to respond to changes in the environment. A feedback mechanism is extremely important to store information, process it and if necessary recommend remedial action.” (Baird, et al. 1975, 44) Often these plans get abandoned or are not effectively integrated into both, government and non-government institutions which Baird et al. explain with insufficient attention to the application of the planning by the relevant agencies. A critical issue for successful pre-disaster planning is further “the grassroot awareness of vulnerability and existing grassroot adjustment to natural hazard” (Baird, et al. 1975, 45f).

2.4.3 Disaster risk reduction DRR

The United Nations Secretariat to the International Strategy for Disaster Reduction (UNISDR) defines ‘disaster risk reduction’ or DRR as “the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events” (UNISDR 2009, 10f). The Hyogo Framework for Action implemented in 2005 by the United Nations presents one approach to meet this set aim in reducing disaster losses regarding lives as well as social, economic and environmental assets of communities and countries. Actors addressed to assist in the implementation of the framework are governments, organisations and the civil society. Another term that appears in this context is ‘disaster risk management’ (DRM) which describes “the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster” (UNISDR 2009, 10). The aim here is “to avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness” (UNISDR 2009, 10f). Twigg (Disaster Risk Reduction 2015, 006) argues, DRM rather corresponds to the implementation of appliances in the field to attain objectives set in the DRR approach but, due to a partial overlap, both terms tend to be used rather loosely in literature and in practice.

According to Glavovic and Smith (2014, 6) “there is a persistent gap between the obvious need to reduce risk and ‘business as usual’ practices that continue to expose people and property to escalating levels of risk”. Therefore, a systematic risk management approach is needed in disaster programming to identify, assess and reduce risks associated with natural hazards in a process of constant improvement. Risk, as outlined in Chapter 2.2.3, emerges at the interaction points between hazards, communities and environments, hence risk management must cover all these aspects while being targeted towards local conditions and needs (cf. Twigg 2015, 006-009). For this, Smith (2013, 17) claims the need for a better understanding of socio-economic conditions along with human vulnerability analysing and mapping in disaster reduction planning in addition to, for example, geophysical risk assessments. The following four factors for long-term risk reduction were identified by Thompkins (2008, p. 736): “(i) flexible, learning based responsive governance; (ii) committed, reform-minded and politically active actors; (iii) disaster risk reduction integrated into other social and economic policy processes and (iv) a long-term commitment to managing risk.” (Glavovic and Smith 2014b, 7) One approach discussed, in regards of DRR, concentrates on inherent risks in social and economic activity to offer protection from external threats. With this, inherent risks become embedded in development instead of added on. The UNISDR (2015b, xvii) states, “Investing in disaster risk reduction is thus a precondition for developing sustainably in a changing climate. It is a precondition that can be achieved and that makes good financial sense. Global annual investments of only USD 6 billion in appropriate disaster risk management strategies can generate benefits of USD 360 billion or an equivalent of more than 20 percent reduction in new and additional expected annual losses.” They continue, “that small additional investment could make a crucial difference in achieving the national and international goals of ending poverty, improving health and education, and ensuring sustainable and equitable growth” (UNISDR 2015b, ix).

Disaster risk management emerged in the 1970s when academics¹⁷ suggested an approach that merged emergency management, pre-disaster risk reduction and risk-reduction during the post-disaster and reconstruction phase. In 1975, Baird et al. (1975) presented a model for this, the ‘disaster management cycle’ explained in Chapter 2.4.2. The logic of this disaster management cycle is still reflected in approaches today as the three goals of the aforementioned Hyogo Framework for Action HFA which are “strengthening institutions and government arrangements” in order “to integrate disaster risk reduction into [both] sustainable development and into effective emergency preparedness, response and recovery” (UNISDR 2015b, 31f).

Sendai framework

On March 2015, the Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted at the Third United Nations World Conference on Disaster Risk Reduction in Sendai, Japan. Seven targets were outlined in the framework along with four priorities for action to prevent new and reduce existing disaster risk: (i) Understanding disaster risk; (ii) Strengthening disaster risk governance to manage disaster risk; (iii) Investing in disaster reduction for resilience and; (iv) Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction. The goal is to “prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and

¹⁷ Davis (1978); Cuny (1983); Hewitt (1983).

recovery, and thus strengthen resilience” (UNISDR 2015c, 36). With the outcome, in the long term, to substantially reduce disaster risk and losses of lives, livelihoods and health as well as in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries. The framework represents “the most significant shifts as a strong emphasis on disaster risk management” (UNISDR 2015c, 5) where the focus in handling disaster primarily lays on precautionary measures as opposed to disaster management. The Sendai Framework replaces the Hyogo Framework for Action 2005-2015, adopted in 2005, with the five priorities (i) ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation; (ii) identify, assess and monitor disaster risks and enhance early warning; (iii) use knowledge, innovation and education to build a culture of safety and resilience at all levels; (iv) reduce the underlying risk factors; and (v) strengthen disaster preparedness for effective response at all levels. While the Hyogo Framework for Action “has provided critical guidance in efforts to reduce disaster risk and has contributed to the progress towards the achievement of the Millennium Development Goals” (UNISDR 2015c, 11) disasters still undermine development efforts. One lesson learned from the Hyogo Framework is the necessity for “enhanced work to reduce exposure and vulnerability, thus preventing the creation of new disaster risks, and accountability for disaster risk creation are needed at all levels. More dedicated action needs to be focused on tackling underlying disaster risk drivers, such as the consequences of poverty and inequality, climate change and variability, unplanned and rapid urbanization, poor land management and compounding factors such as demographic change, weak institutional arrangements, non-risk-informed policies, lack of regulation and incentives for private disaster risk reduction investment, complex supply chains, limited availability of technology, unsustainable uses of natural resources, declining ecosystems, pandemics and epidemics” (UNISDR 2015c, 10f).

The following is taken from the Sendai Framework (UNISDR 2015c, 14-21):

Priority 1: Understanding disaster risk

“Policies and practices for disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be leveraged for the purpose of pre-disaster risk assessment, for prevention and mitigation and for the development and implementation of appropriate preparedness and effective response to disasters.”(UNISDR 2015c, 14)

Priority 2: Strengthening disaster risk governance to manage disaster risk

“Disaster risk governance at the national, regional and global levels is of great importance for an effective and efficient management of disaster risk. Clear vision, plans, competence, guidance and coordination within and across sectors, as well as participation of relevant stakeholders, are needed. Strengthening disaster risk governance for prevention, mitigation, preparedness, response, recovery and rehabilitation is therefore necessary and fosters collaboration and partnership across mechanisms and institutions for the implementation of instruments relevant to disaster risk reduction and sustainable development.” (UNISDR 2015c, 17)

Priority 3: Investing in disaster risk reduction for resilience

“Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment. These can be drivers of

innovation, growth and job creation. Such measures are cost-effective and instrumental to save lives, prevent and reduce losses and ensure effective recovery and rehabilitation.”(UNISDR 2015c, 18)

Priority 4: Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction

“The steady growth of disaster risk, including the increase of people and assets exposure, combined with the lessons learned from past disasters, indicates the need to further strengthen disaster preparedness for response, take action in anticipation of events, integrate disaster risk reduction in response preparedness and ensure that capacities are in place for effective response and recovery at all levels. Empowering women and persons with disabilities to publicly lead and promote gender equitable and universally accessible response, recovery, rehabilitation and reconstruction approaches is key. Disasters have demonstrated that the recovery, rehabilitation and reconstruction phase, which needs to be prepared ahead of a disaster, is a critical opportunity to “Build Back Better”, including through integrating disaster risk reduction into development measures, making nations and communities resilient to disasters.”(UNISDR 2015c, 21)

These four priorities of the Sendai Framework present the foundation for this thesis following the concept of pre-disaster planning or precautionary planning discussed earlier.

Disaster risk reduction financing

There has been a rough stability in disaster risk reduction (DRR) financing since 2003, around 10 percent of overall financing on disasters each year (Kellett and Caravani 2013, 7). However, compared to other priorities of the international community such as food aid, financing of the Global Fund to Fight AIDS, Tuberculosis and Malaria or peacekeeping, this represents a relatively small component of global aid. 2010 was one of the best years on record regarding overall volumes of DRR financing with USD 1.1 billion. However, Figure 31 shows how this number compares with other international aid investments on the aforementioned priorities (cf. Kellett and Caravani 2013, 7). Considering the importance of these other aid funding priorities, this graph still puts the low priority of disaster risk reduction into perspective.

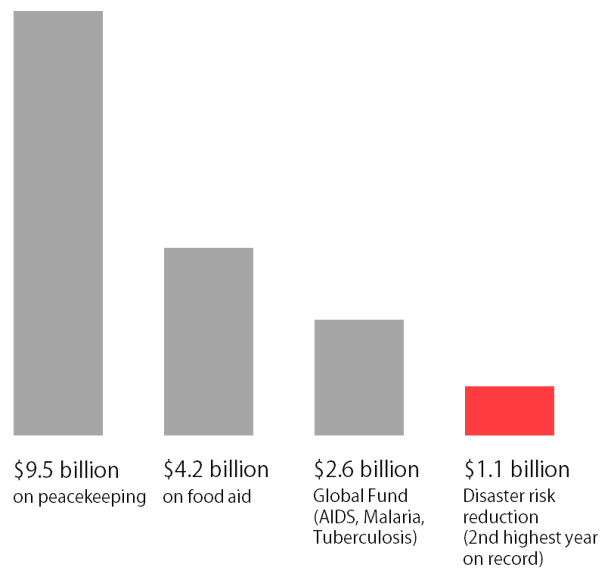


Figure 31. DRR compared with other international aid investments, 2010. Source: Kellett and Caravani (2013, 8); modified.

According to Kellett and Caravani (2013, 5,9,14f) the priority for DRR has been very low within the last two decades. As stated in Chapter 2.3.2, USD 13.5 billion has been spent on DRR which accounts for only 0.4 percent of the total amount that was spent on international aid. In other words, just 40 cents in every USD 100 spent on development aid has been invested in the defence of disaster impact. For example, the sum of total loss and damage in Indonesia between 1991 and 2010 was USD 10,166 million with a DRR financing of USD 1,439 million. With this, Indonesia ranks as second highest recipient for DRR financing. Together with China it accounts for USD 3 billion or 22.3 percent of total DRR financing over this period.

Between 1991 and 2010, twelve of the 23 defined low-income countries received less than USD 10 million for disaster risk reduction while at the same time they received USD 5.6 billion in disaster response (cf. Kellett and Caravani 2013, 36f). This means that in these countries for each USD 1 spent on DRR, USD 160,000 was spent on disaster response. This ranking is headed by Eritrea, followed by Sierra Leone and Zimbabwe. These countries mainly face slowly emerging disasters such as droughts, usually not raising media attention as discussed earlier. At the same time, these countries have the weakest capacity to help themselves. However, “over 20 years [1991-2010], only USD 1 out of every USD 10 spent on DRR by the international community has gone to those countries” (Kellett and Caravani 2013, 36f). In the same period, the disaster losses of developing nations reached a total amount of USD 862 billion. It further stands out that within these 20 years funding was mainly concentrated in a rather small number of middle-income countries. From USD 13.6 billion spent on DRR, the top ten recipients shared almost USD 8 billion while the remaining USD 5.6 was split between the other 144 countries (cf. Kellett and Caravani 2013, iv).

In summary, according to Kellett and Caravani (2013, 42) integrations suggest that the context does not directly influence the direction of DRR financing. Not only is there an insignificant link between risk and per capita financing but “financing DRR has been with little prioritisation across full considerations of risk, need and capacity”. In this context, ‘capacity’ describes government capacity while ‘risk’ includes mortality risk, economic and human risk. Indonesia, for instance, provides a mixed example for this. It poses a challenging country to finance, given the very high level of mortality risk combined with regular and repeated impacts of natural hazards. Yet at the same time, the national government is investing profoundly in reducing the disaster risk level. Between 1991 and 2010 Indonesia received an average of approximately USD 100 million of international DRR financing. On average, the national DRR funding between 2006 and 2012 reached more than 900 million dollars. This may also lead to a scrutiny of the role of international financing (cf. Kellett and Caravani 2013, 34f,42). Kellett and Caravani point out an additional correlation, “where the economy is at risk, volumes of financing tend to be high; where predominantly populations are at risk, volumes are often low.” (Kellett and Caravani 2013, vi)

As mentioned before, in some cases, as for instance in Indonesia, national financing of DRR prevails financing from the international community. There is both, national budgeting and international financing. The relationship between these, as Kellett and Caravani state, needs considerable investigation since the amounts of international financing available are limited. Outside the government level, funding for DRR comes either directly from donor nations or is managed by development banks, funding mechanisms and implementing agencies. Both sources are interconnected as financing to multilateral agencies is also derived from government donors. “Bilateral financing for DRR accounts for US\$ 5.9 billion of the total (equivalent to 43%) whilst the development banks, mechanisms and agencies manage the remaining US\$ 7.7 billion.” (Kellett and Caravani 2013, 35,38) Figure 32 and Figure 33 show the total financing for disaster risk reduction between 1991 and 2010 from the donors mentioned. So far, the effectiveness of DRR financing cannot be measured, an issue that remains a problem regarding the approach.

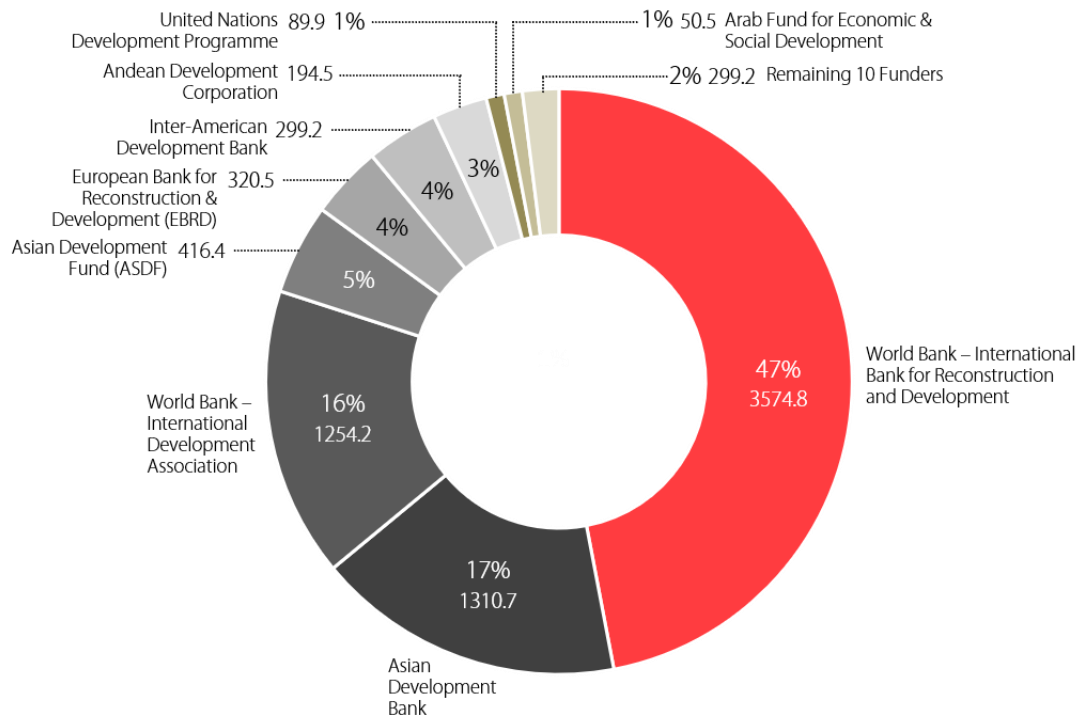


Figure 32. Financing for DRR from development banks, financing mechanisms and implementing agencies, 1991-2010, USD millions. Source: Kellett and Caravani (2013, 38); modified.

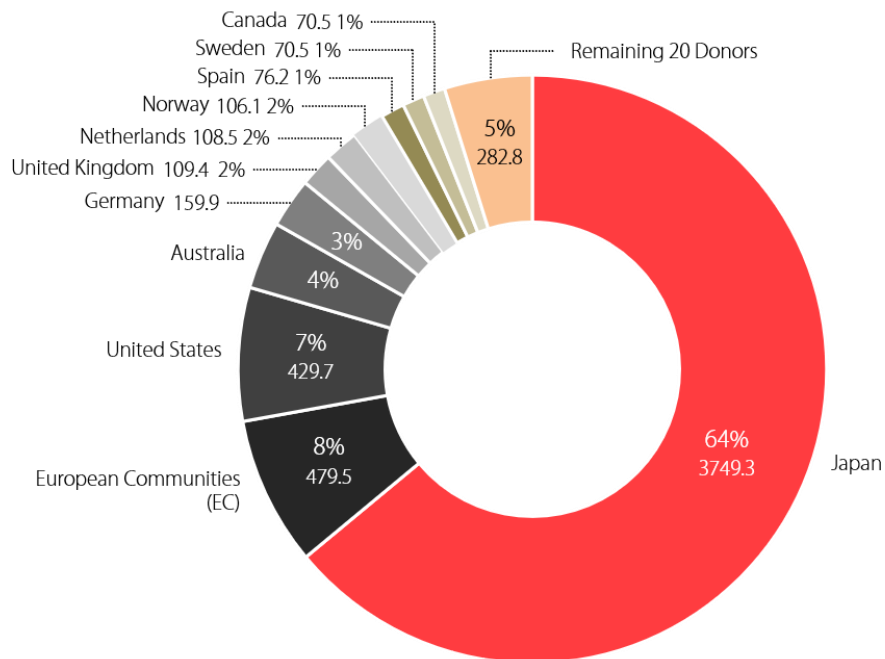


Figure 33. Financing for DRR direct from donors, 1991-2010, USD millions. Source: Kellett and Caravani (2013, 39); modified.

2.5 Conclusion

A natural hazard that hits vulnerable communities has the potential to turn into a disaster. While triggered by physical forces, human actions can have an influence on the outcomes of natural disasters. There is a rise in the number of disasters which can partly be explained by long-term anthropological impacts, a growing population settling in risk prone areas as well as the impact of climate change on severity, frequency and spatial distribution of hydrometeorological¹⁸ events. Disasters can have an extensive financial impact and are usually followed by additional long-term costs, therefore, affect international development funded by domestic resources and international aid. There is a connection between disaster risk and poverty as well as quality of governance which can be seen in the mortality risk.

In the second half of the 20th century, Gilbert White initiated the behavioural paradigm, suggesting adapting human behaviour rather than controlling natural hazards (Smith 2013, 14f). Based on the interactions between hazards and humans, the behavioural paradigm offers a mixed approach with control over nature and adjustment of behaviour. This approach tends to be materialistic and often results in quick short-term measures with inadequate faith in technology and capitalism. The development paradigm on the other hand is based on the idea that a disaster is the result of a catastrophic chain of events. Hence, the scale of a disaster could be influenced through breaking this chain of events while single projects or actions have little effect on prevention or reduction. Following this approach, a disaster is triggered by the underlying economic, social or political problems asking for a more sensible approach, for example through self-help, traditional knowledge and locally negotiated solutions as opposed to a modernisation process based on inadequate imported technologies.

Communities' vulnerability to hazards lead to disasters and is linked to their ability to cope with destructions with their own resources. There are root causes for the vulnerability of a community such as poverty, this results in unprotected buildings and infrastructure or a lack of disaster preparedness. Consequently, communities in less developed countries are left vulnerable to the impacts of natural hazards while they struggle with funding hazard protection and reducing exposure. As a result, the losses triggered by natural disasters are disproportionately high compared to the damage inflicted on resource-rich nations which emerges as serious stress on development. There are also underlying drivers for the risk level of a community such as poor urban and local governance or vulnerable livelihoods.

Whenever a disaster exceeds a community's capacity and resources to manage post-disaster recovery, the reconstruction strategy gets developed in a donor conference. At this stage, after a disaster, a quick provision is important to ensure a prompt start of the reconstruction process, this usually leaves no or little time for detailed planning. Commonly, reconstruction is faced with significant time pressure rooted in the expectations of the media, donors or the beneficiaries themselves, for example international NGOs are pressured to spend money and present quick results to their constituencies. This lack of time for planning can lead to bad results, therefore, the concept of pre-planning for post-disaster reconstruction prior to a disaster event is widely recognised. This is debated with a potential reduction of disaster losses through proactively spending money before disasters strike.

¹⁸ Hydrological, meteorological, climatological

So far, there tends to be a gap between humanitarian relief and the development agenda which roots in different interests as well as diverging types of organisation. A concept of long-term risk reduction, which originated after the Indian Ocean tsunami 2004, is 'build back better', where immediate relief is linked with longer-term processes of recovery and development. The idea behind this concept is that humanitarian assistance in disaster response should go beyond saving lives and alleviating suffering in order to break an ongoing cycle of loss and responding. However, the 'build back better' concept lacks adequate tools for a meaningful contribution to a reduction of communities' vulnerability regarding future shocks. It can also be questioned whether post-disaster response is the right time to tackle underlying problems. Another concept in this field is 'linking relief, rehabilitation and development' (LRRD), a report that suggests the need for a strategic planning policy including political, developmental, societal and technical aspects for communities that are prone to natural hazards. In 1975, the concept of pre-disaster planning was introduced as a tool for mitigation, reducing losses of property, production and life. It should be undertaken from within the community or country preferably by local actors or with the assistance of external sources. The aim of the process is to deal with the causes rather than the symptoms of a disaster both in the strategy of development planning, focusing on long-term goals, as well as during relief activities. In order to decrease the disaster proneness of an area, local resources of the society should be utilised and the processes of increasing vulnerability, increasing disaster proneness and marginalisation must be taken into account.

The idea behind DRR, disaster risk reduction, is a systematic risk management approach to identify, assess and reduce risks associated with natural hazards, covering the aspects of hazards, communities and environments being based on local conditions and needs. So far, the priority of DRR tends to be rather low with only 40 cents invested in the defence of disaster impact in every USD 100 spent on development aid. As shown in Figure 34, almost 90 percent of the funding for natural disasters are invested after a disaster occurs, for emergency response as well as reconstruction and rehabilitation. Between 1991 and 2010, USD 13.5 billion were spent on disaster risk reduction equalling 12.7 percent of the total funding for natural disasters. Shifting the focus from emergency aid to disaster risk reduction could save lives as well as money, time and other resources. As Kellett and Caravani (2013, vi) state, "the future therefore is not just about more money from donor governments, but also about better financing – more integrated and suitably coordinated, and certainly better targeted".

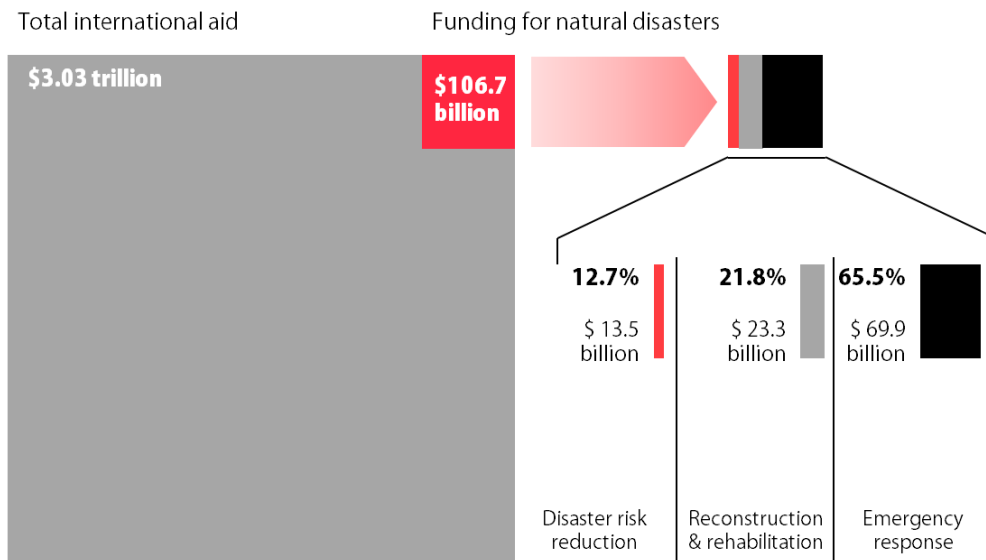


Figure 34. Disaster financing as a proportion of total international aid, 1991-2010. Source: Kellett and Caravani (2013, 6); modified.

With the Sendai Framework for Disaster Risk Reduction released in 2015, the focus shifted for the first time from disaster management to disaster risk management, hence precautionary measures. The four priorities of this framework, which build the basis for this thesis, are: (i) Understanding disaster risk, (ii) Strengthening disaster risk governance to manage disaster risk, (iii) Investing in disaster risk reduction for resilience, (iv) Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction.

A greater capacity of communities and planning authorities to face disaster vulnerability could reduce the impact of natural hazards. According to Khan et al. (2008, 50) a lack of a central instance for integrated disaster management as well as coordination within and between disaster related organizations is lacking which both influence the effectiveness and efficiency of disaster risk reduction. While the focus of international aid lays on emergency response, reconstruction, and rehabilitation, disasters are often viewed isolated from the processes of long-term development aid and poverty alleviation. Commonly, disaster management and development planning organisations and authorities operate separately from each other. Kahn et al. (2008, 50) criticise that disaster management, development planning and environmental management institutions are often isolated and lack an integrated planning concept. To reach a more effective and efficient disaster management, there should be a central authority for integrated disaster management to coordinate within and between disaster related organisations.

Post-disaster recovery responses are rather short-term solutions due to an inadequate timeline and time limited financing. According to Davis and Alexander (2015, 170), sufficient time is needed to carry out planning with care, for example, to revise building codes, train professionals and builders, ensure that the quality of construction is controlled as well as to legislate in favour of improved land use planning.

3 Housing in the context of protection, mitigation and adaptation

Housing adjustment to natural hazard risks is primarily significant at a local level where both the costs of inaction and the benefits of action are initially only felt locally. Therefore, according to Wilson (2009, 224), industrial countries have little interest in acting. In contrast however, in case of a disaster, industrial countries provide a huge amount of financial means in both the emergency and reconstruction phase which was outlined in detail in Chapter 2.3. As discussed in Chapter 2.4 the time after a disaster, during the reconstruction phase, can be a good opportunity to implement housing adjustment strategies and measures. Crucial in this phase is “the reversal of policies that incentivize maladaptive behaviour or solutions” (Glavovic and Smith, Introduction. Learning from Natural Hazards Experience to Adapt to Climate Change 2014b, 4). One example of this are post-disaster funding programmes that aim at rebuilding vulnerable communities to the same condition they had before the event, with the consequence that the same event is likely to have a similar outcome at a different time. The following subchapters define the concept of housing adjustment concluding with characteristics of well-adjusted housing. Another issue related to the subject discussed in this chapter is the understanding that adjustment does not automatically equal good. There are adjustment responses or actions that can increase both the exposure and vulnerability to natural hazards and are previously described as maladjusted housing. Atop of this, since housing adjustment measures directly affect the life of people who do not represent a homogeneous group, there are likely groups or sectors of society or communities that rather benefit while others are rather harmed by housing adjustment (cf. Glavovic and Smith 2014b, 3).

3.1 Housing

“Housing describes the immediate physical environment, both within and outside of buildings, in which families and households live and which serve as shelter.” (Jha, et al. 2010, 363) As stated by Janson and Tigges (2013, 33), architecture and housing are inextricably linked. Along with other functions, the invariable purpose of architecture is to articulate and shield space in a way so that it is available for people to inhabit the earth. This includes both a sheltered residence and the development of their activities. The fundamental meaning of housing can be derived in different existential concepts from the concept ‘house’. House shall be deemed as the essence of protection or shelter and security or feeling of security towards a hostile outside world. As an enclosed place, the purpose of a house is to offer an autonomous space that guarantees peace and quiet on the inside, so people can make their presence to the outside world. According to Le Corbusier (1923, 86), “a house is a machine for living in” (“une maison est une machine à habiter”), which means it should be designed to provide everything that defines a ‘place to live in’. This includes shelter and safety, just as the creation of an environment that offers the possibility to lead a fulfilling life. Based on this, the efficiency of a design must consider the complete range of programme issues including cultural, emotional as well as spiritual. This approach provides a valuable guide to place cultural resources into context (cf. Stein 2013, 199). Following this, housing does not only offer necessary consistency for daily life, which precludes disturbing unforeseen events or eventualities, but also

generates trivialities in its function as a ‘redundancy generator¹⁹’ as defined by Sloterdijk (2004, 520). Further, Janson and Tigges (2013, 357) point out the possible familiarity with the house as a home or habitat. Another term used for housing is ‘habitation’. The architecture of a habitation reflects the lifestyle of its inhabitants. Particularly important for habitation are (i) the relationship between the individual and the community, (ii) the relation of closure and opening to the world, (iii) between standard and appropriation leeway as well as (iv) the meaning of homeliness and habit. All these factors are strongly depending on circumstances such as the ideas of an era, history, cultural characteristics, traditions, social background, etc. Hence, through habitation or housing, architecture significantly interferes the regular flow of people’s lives by enabling, hindering and conducting the processes of daily life (cf. Janson and Tigges 2013, 360).

The term housing, as it is used in this work, includes the internal and external spatial organisation within and between buildings and settlements. Hence, housing is not only defined by layouts, building techniques or building materials but also by people’s activities and relations within houses, villages or settlements. Housing presents a social and cultural space within a natural environment and is the setting for human relationships. Oliver (2006, 192) describes this idea when he discusses the difference between a ‘house’ and a ‘home’: “A town is made of buildings, but a community is made of people; a house is a structure but a home is much more. The distinctions are not trivial, nor are they sentimental or romantic: they are fundamental to the understanding of the difference between the provision of shelter which serves to protect and the creation of domestic environments that express the deep structures of society.” Durable housing as defined by Schilderman and Parker (2014, xiii) must protect people, minimize the risk from natural hazards and enable them to pursue their normal household duties, resume their livelihoods or maintain social networks. In reconstruction, “too often, agencies provide only houses, and leave it up to local authorities or utilities to provide related infrastructure” (Schilderman 2014, 7). In 1982, Ian Davis pointed out that housing should be understood as a ‘process’ rather than a ‘product’. “Nevertheless, the role of donors and humanitarian agencies is frequently misconstrued as being to provide houses rather than to provide assistance that enables communities and local government to identify and overcome issues that prevent families – particularly the most vulnerable families – from accessing decent, durable, and affordable housing.” (Schilderman and Parker 2014, xiii)

Another term often used in connection with natural disasters and reconstruction is ‘shelter’ which Davis and Alexander (2015, 196) depict as “a fundamentally diverse issue. It is a subject with complex variables in terms of site, settlement, climate, size, shape, materials, culture, symbolism, resources, traditions, construction methods and political dynamics. Thus prescribed, generic answers or approaches that may be found in handbooks or Sphere guidelines *never* remove the need to understand specific preferences and functions [...]. The need for officials to face complex dilemmas in a positive manner remains a major challenge to anyone who fondly imagines that shelter is a simple problem that demands simple solutions.” In other words, there cannot be a one fits all handbook on how to design shelter because it strongly depends on the context and the same applies to housing. The International Federation of Red Cross and Red Crescent Societies (IFRC) and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) (2015, 163) describe this

¹⁹ The task of the redundancy generator is to separate the mass of arriving, potentially meaningful signals from the world into familiar and unfamiliar ones. Housing therefore creates familiarity and banished the unfamiliar behind the door. Thus, it provides the inhabitant with the ability to distinguish familiar from unfamiliar. In this sense, housing allows for determining useful repetitions. To be at home one must form an unconscious unit with the home.

complexity as follows: “[...] shelter is not merely a non-food item, or a covering or a structure. It has to be regarded as a foundation for livelihoods, a location where building skills are taught, a place to recover damages identities, an opportunity for psychological recovery for family as they re-group and a structure that is environment friendly. Most of all every shelter has to become a *home* not just a *house*.”

3.2 Maladjusted housing

If a natural hazard hits maladjusted housing it has the possibility to lead to a disaster. The term maladjusted is used to define housing which is unsuited or poorly suited to a particular situation in regard of climatological, meteorological, geophysical and hydrological conditions as well as regarding institutions. There are various possible reasons for maladjusted housing in less developed countries. Most of them are closely linked with institutions, for example in regard to existing building codes, existing building traditions or traditional materials. Following the definition of Glavovic and Smith (2014b, 5), institutions are defined as “systems of societal ‘rules’ and norms that shape social interactions and choices”. They are “embedded in social settings; they are social constructs with historical underpinnings and they are subject to change over time”. This means institutions include not just ‘rules’ but also norms, cognitive attributes as well as underlying social and cultural foundations. Hence, traditional materials or traditional building codes are defined as institutional mechanisms just as building codes or land regulations. These mechanisms are closely related to communities’ level of vulnerability (cf. Glavovic and Smith 2014b, 6).

A fragile physical environment, such as unprotected buildings and infrastructure or settlements in dangerous locations, results from dynamic pressures, for instance, a lack of appropriate skills or a lack of local institutions. Factors behind this may be a shortage of money and other resources, a lack of planning rules, inadequate regulations or not accounting for natural hazard impacts in the planning process for housing. Furthermore, less privileged population groups may lack the necessary economic, technic and financial possibilities to improve their homes. Even if there is an existing building code, it can only be effective if combined with regular site inspections throughout the construction period. In addition, Smith (2013, 155) states “building codes are frequently neglected and bypassed, due to a lack of resources, imperfect technical knowledge and local corruption”.

In several cases, houses get built without a planner which itself does not yet pose a problem. Although, as described later in Chapter 4.3, the absence of a planner can have negative consequences and sometimes lead to safety issues. Another topic is the usage of appropriate materials. It is frequently the case that traditional materials, techniques and building methods are considered regressive and therefore are no longer in use. This view is shared by either the government, the people themselves or both. As stated by Kessler (2014, 82) even “low-income families tend to avoid traditional materials such as bamboo and adobe as they are perceived to be ‘poor man’s materials’. On the other hand, the concrete block and reinforced concrete frame construction are preferred as a result of their modern image.” Using the example of earthquakes, about 60 percent of all hazard-related deaths are caused by the failure of unreinforced masonry structures (cf. Key 1995, 28). On the other hand, some indigenous houses have proofed to be earthquake resistant. For example, when Nias island was hit by an earthquake with the magnitude of 8.7 on the Richter scale in 2005, as described in Chapter 8.1.1, the native wood-framed houses survived mostly undamaged however approximately 1,000 people died in collapsed brick buildings

(cf. Smith 2013, 154). In other contexts, it could be the case that the knowledge about traditional techniques and methods has simply fallen into oblivion. This development is problematic since the traditional building knowledge can be more suitable for adjusting housing than modern standards or trends, particularly if they are only the attempt to emulate Western modernity as it was described in the example of Nias island.

Another reason for maladaptive housing is frequently a lack of knowledge in respects to expected changing conditions in connection with climate change. This can be in combination with missing knowledge on technical possibilities or construction methods as well as adjusted livelihood options. This results in housing that might be adjusted to past natural hazard conditions but does not consider current or future expected changes. Although this misalignment is well-known in many cases, often there is no felt pressure to act due to unreliable forecasts on both the time and degree of the actual effects. In addition to this, in several cases housing would pre-date the building codes and retrofitting to new standards is both difficult and expensive (cf. Smith 2013, 155). According to Smith (2013, 159) “administrators and decision makers are not always convinced of the threats and may fail to see any financial advantage in the need for investment in [natural hazard] security. At worst, building codes can lead to new building in hazardous areas if they create a false sense of security”. Also, coping and adjustment strategies from the past may not be sufficient for the future. For example, this is the case in the Vietnamese Mekong Delta where a majority of houses are built on stilts and therefore are adapted well to the hazard of frequent floods, however this construction method cannot be combined with the hazard of strong winds or typhoons (cf. Birkmann, et al. 2012, 272). Figure 35 and Figure 36 show this particular problem in the case of stilt houses on the Tonle Sap Lake in Cambodia.



Figure 35. Stilt house in Cambodia after a storm I.
Source: Lucas, 2013.



Figure 36. Stilt house in Cambodia after a storm II.
Source: Lucas, 2013.

The definition of maladapted as ‘poorly suited to a particular situation’ can be broadened from a technical or engineering approach to sociological components which is discussed in detail in Chapter 4.4.

3.3 Housing adjustment

So far, the issue of housing adjustment has been comparatively muted in politics. One of the main reasons for this is that “mitigation is a global issue” whereas “adaptation is particularly significant

at local or regional levels” (Wilson 2009, 224). As stated above, both, the costs of inaction and the benefits of action are initially only felt locally, so industrial countries have little interest in taking action. Housing adjustment to the natural environment and natural hazards is not a new issue. “Throughout history the climate has changed and populations and planners have adjusted accordingly and adapted gradually to seasonal changes in extreme weather events.” (Halsnaes and Laursen 2009, 83) There is a strong faith in technology of today’s society which, according to Frampton (1980), emerges from the common belief of modernity to have the ability to control or master nature. It can lead to the conviction that everything can be solved with technical solutions. For example, the simplicity of cooling and heating air contributed to careless attitudes toward orientation, climate, building envelope and material performance. This was followed by a huge number of buildings that appear to be designed to exist on any site and thus are appropriate to none (cf. Rifkind 2013, 20). Additionally, traditional housing techniques can be lost in the procedures of reconstruction after a disaster. For example in Aceh, some agencies tried to replicate the style of a traditional Acehnese house but, due to the lack of suitable skilled craftsmen and appropriate material, the outcome was of bad quality and led to a loss of confidence in this approach among the local communities. According to da Silva (2010, 56) in some cases, “key characteristics such as the foundation stones (umpak) were replaced by concrete plinths and coconut timber or softwood used instead of hardwoods. These modifications tended to compromise structural integrity and termite attack”. As a consequence, masonry and reinforced concrete houses became the preferred priorities (cf. da Silva 2010, 56).

Glavovic and Smith (2014b, 3) distinguish between ‘Anticipatory’ and ‘Reactive’ adjustment to climate change which in the following is expanded to the issue of adjustment to natural hazards. While anticipatory adjustment is proactive and takes place before impacts are experienced, reactive adjustment takes place in the aftermaths of experienced natural hazard impacts. Further, they distinguish between ‘Private’ adjustment, which is driven by individuals, households or private entities, and ‘Public’ adjustment which is both initiated and undertaken by the government. This is often and preferably in partnership with non-state actors to realise preferred public outcomes. These can be local stakeholders and community members but can also include actors from the private sector or civil society, together with non-governmental organisations (NGOs), the scientific community and in some cases donor agencies and even the United Nations. The last difference is made between an ‘Autonomous’ and ‘Planned’ adjustment. While the latter is defined by Glavovic and Smith (2014b, 5) as an “intentional and liberal choice to take a course of action to return to, maintain or attain a desired state” regarding a potential natural hazard risk. Autonomous adjustment describes spontaneous adjustments not necessarily consciously initiated to respond to natural hazard risk. In conclusion it can be stated that local authorities have a major influence on housing adjustment and with this enable community members to realise desired livelihood outcomes (cf. Glavovic and Smith, Introduction. Learning from Natural Hazards Experience to Adapt to Climate Change 2014b, 5).

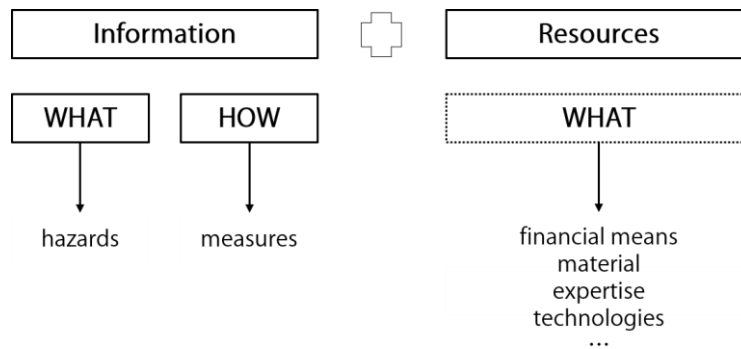


Figure 37. Elements of Adjustment; own diagram.

In order to adjust housing to natural hazards it is crucial to have the necessary information, what to adjust to and how to adjust, while the measures are based on the resources available such as financial means, material, expertise or technologies. These are visualised above in Figure 37. The resources include local characteristics, as for example, culture, religion, building traditions, etc. Glavovic and Smith (2014, 4f) state, adjustment “needs to be located within the context of the factors shaping community development including the underlying causes of vulnerability, exposure to extreme events and the institutional structures and processes that facilitate individual and community decision-making and access to community assets and ultimately determine livelihood outcomes”.

The following diagram (Figure 38) was introduced by Smith (2013, 98) to elucidate measures reducing disaster impacts. Identification of natural hazards, followed by assessing risks, are the basis for the development of protection, mitigation and adaptation measures for housing. These three fields of measures combine both the engineering as well as the behavioural paradigm. They follow the previously introduced complexity paradigm shown in Figure 39 with an equal emphasis on both the societal and the physical system. For the purpose of the complexity paradigm disasters occur at the interface between the physical system and the societal system while both sides are weighted equally. Hence, the scale of disaster impacts may be influenced by an alteration of the characteristics of the social and physical system in order to break the chain of events leading to a disaster (Smith 2013, 47f).

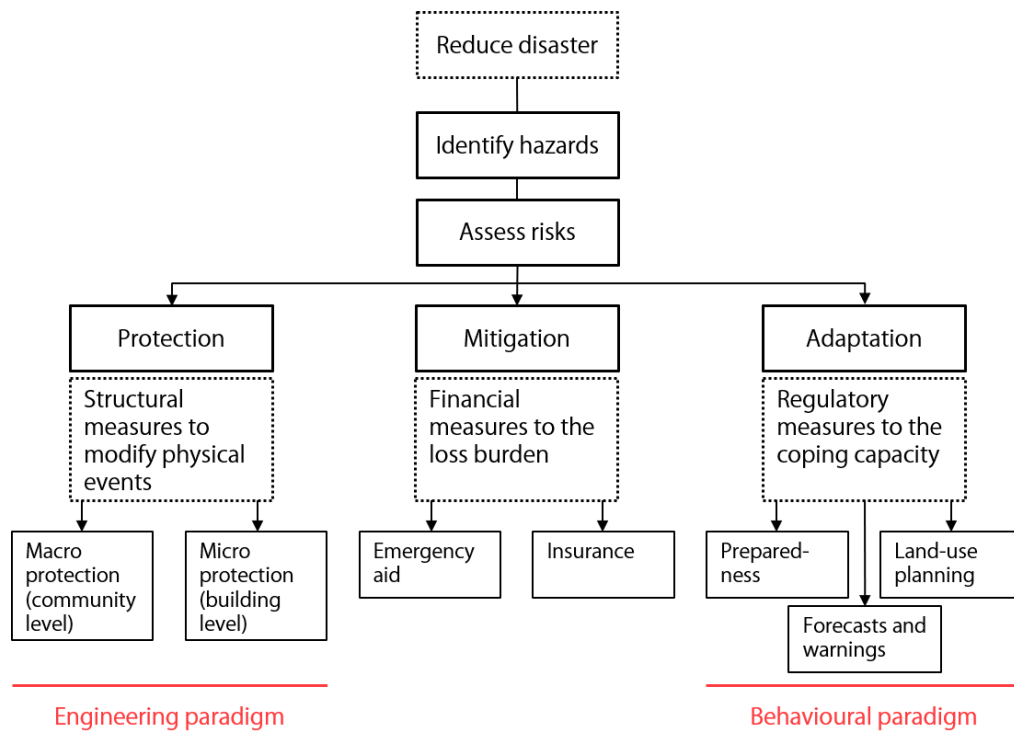


Figure 38. Disaster reduction strategy. Source: Smith (2013, 98); modified.



Figure 39. Complexity paradigm; own diagram.

Protection measures comprise structural measures to modify physical events which are either on a community level (a sea-wall) or on the building level (earthquake resistant construction methods). Mitigation measures include financial processes to cope with the encumbrance of loss such as emergency aid or insurance policies. Regulatory measures to the coping capacity are described as adaptation and contain preparedness, forecasts and warnings as well as land-use planning. The effects of these types of intervention cannot solely be determined to their category but mutually influence each other, for example protection measures can have an influence on adaptation measures (cf. Smith 2013, 97f).

3.4 Characteristics of well-adjusted housing

Due to limited time and resources during reconstruction, there is commonly an insufficient consideration of quality for housing projects. According to da Silva (2010, 56) quality must be understood from the occupants' perspective, hence, is based on community involvement. She names habitability as the key performance factor to be considered comprising protection from the weather, internal comfort, safety and security, sufficient space, and access to services. On the long-term perspective, additional factors may be of importance such as durability and adaptability as shown in Figure 40. Building performance, as stated by da Silva (2010, 57), goes beyond the quality of construction and puts the user in the centre of considerations. However, the focus of her consideration is on a single house unit. While this thesis looks at housing as an internal and external spatial organisation within and between buildings and settlements, therefore the factors for quality become more multidimensional.

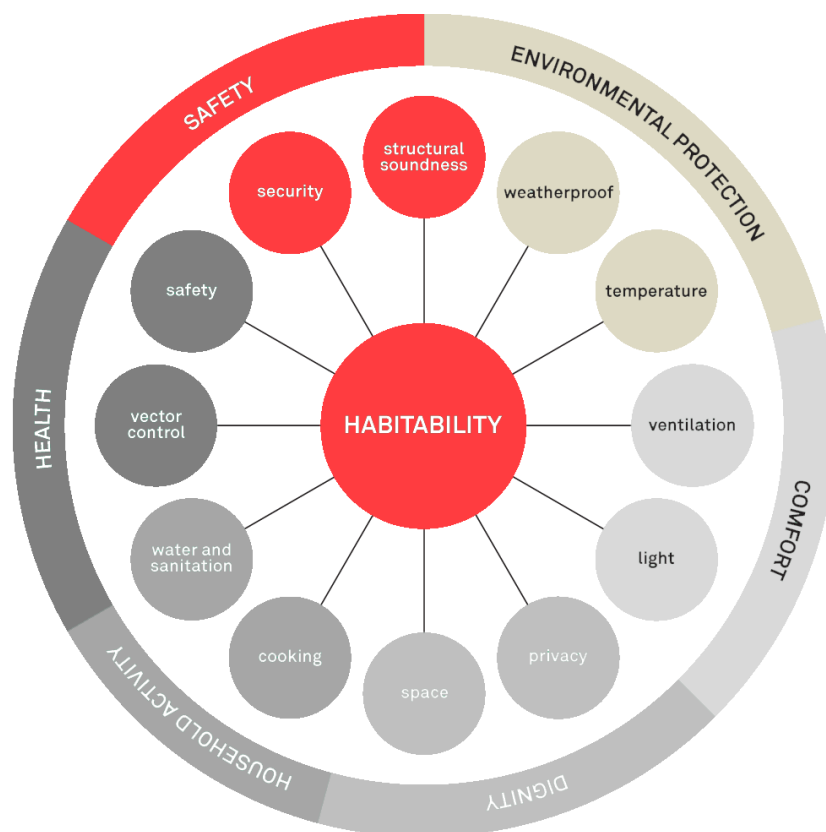


Figure 40. Key performance criteria for houses. Source: da Silva (2010, 57); modified.

The following characteristics of well-adjusted housing are defined based on findings from reconstruction projects and various handbooks and literature²⁰ on sustainable housing reconstruction. One main aspect regarding this thesis is the resistance of housing to the pressures of future and ongoing natural hazards, as defined within this work. As mentioned before, apart from the technical characteristics there are a vast number of characteristics concerning social and economic issues which are just as important. For example, the design of housing units need to align with the local culture and allow families to gather in ways that are culturally acceptable. Units also need to be designed with reference to economic needs, such as shelter for animals or the spaces for home businesses. Further, homes should be situated at a place with adequate transportation links, such that the people who live in them can get to work. Another important aspect that is often underestimated is the preservation of the social fabric to maintain social networks. A list of these characteristics as supposed in this thesis is presented in Table 3.1, Table 3.2 and Table 3.3. These are allocated to a field of measures as defined by Smith (2013) previously introduced and include possible instruments to achieve these characteristics. According to Davis and Alexander (2015), practical problems can often be foreseen by conducting a risk analysis and site surveys to understand how items fit together. In any case, a close cooperation with the community, house owners and beneficiaries is an essential requirement.

²⁰ Jha et al. (2010); Duyne Barenstein and Pittet (2013); Davis and Alexander (2015); Ahmed and Charlesworth (2015); Aquilino (2011); Charlesworth and Ahmed (2015); Glavovic and Smith (2014); Hyde (2000); IFRC and OCHA (2015); Lizzaralde (2014); Naimi-Gasser (2013); Olgyay (1963); Oliver (2006); UN Habitat (2015).

Protection measures

Table 3.1 Protection measures for well-adjusted housing. Source: Jha et al. (2010); modified

Characteristics	Categories	Explanation	Instruments
Availability of services	Materials Facilities (Community) Infrastructure	For adequate housing the occupants require safe drinking water, adequate sanitation, energy for cooking, heating, lighting, food storage or refuse disposal; Integrated approach where a range of elements are provided, roads, water, sanitation, electricity, schools, community buildings, parks	Mapping and geospatial information; Check existing master plans; Indicate houses, access roads, infrastructure and services, green, recreational, commercial and religious areas; Select an appropriate water-supply and sanitation system; Select sustainable power system that, to the extent that is possible, uses renewable energy sources; Opt for access roads with adequate surface and space for extension; Establish telecommunication connections
Habitability see also Adaptation	Climate conditions Future climate conditions Natural hazards Materials	Housing needs to guarantee physical safety or provide adequate space, as well as protection against the cold, damp, heat, rain, wind, other threats to health and structural hazards; Units are built so they resist the pressures of future or ongoing hazards, as defined within this work, hence will not collapse in renewed hazard impacts	Community-based risk assessment; Vulnerability assessment; Environmental impact assessment; quality control of materials and works; Use of local sustainable construction technologies; Identify required disaster-preparedness measures; Identify if existing structures can be reused/integrated with the new buildings; Select house shape, building components and technologies according to climate and natural hazard risk
Accessibility see also Adaptation		The specific needs of disadvantaged and marginalized groups are taken into account	Choose building design that allows for the need of disadvantaged; Needs assessment of future house owners;

Mitigation measures

Table 3.2 Mitigation measures for well-adjusted housing. Source: Jha et al. (2010); modified

Characteristics	Categories	Explanation	Instruments
Security of tenure		For adequate housing the occupants need to have a degree of tenure security which guarantees legal protection against forced evictions, harassment and other threats	Clarify what rights the beneficiaries/users will have (to sell, rent); Check land property ownership and the right to build
Affordability	Materials Design Maintenance	The costs of housing should not threaten or comprise the occupants' enjoyment of other human rights	Bill of quantities and detailed budget; Choose building designs and materials that are energy efficient, environmentally appropriate, low-cost and practical; Identify the resources; Integrate action plan and budget for future maintenance
Material security	Insurance cover (without life insurance)	In case occupants lose their house in a disaster, their existence is not threatened	Identify insurance coverage; Clarify minimum needs for existence; Include insurance payments to maintenance and busget plan

Adaptation measures

Table 3.3 Adaptation measures for well-adjusted housing. Source: Jha et al. (2010); modified

Characteristics	Categories	Explanation	Instruments
Location		Should not be cut off from employment opportunities, health-care services, schools, childcare centres and other social facilities; Should not be located in polluted or dangerous areas; The homes are situated at a place with adequate transportation links, such that the people who live in them can get to work	Check existing masterplan; Indicate areas (infrastructure and services, ...)
Cultural adequacy		Should respect and take into account the expression of cultural identity; The design of units follows the culture; for instance, families are aggregated in ways that are culturally acceptable	Explore expectations of users; Select house shape, building components and technologies according to culture; Use materials that are socially accepted; Design kitchens, stoves and bathrooms to ensure cultural acceptance, hygiene, smoke-less cooking and safety; Diversity of houses rather than uniformity in house design
Economic needs		Units are designed with reference to economic needs such as shelter for animals or the need to maintain workshop; Support livelihoods	Skills training, provision of equipment, necessary infrastructure, start-up supplies, cash-for-work, creating jobs and marketing opportunities (local building products supplier, producers; Ensure location meets the users' needs
Social fabric	Social Nets Neighbourhood assistance Families Self-help	Preserve the social fabric to maintain social networks; See also availability of services	Community participation; Community assessments; Offer community buildings or the like, possible areas for the community to gather

Maintenance	Access to material Knowledge of building methods	The house should be designed for easy and self-evident care and maintenance; Ensure all materials can be worked/repared locally; The occupants need to know how to maintain their home; The house should be built in a way, so it can be modified by the users	Checklist of regular actions needed (cleaning of storm water drains, vegetation control, pest control); Training/instructions for cleaning, small repairs, etc. to users and house owners; Training for masons, labourers, engineers, as needed; Technical documentation
Accessibility see also Protection		The specific needs of disadvantaged and marginalised groups are taken into account	Choose building design that allows for the need of disadvantaged; Needs assessment of future house owners;
Habitability see also Protection	Climate conditions Future climate conditions Natural hazards Materials	Housing needs to guarantee physical safety or provide adequate space, as well as protection against the cold, damp, heat, rain, wind, other threats to health and structural hazards; Units are built so they resist the pressures of future or ongoing hazards, as defined within this work, hence will not collapse in renewed hazard impacts	Community-based risk assessment; Vulnerability assessment; Environmental impact assessment; Quality control of materials and works; Use of local sustainable construction technologies; Identify required disaster-preparedness measures; Identify if existing structures can be reused/integrated with the new buildings; Select house shape, building components and technologies according to climate and natural hazard risk

4 Planning

“Plans are worthless, but planning is everything.” (Eisenhower 1957, 818)

Based on this quote, Davis and Alexander (2015, 181) argue: “The most important observation one can make about planning, about sheltering and about housing is that the process is usually more important than the physical outcome in form of plans, shelters and houses. This is because planning is an approximate process that deals with developments in the future that cannot be known perfectly. [...] The planning process enables the planner to find out many things about the activities to be planned in order to regulate them. Planning needs to be a participatory process that is considered to be the common property of all individuals and institutions that have a stake in it. It is usually a social process as well, in which consultation is the only way to ensure that plans are accepted, utilised and adhered to. A good plan thus represents a consensus among the interested parties, who are all aware of its provisions and their roles in its enactment.”

The following definition of the term ‘planning’ is inclined towards Fürst and Ritter (cf. 2005, 765-769).

In contemporary common parlance, planning is understood as considerations dedicated to attaining objectives, intentions or plans (cf. Scholl 2005, 1122). According to Fürst and Ritter (cf. 2005, 765), planning is understood as a systematic process for the development of operational objectives and sequences of tasks over a longer period. Planning is commonly associated with scientific rationality, future orientation, governance or management and coordination. However, planning is always pluralistic, there is no absolute truth or evidence. The components of planning – contents, form and process – are determined by each particular planning situation or the respective purpose of planning. Planning poses an instrument for solving and managing social problems by expanding political opportunities for action in two ways. It can help to improve the information base as well as increase the options for future actions and conflict management. Following this, planning has a so called ‘early warning function’ which means that the development of problems is addressed at an early stage and the perception, definition and possible solution space of the problem are already predefined. Second, it has an ‘orientation function’ by extending the timeline of action to the future. Further, it has a ‘coordination function’ because conflicts of objectives and measures caused by interdependencies and the related evaluation depending on different interest and concerns are considered and cleared up early. Finally, in specific cases, planning attempts to resolve distribution conflicts and conflicts of interest in favour of cooperative learning processes that are oriented towards the common good, ‘moderation function’ (cf. Fürst and Ritter 2005, 766f). The authors state, planning must define the objectives as well as evaluate the results while mandatory planning always sets restrictions which can have a market impact as, for example, “internal development before external development”. Therefore, it is crucial for planning to constantly balance between various concerns including individual and collective interests, market economy oriented and wider social (society as a whole) issues. The decisions of today must increasingly be made quicker, for example, regarding frequently rapid and unforeseeable changes in the wake of climate change. It appears therefore necessary to make a clearer distinction between planning of long-term and stable control, organisational and order structures, and planning of specific problem-solving processes. These latter forms of planning results must be prompt, adaptable and flexible towards changes of context and they also should be developed as cooperative learning processes (cf. Fürst and Ritter 2005, 766f).

Since the idealised model of full rationality formerly used in planning has long been proved to be an illusion, planners need to learn to lower their claim for rationality and to manage with uncertainty and limited knowledge. Planning is rather understood as a possibility to organise decision-making processes more effectively that is to draw decision-making horizons for the longer term, to observe and respect the factual, social and spatial contexts and above all to understand the whole procedure as a learning process. Planning can only be successful if it is designed as an integrative management process which equally includes conception and implementation, observation and control, personnel management and use of resources, the clearest possible targets and proactive engagement of the persons involved whilst not forgetting the ethical dimension of acting (cf. Fürst and Ritter 2005, 768f).

4.1 Planning approach

The following definition is based on Schönwandt and Voigt (2005, 769-776).

Planning can never occur without a planning approach. Usually, planning has a specific reason or initial objective and additionally each planning uses an underlying planning approach. This means that whether consciously or unconsciously, each planner consults at least one approach (cf. Schönwandt and Voigt 2005, 769). A planning approach according to Schönwandt and Voigt (cf. 2005, 769f, 772) consists of four components, namely a set of problems (view of the problem), a set of targets, a set of methods and certain background knowledge. This is based on Bunge (1996, 79) who already introduced these four sets with problems (P), targets (Z), methods (M) and background knowledge (H). These four elements are explained in more detail in the following.

The first to be discussed, is the view of the problem or the definition of the problem. According to Kuhn both, our thinking and acting is based on particular theoretical assumptions that determine what will be accepted or understood as a problem as well as which solutions are possible. Every planning problem is an unsolved task and each 'view of a problem', 'problem definition' or 'solution to a problem' has its origin in the underlying planning approach and therefore is not objective, in the sense of viewer-independent. This is because the starting point for a problem can be either (i) a current state which is considered negative according to the observer and therefore should be improved, or (ii) a current state considered positive that, again from the observer's perspective, requires an intervention in order to be maintained (cf. Schönwandt and Voigt 2005, 772f). This means both the definition of the problem as well as the determination of the target are undertaken by the observer so also by the planner in the role of an observer.

The background knowledge is a combination of discipline-specific and philosophical elements. Discipline-specific background knowledge refers to the different fields of knowledge of individual professional disciplines as for example sociology, architecture or engineering. Philosophical background knowledge, the second element, can be divided into ontological, epistemological and ethical aspects. While ontology addresses the question what the real world consists of, epistemology addresses theories of cognition and knowledge. Here, the question examined is how conceptual processes occur as well as what will be the products or results of these processes. The epistemology used in planning is intended to enable the observer to develop most accurate descriptions of the planning situation while positions towards this rank between "knowledge is real and therefore easy to communicate with other people" and the other extreme "knowledge is soft, rather subjective, it is

based on experiences, insights and is primarily personal". The ethical aspect covers the values and moral concepts underlying planning which generally become apparent as conflicts between contradictory values. An example for this is the planner's decision of whose side to take. At this point, planning mainly for the poor and disadvantaged populations stands for social justice (Rousseau, Marx, Rawls), for the majority represents utilitarian justice (Hobbes, Bentham, Mill) and taking the side of the strong members of the society stands for liberalistic or elitist justice (Nietzsche, Smith, Hayek) (cf. Schönwandt and Voigt 2005, 772f).

The determination of certain targets and definitions of problems together with certain background knowledge affects the selection of used methods. For example, for bottom-up planning with a focus on the interests of the people affected, methods of communication and participation automatically come into play since they are a precondition for an active involvement. Atop of this, the development of new methods leads to processing of a new problem, a formulation of new targets as well as a development of theories as new background knowledge (cf. Schönwandt and Voigt 2005, 774f). In the context of adjustment of housing to natural hazards, methods such as risk mapping, scenarios and prognosis on natural hazards and climate change or new possibilities in structural design pose methods that can lead to a new attitude towards a changed handling with problems. If there is no knowledge about expected changes in climate for a particular site and the associated risk for the community living there, maladapted housing will rather not be defined as a problem and adjustment of housing will rather not be identified as a solution.

Schönwandt and Voigt (2005, 775) argue, the solution of problems is usually dominated by discipline-specific background knowledge whereby individual disciplines naturally explain reality with their specialist concepts, examine specialist context statements and apply specialist methods. As a result, specific problems are defined and solved with corresponding solutions. Therefore, architects or engineers mostly propose constructional solutions while sociologists propose social solutions and so forth. The planning approach applied in this case considers only parts of reality and includes predetermined values of what aspects are considered as relevant and which are not. This aspect is vital with regards to this thesis. The planning approach of a planner decides on the definition of a problem as well as the possible set of solutions for a problem. In the context of housing adjustment, the objective is to use an approach across disciplines which opens new potentials and new answers. This discussion about planning approaches is also supporting the issue of knowledge sharing within the topic of housing adjustment which will be described later (Chapter 9 Discussion). In summary, the chosen planning approach determines the problem solution and therefore, for the same current state, different approaches normally lead to different solutions (cf. Bunge 1996, 80). Planning approaches are alterable and dependent on time because knowledge as well as values change over time. Consequently, a planning approach cannot be "true" or "false" it can only be appropriate or inappropriate, relevant or irrelevant, adequate or inadequate and always with regard to certain planning questions or tasks. This leads to conclude that an appropriate procedure would be to first agree on a definition of the problem which is accepted by all parties involved and then specify and find the desirable objectives as well as the relevant background knowledge and the appropriate methods (cf. Schönwandt and Voigt 2005, 775f).

4.2 Theories of planning

The definition of theories of planning is based on Schönwandt and Jung (2005, 789-797).

As stated above, planning is the conceptual anticipation of future actions. In this process, the task of planning theory is to systematically explain and support this activity. The term 'planning theory' comprises two different thematic areas, these are "theories in planning" and "theories of planning" (cf. Schönwandt and Jung 2005, 790,792). This chapter focuses on theories of planning which concerns the planning process in itself. In planning concepts, such as objective knowledge in the sense of knowledge independent of actors, rational in terms of reasonable and therefore per se correct decisions or optimal solutions as in conflict free or uncompromised and unaffected of power conflicts are inapplicable. This is because expert knowledge is always based on values and standards and therefore consequently is subjective²¹. The aim of systemic planning models is to logically integrate as many as possible of the aspects of planning and put them in a systemic connection. These planning models are here termed as planning theories of the third generation which includes, in the broadest sense, the planning models of Stachowiak (1992), Heidemann (1992) and Schönwandt (2002) (cf. Schönwandt and Jung 2005, 794). In the following, the planning model of Schönwandt will be described in more detail. In his definition, planning takes place in a planning world that is in turn embedded in a life world. It is in the planning world where instructions, as for example plans, are established. Since planning is always done by people, the planners themselves are an essential component in each planning process. Through their thought worlds they create a planning world or a "professional community". Core to these thought worlds are the planning approaches as described above. So, the planning world presents the "professional community" that is built by the common thought world of planners while life world is the surrounding or context where the planning world is embedded. All the operating steps of planning tasks take place embedded within those two components (cf. Schönwandt and Jung 2005, 794f).

The life world contains the totality of actors outside the planning world that are involved in a planning process or affected by it. This includes among others, politicians, citizens, authorities, companies and associations. Further, it comprises the so-called agenda which is the catalogue of political discussion and contentious points that plant the seeds for planning processes and planning decisions. The life world especially includes all material, as for example physical space, and conceptual circumstances such as social, economic, ecological or political-administrative aspects that are the objects of planning. However, it is always only about the section of life world that planners can perceive or act on. Planners can neither completely observe the life world nor affect all its facets with their measures. The process of planning tasks takes place as an exchange between these two worlds. The third component net to planning world and life world are the concrete work steps. These three components influence each other mutually and are in permanent exchange which is why they are distinguished even though they cannot really be separated (cf. Schönwandt and Jung 2005, 795).

The theoretical basis of this planning model is the systems theory following the "system-environment-paradigm"²². According to this, a system consists of a system core, here represented as the planning world, which is embedded in its surroundings, the life world. However, only the

²¹ See also: Meyerson and Banfield (1955); Lindblom (1959).

²² See also: Uexküll (1928/1973).

components of the life world are taken into consideration that are influencing the planning world, or that are for their part influenced by the planning world. The life world consists of the entirety of all stakeholders, the agenda which is the catalogue of political dialogue and contentious points, physical circumstances as well as conceptual conditions as for example social, ecological or political aspects (cf. Schönwandt and Jung 2005, 795). Since the model allocates the individual work steps of planning to the corresponding worlds, the relevant aspects of planning are put into a suitable and comprehensible relationship. Additionally, through the system-environment-paradigm the model examines the aspect that planning does not act in a vacuum but in a life world which means in a certain context. Planning can neither be understood nor practiced regardless of the overall system which it is part of. This explains why there is often planning decisions that are inconsistent with the political argumentation or the majority in the life world, while neither of these sides can automatically be considered superior (cf. Schönwandt and Jung 2005, 795f). In relation to housing adjustment and reconstruction after a disaster, this means there cannot be one solution that fits all, planning here should happen in a case to case manner based on the respective political, social, ecological, economic and administrative context.

4.3 Planner

Various researchers have stressed the importance of involving built environment professionals in disaster risk reduction and response.²³ Lloyd-Jones et al. (2009, 10) use the term ‘built environment professionals’ to refer to architects, planners, engineers and surveyors. These professionals commonly work together in project teams and, besides a good understanding of the skills and expertise of their colleagues, need appropriate knowledge and experience to work in natural hazard related situations. Built environment professionals as defined by Lloyd-Jones et al. (2009, 11) comprise of practitioners concerned with “technical support services consultation and briefing, design, planning, project management and implementation, technical investigations including monitoring and evaluation studies” while they can also design and implement policy, standards and regulations of the built environment or be involved in training, professional education and research. However, Lizarralde et al. (2014, 1) state: “The most important contribution of architects and other specialists does not come from where it is commonly believed to (design and construction) but instead from a proper understanding of the roles and capacities of the multiple actors involved.” In the context of this work ‘built environment professionals’ are referred to as ‘planners’ comprising of all the previously listed professions as set out by Lloyd-Jones et al.

Through their work, planners have an influence on the social, economic and environmental development of a community (cf. Lizarralde, Johnson and Davidson 2014, 20). With a focus on spatial planning, Domhardt and Kistenmacher (2005, 753) describe the responsibilities of planners as target-oriented impact on spatial development of society, economy, infrastructure and environment by establishing strategies, concepts, programmes and plans as well as projects for respective decision-makers and decision-making processes. At the same time, for planners there is a gaining importance of involvement in implementation and management tasks as for example, moderation or mediation. Therefore, requirements are increasing regarding communicative skills. Planners and other decision-makers “have the responsibility of determining the “rules of the game” that are required for developing sustainable housing solutions that respect the environment, the culture and

²³ See Tauber (2014); Aquilino (2011); Lloyd-Jones et al. (2009).

the society” (Lizarralde, Johnson and Davidson 2014, 24). As stated by Blotevogel (Raum 2005, 840) planners considered themselves of being experts for a long time, a situation that started changing with the development of citizen involvement for participative planning and the inclusion of natural hazard awareness. For the most part planners are the outsiders, not experts but on this perception it is possible to develop systematic planning processes establishing appropriate measures by taking existing resources of persons and organisations into account (cf. Weth 2005, 823). In order to work in planning, it is essential to be aware of knowledge gaps stemming from the outsider role.

Lizarralde et al. (2014, 23f) claim: “The principal difficulty in reconstruction is not so much that of building houses (which in most contexts is relatively easy to solve from the technical point of view) but of creating – through the built environment – the conditions for economic recovery, wellbeing and long-term sustainable development. However, presented in this way, this is a statement of the solution as much as a statement of the problem, because how do we know what those conditions are?” There are various examples from reconstruction projects in disaster-affected areas where unqualified choices of decision-makers or planners led to the development of unsuitable solutions, some presenting a danger or problem for the beneficiaries. The issue is deepened in the following Excursus on the basis of two examples²⁴. This special role of the planner in reconstruction also applies to everyday-planning. Housing reconstruction as well as housing adjustment are complex projects that often fail due to an insufficient elaboration and analysis of targets and root causes or an assumption of familiar work practices without reflection (cf. Weth 2005, 822). An in-depths discussion of this can be found in Schönwandt et al. (2013), Schönwandt (2002) and Schönwandt (1986). The following subchapters discuss the responsibility of the planner and inevitable skills foundational to work in the field of housing adjustment and housing reconstruction.

²⁴ Extracted from Brenner (2017).

Excursus

Mistakes made in reconstruction tend to be repetitive and hereafter two cases are presented to illustrate this situation. There is a series of anthropological studies and research about the impact of reconstruction projects in developing countries with questionable results regarding the quality of housing²⁵. In reconstruction after a disaster, one aim is to decrease the level of vulnerability to natural hazards. However, in some cases some beneficiaries are more vulnerable to natural hazards after the reconstruction than they were before. As Lizarralde et al. (2014, 20) put it: "Rushed by the urgency of attending to immediate needs, reconstruction projects rarely develop into sustainable solutions in long term." The two examples following present two common challenges/flaws in housing reconstruction entailing quality losses. One aspect is the importance of involving the affected community, which was analysed by Dune Barenstein and Pittet (2013) in a reconstruction project in India following the Indian Ocean tsunami in December 2004. It is suggested that decisions regarding building technologies and housing design should be made in close collaboration with the beneficiaries. According to Dune Barenstein and Pittet (2013, 120), in a perfect world "a careful participatory analysis of the local housing culture and of the strengths and weaknesses of communities' building practices would define the reconstruction approach to be adopted and the building technologies to be promoted with the aim to 'build back better'". The second example discussed focuses on the sociocultural impact. During reconstruction projects the focus often lies solely on the houses while the surrounding space, as well as the vegetation, may be equally important aspects to consider. This topic is discussed with another post-tsunami housing project in Tamil Nadu which has been analysed by Jasmin Naimi-Gasser (2013).

Case 1 The importance of involving the affected community

In 2006, Dune Barenstein and Pittet (2013) carried out a reparability assessment of 1,500 traditional houses in two villages in Nagapattinam district in Tamil Nadu, India. As part of the reconstruction efforts following the tsunami 2004 an NGO intended to replace these houses with concrete houses built by a contractor. This assessment proved that most of the houses examined were reparable or undamaged and therefore did not need to be replaced. Besides this, they also did an analysis of the sustainability of the existing housing typologies regarding the costs of construction and maintenance, thermal comfort and the ecological impact of the materials used. Their findings showed valid evidence about sustainability, reparability as well as functionality, beauty and comfort of the existing houses. However, all these findings were ignored by the NGO and, as a consequence, 700 intact traditional pre-disaster houses were demolished and instead replaced with concrete houses that were both unsustainable and mal-adapted to the local conditions (cf. Dune Barenstein and Pittet 2013, 122).

In Tamil Nadu it is a social event to build a house and a number of specialised community members are participating. The plan of the house is linked to the horoscope of the oldest woman of the family which is conducted by a priest. Commonly, the construction process of the house is planned and supervised by the women. Further, the design of the house, the size and the materials that are used vary with the socioeconomic status of the house owner including age, family size or financial resources. The first house of a new married couple is usually very simple and gets improved over the years (cf. Dune Barenstein and Pittet 2013, 122f). There are three roof types used in the area,

²⁵ See inter alia: Cernea 1997; Oliver-Smith 1990, 2009, 2010; Dune Barenstein 2004-2014; Tauber 2014

thatched roofs, terracotta tile roofs and flat reinforced cement concrete (RCC) roofs. Thatched roofs are relatively inexpensive and provide good thermal comfort. Due to the high maintenance requirements, families that can afford it replace the straw or coconut leaves with tiles. Both these vernacular roof systems work for the local climatic conditions yet are considered to be backward, in particular by the government. However, while flat RCC roofs demonstrate wealth and modernity they also lead to an unbearably hot indoor climate. People commonly respond to this by building a thatched roof on top of the flat one (cf. Duyne Barenstein and Pittet 2013, 122ff). The traditional houses usually have only two or three rooms, comprising of one main room, which is mainly used as storage, and a large veranda. This veranda states the most important room where most activities happen. During the day people entertain their guests and spend their leisure time in this semi-open area and at night the veranda is used as a sleeping area (cf. Duyne Barenstein and Pittet 2013, 126). In the reconstruction project the NGOs followed the rules of the government and built all houses with flat RCC roofs. They also did not consider building a veranda which has a climatic and sociocultural importance in this area. Neither the choice of materials nor the design of the new houses was made according to the local climatic conditions, the cultural traditions or the capacity of the local building sector (cf. Duyne Barenstein and Pittet 2013, 134f). Atop of this, a study showed that the material used by the NGO's for housing construction has a larger environmental impact compared to traditional houses. As an overall result, the coconut and straw thatched houses were considered the most sustainable regarding economic viability, environmental impact and climatic comfort. In synergy to this, the RCC houses built by the NGOs represented the least sustainable housing type in terms of expense, climatic comfort and environmental impact (cf. Duyne Barenstein and Pittet 2013, 128-134). Further, the community members that were usually involved in the planning and construction process did not play a role in reconstruction. Since the NGOs worked with external contractors and used new technologies beyond the traditional ones they also excluded the local people from future maintenance work. Duyne Barenstein and Pittet (2013, 135) argue that agencies involved in reconstruction "should have made informed and contextually appropriate technological choices and paid more attention to preserving the design, materials, and construction practices of Tamil Nadu's coastal communities". Their comparative analysis indicated that regarding the aspect of comfort, cost, and environmental impact the newly built houses are significantly less appropriate than the former pre-tsunami traditional houses (cf. Duyne Barenstein and Pittet 2013, 135).

Case 2 The sociocultural impact

In a project assessed by Naimi-Gasser (2013), participation of the local community was enforced by the government. However, the community meetings were solely used to present finished plans and models as well as to ask the people for their needs, expectations and ability to take part in the building process (cf. Naimi-Gasser 2013, 140). All the vegetation and houses on the site, whether damaged or not, were cleared to simplify the construction work. The new contractor-driven settlement differs from the pre-disaster one in design, choice of material, location, layout and surroundings including vegetation. The environment, which people were used to, transformed completely due to the reconstruction process. Most importantly they lost their trees. Trees can be the providers of community space and therefore can play an important role for the social life of a community (cf. Naimi-Gasser 2013, 141-144). For the community living in this project area in Tamil Nadu, trees "are connected to notions of health, protection, beauty, and sacredness" (Naimi-Gasser 2013, 141). In this particular case, people used to spend most of their time outside their houses in the shade of the trees. This is where they maintained their social networks, spent their leisure time,

stored their nets and found protection from the heat. The lack of trees had a significant effect on the well-being of the people and led to loneliness, boredom, physical and mental health problems, discomfort, tension, alcohol problems and deep sadness (Naimi-Gasser 2013, 144-153). In this project the seemingly simple act of cutting down trees in order to construct houses destroyed a community by disregarding their culture. Instead of the familiar surroundings and buildings, people were offered a borrowed culture with borrowed houses and a borrowed way of life. Naimi-Gasser (2013, 154) claims that if people were "given the option of rebuilding their houses themselves, with adequate technical and financial assistance, the villagers could have dealt with housing in a more holistic way, paying attention to the home compound, rather than only the house, and making sure that their precious trees were spared".

4.3.1 The planner's role

Michel-Fabian (cf. 2005, 229) defines at least four dimensions of the responsibility concept: Who is morally responsible? Why do we have a moral responsibility? Who and what should be included to our area of moral responsibility? What should we do, based on this responsibility? The responsibility of the planner roots in the principle of non-harm which indicates that objects of the area of authority may not be harmed without specific need. We have the responsibility to handle everything respectfully in the sense that we must not impose any unnecessary harm to anyone or anything in the world. Therefore, planners must justify and argue the necessity of their decisions accordingly. In addition, there is the principle of doing good which says to reasonably treat and support objects within an area of responsibility, pursuant to their respective characteristics. This principle sets the task for the planner to specify the characteristics of the parties concerned, using for example participation procedures, and take them into account in their decisions. Again, reasons for non-consideration must be stated. These principles aim at a reflected handling with standards, principles, instruments, methods, plans, planning results and consequences towards an open social discourse. Planners must be capable of ethical self-reflection as through planning it is possible to draw attention to moral problems and difficulties. Thus, this competence should be incorporated in education and teaching of planners (cf. Michel-Fabian 2005, 230-233). This aspect is discussed in detail in Brenner (2017) focusing on the role of the architect in a planning process concluding "architects need to develop sensitivity towards people's needs and expectations stemming from their cultural backgrounds". This conclusion can be extended to all planners as defined in the preceding subchapter and applies for most planning tasks as each context is different in terms of social, cultural, climatic, etc. features. Planners must be both prepared and equipped for this (cf. Brenner 2017, 211).

The following is based on Brenner (2017):

Planners work on projects all over the world as for example, in the field of reconstruction after disasters in developing or low-income countries. Often, they work outside of their own cultural and environmental context which raises special challenges often neglected within the discipline. One reason for this is that planners are not familiar with the context of these places they plan for. This includes for example, the culture, building technologies, traditional materials as well as the local climate and natural hazard conditions. There are many lessons that can be learned from reconstruction projects and some of them can help defining the skills planners need to work in this field (cf. Brenner 2017, 199,211). The role of the planner can only be defined from within the specific planning context. It is not possible to constitute a single role for the planner along with the necessary

skills. According to Davidson et al. (2007), each project is different and there is no single ‘best’ approach for the planner’s role. However, various studies have identified several skills and abilities that could improve the outcome of reconstruction projects. Lizarralde et al. (2014, 24) state, planners are responsible to determine the necessary rules for developing housing solutions respecting culture, society and the environment. Commonly, planners contemplate that the solution is coming from their own context or from their own country. One reason for this might be that the professionals are not trained adequately for unfamiliar environments and changing contexts where, according to Tauber (2014, 220), “it is necessary to see other worlds as much as possible from inside and develop solutions ‘from within’”. A planner working in this context must have a profound knowledge with regard to different construction technologies, site supervision and project management but atop of this there is a number of other skills required. For example with regard to architects, Tauber (2014, 212) found: “Based on the villagers’ statements, the ideal skills of ‘their architect’ can be summarised as follows. He speaks their language, is well acquainted with their (building) culture, interacts intensely (individually) and listens intently, asks questions if he does not know something, and only then develops the project. He cooperates closely with them during *all* the stages of the project. [...] he shows what the house will look like in the end. [...] he has the ability to build a good-quality house.” Davis and Alexander defined a range of team and leadership requirements for the management of shelter and housing projects that will be introduced with the following table.

Table 4.1. Team and leadership requirements for the management of shelter and housing projects. Source: Davis and Alexander (2015, 149)

Knowledge	Skills	Attitudes
... of the relevant field and its application to recovery planning: architecture, engineering, planning, construction, etc.	<i>Interdisciplinary teamwork skills</i>	Empathy, listening skills and accountability to survivors
<i>... of disaster and development principles and practice</i>	Creativity, improvisation, ability to make much out of limited resources	<i>Leadership, vision, integrity</i>
<i>... of project management and financial management</i>	Understanding and respect for local culture, social patterns and building traditions	Ability to see both short- and long-term needs and macroscopic and micro-level concerns, and to merge them in project design
... of working with low-income groups and of advocacy	Training, mentoring and educational skills	Political awareness and sensitivity
... of disaster risk reduction	<i>Social skills and communication skills needed for participatory management</i>	<i>Patience, tenacity and perseverance</i>
<i>... of the given disaster situation, of the multi-sector recovery plan and of the key players</i>	<i>Coordination skills</i>	A willingness to learn and adapt as recovery proceeds

Note: credentials required by leaders and directors are given in *italics*.

It is argued that in some instances several of these skills are not adequately taught in classical planner training at universities. The following illustrates this in the example of architectural education. According to Tauber (2014, 217ff) there are five assumptions taught at today’s

architecture schools both implicitly and explicitly influencing the quality of post-disaster housing²⁶. The first assumption is that architects can learn hardly from history. Tauber claims, today's design teaching often premises an approach where each problem is new and has to be resolved from scratch, opposed to the idea of traditional building cultures. For example, traditional houses are often likely to be appropriate to local conditions (cf. Tauber 2014, 218). These traditional construction technologies which have been used for generations may need improvement. However, this knowledge could still be integrated to strengthen the ability of vulnerable communities adjusting their homes to current and expected future natural hazard conditions, without compromising their traditional construction practices. In this instance the architect could act as a promoter and catalyst for an exchange of knowledge. Davis (2006, 231) is supporting Tauber's point by stating that the formal education of architects has "traditionally promoted an attitude toward professional expertise that seems opposed to the idea of shared, embedded knowledge". The second assumption is that the expertise of the architect is better than that of 'ordinary people'. This is taught rather implicitly and leads to the attitude that architects must maintain control over other participants of a design or building process such as builders, craftsmen as well as the client or community they design for. Again, this opposes to the idea of traditional building cultures which thrives on the sharing of cultural values and habits. Instead, in a sense, it tends to train the future architect to decline his or her own culture and through this ignore the effect it may have on their dealing with and attitude towards other cultures (Tauber 2014, 217f). The following two assumptions are closely related to each other as well as linked to the one just described. In architecture schools there is often the belief that the architect, as the 'star designer', is more important than other professionals of the built environment, due to curricula which demote most other participants. On top of this, there is the idea that 'object building' is more important and a more dignified design task than the design of conventional housing. When looking around in architecture schools rather few design projects deal with ordinary (informal) housing in rural or urban contexts (cf. Tauber 2014, 218). The last assumption Tauber (2014, 218) mentions is that learning can effectively happen in a studio, away from construction sites, buildings, craftsmen and especially the people. Davis (2006, 237f) states that the current living environment and the daily reality might be the best teacher for architecture students.

Another distortion within architectural education is that architecture students are primarily taught to improve their visual competences not so much their communicative skills or intercultural awareness (cf. Tauber 2014, 213). These skills are key enablers to work on an interdisciplinary basis within diverse cultural contexts. According to Tauber (cf. 2014, 207) education should provide students with the necessary skills required for a working context where it is essential to closely work together with a community. An architect who sees his work as an individual pursuit and expression of his design preferences tends to find it difficult to work in a context where the design has a community's ownership of expression. "There are many missing pieces that are not given importance in classical training, even though, I would argue that they are very relevant, not only in a post-disaster project, but also, for example, in a regular housing project in Britain." (Tauber 2014, 207) According to Tauber, a paradigm shift is needed in the architectural education that shapes the attitude that architects are neither central nor the 'expert' in a building process (cf. Tauber 2014, 219). Architecture schools should teach sensitivity towards local building cultures, cultural diversities as well as traditional construction technologies. Studying traditional building codes and technologies is nothing new and has been done by various architects to find inspirations regarding design tasks and environmental issues. For example, Bernard Rudofsky examined in the 1960s

²⁶ Based on Davis (2006).

vernacular constructions and traditional building methods with the intent to design for a more liveable world (cf. Bone 2013, 12). There are many authors addressing these aspects along with aspects as the traditional architecture and the history of housing and settlements such as Olgyay (1963), Oliver (1978), (2003), Konya (1980), Goad (2000) and Hyde (2000).

Regarding reconstruction projects, students also need to be introduced to “the political and economic dimensions of post-disaster contexts and these dynamics at a local, national and international level” (Tauber 2014, 219). Furthermore, they should explore development paradigms and the different approaches in post-disaster reconstruction. Concluding, Tauber underlines the importance that architecture students learn to respectfully meet other disciplines and to understand both their methods and their requirements. This is true for all participants of a planning process including builders, masons or artisans but it is especially crucial regarding the clients or the community they subsequently work for. “Education should build confidence in developing projects together with many different actors out of a given context rather than imposing one’s own will onto a situation” (Tauber 2014, 219). As stated by Wemhöner in an interview (Wemhöner 2013, 203) “We architects are outsiders [...] because we are from a different region and have a different background, but at the same time we have know how that might be of relevance”. This applies to most planning tasks regardless of where they are situated or who they are for and can likely be translated to all planners as defined above.

4.4 Planning Instruments

The range of planning instruments considered in this thesis is based on the instruments of spatial planning suggested by Jung (2008) and the regimes and budgets model approach by Heidemann (1996). The model of regimes and budgets are premised on systems theory considerations discussed in more detail in Jung (2008). Regimes describe environmental conditions communities are subject to while on the other hand time, material and physical budgets are at the communities’ disposal to perform tasks. Based on this approach Wolfgang Jung (2008) defined the instruments of spatial planning analysing the impact of planning instruments on regimes and budgets of the target group. He concludes and underlines that the scope of action in planning exceeds the (i) provision of locations and (ii) construction and maintainance of facilities. Instead Jung suggests that planning also includes the (iii) adjustment of organisations operating in or with these facilities as well as (iv) influencing behaviour. These planning instruments influence and likely depend on each other. As for example, in order to have a working evacuation procedure, evacuation buildings and roads need to be installed on an adequate site. Concurrently, communities need to be educated in the evacuation procedure which involves some kind of an organisation as for example teachers or community heads as well as evacuation signage. In reconstruction planning as well as everyday planning the instruments beyond (i) provision of locations and (ii) construction and maintainance of facilities aiming at influencing people’s behaviour are likely to be overlooked. According to Jung (2008, 200), the behaviour of individuals who use the space appears to often have a bigger impact and transforming effect on it compared to other planning instruments. Hence, for some spatial planning tasks other interventions might be more target-oriented. The beforementioned regimes and budgets model can be used by planners to estimate the limitation and facilitating of activities to render the effectiveness of interventions as well as their counterproductive effect.

The following will list regimes and budgets as defined by Heidemann taken from Jung (2008, 111-116).

Regimes

Regimes are environmental conditions that individuals are exposed to. These environmental conditions, also called living conditions are created from regimes through social use. They are restrictive, of the one part, but on the other hand also provide the opportunity to act (cf. Jung 2008, 113). As Laptin (2005, 5) describes, a knowing, perceiving, acting and also designing individual or social being makes his acting dependent on the respectively perceived scope of action and the resultant opportunities (cf. in: Jung 2008, 113). Hence, the scope of action is dependant on the respective regimes. When relating regimes to living conditions, mainly the regimes with a social character are distinctive feature for the action undertaken by individuals and institutions. Here regimes are the regularities within which these environmental conditions are present and determine the opportunities offered to the individual. The social regimes consist of information, places and time flow (cf. Jung 2008, 113f). For this thesis the focus regarding regimes lies on these social regimes. Information describes what is permitted and what is illegal including laws as well as formal and informal regulations, for example, construction bans, building codes or the necessity of a fisher to live close to the shore. Places correspond to areas and facilities within the meaning of the instruments (i) provision of locations and (ii) construction and maintainance of facilities. However, as regimes places are not the areas and facilities in themselves but their unequally distributed occurrence, for instance, missing workstations, absence or presence of schools, hospitals, markets. The third component, time flow, represents time rhythms individuals are exposed to such as natural rhythmy: day and night, biological rhythms: waking and sleeping but also of social nature including opening hours or departure times. These last mentioned rythms of social character are of particular interest for this thesis.

Budgets

The beforementioned scope of action is not only dependant on the regimes but also depending on the existing budgets (cf. Jung 2008, 113). These budgets are the means of an individual to interfere with the environment and act. They can only be generated if regimes are present. Budgets are basic lifestyle factors that are available for individuals and comprise of time, device and skill. Every individual has a certain amount of time at their disposal which is confined by time intervals such as sleep or food intake. Devices describe available means such as money, materials or property but also include rights and claims. Skills are experiences and capabilities an individual has gained over time and is able to apply. It includes both knowledge as well as the ability to use this knowledge, hence the know-how.

The regimes and budgets approach seeks to demonstrate the impact of planning instruments on the individual's scope of action resulting in effects on spatial development and how this instrument can also be turned around in order to find non-constructional solutions for planning tasks. In Chapter 9 the regimes and budgets model is used to suggest possible planning instruments and considerations regarding the findings of the research case in order to introduce a line of thought for potential improvements in pre- as well as post-disaster planning.

5 Exogenous international influence

During reconstruction programmes there is commonly a large proportion of international help and therefore a huge exogenous international influence. Frequently, in these processes donors and agencies make decisions over the heads of the local community, which subsequently can lead to negative results. As Kessler (2014, 77) describes for Haiti: “it was clearly recognized that the challenge for Haiti was to marshal the available resources and entrepreneurial capacity of the Haitian people to restore neighbourhoods and improve the quality of life for all those affected by the earthquake. Unfortunately, this approach was ignored by donors, many of which had their own agendas.” A term often discussed in this context is indigenous knowledge. The UNISDR (2011, 12) defines indigenous knowledge as “community coping practices, local community knowledge accumulated over generations of living in a particular environment that is shared and applied to reduce community vulnerability and form the basis of community coping practices”. This chapter discusses the convictions of modernity, motivations underlying development and puts both into question.

5.1 Criticism of modernity

An important philosophical foundation of modernity is the Enlightenment. Based on Kant (1967, 55-61), the ‘project of modernity’ is where mankind can solve the essential problems of human coexistence with the help of its ‘ratio’, through rational politics, a rational economy and technical progress. Today, the entire system of science and technology has been put more and more on the defensive. This is due, among other things, to the fact that besides all uncontested advances, new risks and problems evolved. Technical progress is particularly responsible, for example, risky large-scale technologies such as nuclear technology or biotechnology as well as new concerns such as environmental pollution or anthropogenic climate change leading to the fragility of the enlightening progress optimism regarding technical and social progress. This decay is likely to have a significant effect on politics since the present consented aim shaped by progress and modernisation is fading. Further, the formerly self-evident acceptance diminishes that society and space are rationally shapeable. In modernity, space commonly has a subordinated role since geography is not seen as socially produced but only as physical background. Moreover, another concept of modernity is that regionalist movements are premodern and therefore would automatically vanish. The design vocabulary of modernity, derived from the hegemony of function very clearly represented in the ‘Bauhaus-aesthetics’, based on the central idea ‘form follows function’ which led to the international style with clear cubical structures, smooth facades and the avoidance of ornamental decorations. “Modern architecture oriented to functionality was primarily developed in the twenties and thirties of this century by architects such as Le Corbusier and Mies van der Rohe. This architecture placed a considerable emphasis on the implementation of universal principles [...]” (Loo and Reijen 1997, 287, free translation)

According to Loo and Reijen (1997, 11ff) modernisation is a complex of interrelated structural, cultural, psychological and physical changes which formed and is still channeling the present state of the world in a particular direction. This development started off in Western Europe and was later adopted by the rest of the world. The following criteria are inter alia characteristic for a modern society: production for a market, high status of science and technology, multiple political parties

struggle for power, growing urbanisation, individualisation considerably advanced. Criteria for modernisation are under examination since the 19th century, then and now by contrasting the non-modern/traditional with the modern where both are indicated as ideal types. This simplified representation of traditional and modern societies serves as a heuristic function. The abstract contrasting of traditional and modern gave the impression that modernisation always takes place as an overall process, however, there is the possibility of a partial modernisation which does not affect all social areas. Loo and Reijen (1997, 23) raise the question whether a modern industry can be developed in a strongly traditional culture.

Most modernisation theorists of the 19th century as stated by Loo and Reijen (1997, 19) followed the 'idea of evolution' where modernisation can be seen as a development proceeding on a particular track with certain stages. This is based on two assumptions; first, social reality exists of phenomena that can be ranked in a specific way since there are 'higher' and 'lower' forms of life; second, over time a process takes place where 'lower' forms of life gradually transform into 'higher' forms of life. This mindset led to a categorisation of societies in the world following a special hierarchy from 'traditional' to 'modern' or from 'primitive' to 'cultivated'. Known societies were seen through the eyes of a modernised western society, hence institutions and ideas that did not fit into this framework were neglected as 'not modern' or 'uncivilised' (cf. Loo and Reijen 1997, 19-22). This approach has been subject to substantial criticism based on the argument that modernisation varies from one country and one sector to another, thus is not a linear evolution. Further, the ethnocentric character of these modernisation theories has been criticised, where as a general rule, the western society was seen as some kind of natural endpoint of modernisation. Claude Lévi-Strauss (2012, 12) claims, for the past two centuries western civilisation defines itself as civilisation of progress while other societies committed to the same ideal thought they had to hold this up as a model. While the social sciences undertook attempts to respond to this criticism by implementing the idea of a multilinear development²⁷, other academic disciplines did nothing of the kind. For example, a great part of economic development theories of the fifties and sixties still reflect the idea of evolution, with a universal development model following the example of American society which was considered as the furthest developed (cf. Loo and Reijen 1997, 19-22).

Loo and Reijen (1997, 32f) describe a modernisation model comprising four dimensions affecting the area of activity shown in Figure 41: differentiation/structure, rationalisation/culture, individualisation/person, domestication/nature. The process of domestication, with people gain ever-more control over animal species and natural forces can be seen as a characteristic for modernity. An aforementioned uniformity in architecture results from the rationalisation paradox: Besides pluralisation a contrary development takes place in modernisation which can be described as generalisation (cf. Loo and Reijen 1997, 32f). In this process of generalisation, formerly separated cultural systems consisting of values, norms and meanings detach from their foundation and merge depicted through fewer distinguishable characteristics followed by a qualification of their meaning to regulate behaviour. Culture here is defined as knowledge, symbols, habits, views, skills, rules and provisions that are passed down from one generation to the next. While people gained some independence from physical conditions, they became more dependent on technical equipment, on

²⁷ Van der Loo and van Reijen (1997) turn against ethnocentric evolutionary thoughts conceiving modernisation as unilinear development. Instead they rather emphasize the paradox character of the by no means harmonious modernisation processes. These processes are not harmonious because the individual components do not necessarily interact with one another in a conveying manner, and because they can 'tilt' on the other hand.

other people as well as on themselves (cf. Loo and Reijen 1997, 40-44).²⁸ For example, while people could live close to the shoreline due to dams or embankments, they are dependent on maintenance of these protective structures which needs organisations, institutions and discipline. The same also applies to early warning systems or evacuation plans. Conversely, if the organisation fails to function, mastery of nature can be dangerous and lead to a wrong sense of safety and a settlement of hazardous areas. Domestication, along with technological development, led to both liberation and dependence. Moreover, there is conviction dominating our modern culture that every problem can be solved with technological solutions. “Until today it is taken for granted that human destiny can be improved, that various disasters and hazards can be averted by means of technology.” (Loo and Reijen 1997, 229).



Figure 41. Area of activity. Source: Loo and Reijen (1997, 32); modified.

Modernisation phenomena show different variations, while some modernisation theories depict generalisation of values and norms, others outline standardisation and pluralisation of knowledge. During the course of modernisation people became more inter-dependent over longer distances. People all over the world, from Western European citizens to rather disadvantaged groups in parts of Asia and Africa, are all connected through mutual dependencies that highly determine their current way of life but also their opportunity to survive (cf. Loo and Reijen 1997, 269, 293).

Bruno Latour, representative of the French post-structuralism, criticizes modernity on account of a separation between culture and nature, human beings and objects, natural/cultural sciences and society. He argues that in modernity there is a disconnection between the understanding of things and interest, power and politics of human beings (cf. Latour 2015, 9). According to Latour, one cannot separate the world of things and the world of human beings, a principle which is rooted in Foucault’s order of things. “You just need to push any harmless spray can and just like that one is underway to the Arctic, from there to the University of California in Irvine, to the assembly lines in Lyon, to the chemistry of noble gases and then perhaps to the United Nations. But this fragile thread, however, is fragmented into as many pieces as there are pure subject areas out there.” (own translation from German, Latour 2015, 9) These networks and connections were divided into individual areas by the thought and ideas of representatives of modernity. Latour states this separation is artificial and has never existed, therefore he proposes the idea that we have never been modern. Even though Latour treats the thinkers of modernity quite strikingly, he establishes unusual connections between systems and with this facilitates new insights. This understanding is shared by the “New Age thinkers” (Loo and Reijen 1997, 293f). According to them the most significant psychological and social problems in modern society can be traced back to the tendency of modern

²⁸ See also Adorno and Horkheimer (1947).

people to think in terms of contradictions, as for example, the separation between human and nature, individual and society, science and mysticism. They advocate to strive for unity or holism which is defined as the doctrine of the whole and the relationship of things and processes. Several groups voice criticism towards holism as it does not offer a clearly defined idea how to change things, while it denounces that something needs to be done differently. Also, in the past degenerated in totalitarian tendencies placing society above individuals. However, in 'New-Age-thinking', individuality, self-confidence and self-growth are prioritised. Finally, holism stands for a radical break with the past and presents a new 'grand history' (cf. Loo and Reijen 1997, 293f,296f).

Following Latour's reasoning, capitalism, which was supposed to reach a deflection of exploitation of people by people to exploitation of nature by people, only compounded these two sides of exploitation. Hope for unlimited capture and control of nature was underlying capitalism. With the first climate conferences in 1989 in Paris, London and Amsterdam, the end of capitalism was initiated according to Latour. He claims famines and environmental degradation on a large scale are self-inflicted by humans. While the countries in the so-called North and West were able to save their people and parts of their landscapes, they were destroying the rest of the world and driving other peoples into misery. Some of these peoples thought to find a remedy for their situation by imitating the West whereas the West thinks to be in the position to teach others lessons while they leave the earth and its people to die. "As the only one he [the Western World] believes to know a dead certain system whereby constant gains can be made while he possibly had lost everything." (own translation from German, Latour 2015, 16f)

5.2 Development

According to Baird et al. (1975, 28), "development is an ecological process in which a 'society' increases its capacity for dealing with the environment including extreme environmental conditions which produce disaster. This capacity for dealing with the environment depends on the extent to which society understands the laws of nature (science), on the extent to which 'society' puts that understanding into practice (technology) and on the manner in which 'society' is organised." This definition suggests that a society is not developing if it is dependent on external science or technology hence does not have control of its own resources. In order to continue developing, wealthy countries need to control resources and raw materials which eventually leads to the development of underdevelopment. The control and exploitation of indigenous resources of the governing elite isolates the 'underdeveloped' population from the traditional indigenous resource base and forces them to accept new strategies which can leave them more vulnerable and enhance disaster risk. This explains the phenomenon discussed earlier that the number of natural disasters in underdeveloped countries has increased while the probability of the natural hazard increased only marginally. The development of underdevelopment, following Baird et al. (1975), results in a movement towards vulnerable settlement patterns caused by an increasing process of marginalisation as a consequence of an increasing disparity between rich and poor countries. Hence, the number of disasters will increase because more people will be living in hazardous areas and are therefore more disaster prone (cf. Baird, et al. 1975, 29,33f).

Figure 42 displays the tendency towards increasing disaster proneness where vulnerable settlements are a result of marginalisation caused by the development of underdevelopment. In the case of disaster occurrence 'relief aid' which "is correlated with the amount of international aid and this reflects its trade relationship in developed countries" presents a further variable in the process.

Typically, relief aid simply reinforces the former status quo which in turn leads to aggravation of marginalisation and disaster vulnerability. Baird et al. (1975, 33f) go as far as to say that relief aid is hindering an adjustment to future natural hazards while exacerbating vulnerability. “Relief is the enemy of reconstruction. Therefore minimise relief. Even the minimal relief operation stretches the public sector executive capacity to the utmost. Therefore avoid paternalism. The public sector must not touch any jobs the people can do themselves. The last thing the public sector should do is the construction of houses of any kind.” (Davis and Alexander 2015, 32)

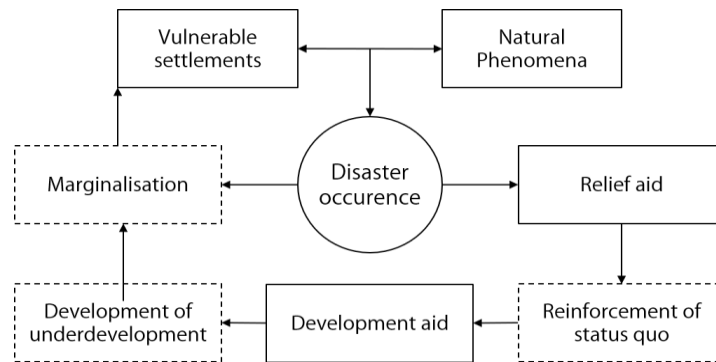


Figure 42. The tendency towards increasing disaster proneness. Source: Baird et al. (1975, 35); modified.

Another element introduced in Figure 42 is ‘development aid’ through which measures of development policy are funded. Development policy comprises all measures taken to improve the level of development of underprivileged countries, also referred to as developing or underdeveloped countries (cf. Hemmer 2017). The consensus of values of development policies is based on the human rights documents which led to a relatively stable and uniform value system. Within this, development is defined as a socio-economic-cultural process with a wide range of targets such as inter alia, respect of human dignity, basic needs satisfaction, gender equality, democratisation of political structures, equitable distribution of property and income, economic growth, humane working conditions, functioning health care, intact environment and access to educational institutions. Development policy started after World War II and gained broader recognition after the end of the Cold War in 1991 and thenceforth, leading to global conferences starting in the nineties in Rio de Janeiro where the first global development plan ‘Agenda 21’ was resolved. In the beginning of the 21st century, the G8 countries adopted their Millennium Development Goals, MDG, which mainly provide the ambitious goal of halving poverty in the world by 2015. Based on the Enlightenment and the experience with other non-European cultures from the 15th century, today development policies have two fundamental motives, a moral and a pragmatic one. The moral motive is most pronounced in non-governmental organisations and roots in an ethical obligation to help people in need and oppression as well as to act justly. Some interpret this as reparation for damages and their effects caused by conquest and exploitation. The pragmatic motive stands for a development policy which averts potential damage to industrialised countries through, for example, preventing massive migration from developing to industrialised countries by addressing root causes, protecting globally important ecological resources (rainforest, global common goods) if destruction would affect industrialised countries or fighting against terrorism fostered by poverty. Further, developing countries represent attractive new markets, hence development policy measures are

used for an export promotion. Development policies of the OECD countries can be ranked based upon those two motives. According to Ihne and Wilhelm (2006, 3,6-9) European countries, such as Germany, the Nordics and the Benelux countries are well balanced between moral and benefit, however, in Germany the pragmatic motive gained in significance since the 1990s. France, Japan and the United States on the other hand are recognisably focusing more on the pragmatic justification of development policies, foremost economic and political interests (cf. Ihne und Wilhelm 2006, 3,6-9). Erler (1990, 8,87), as a highly critical voice, concluded almost thirty years ago that development aid does more harm than use in the name of modernity and progress, keeping nations in dependence and therefore people in poor countries would be better off without it. Moyo (2009)²⁹, Easterly (2013)³⁰ and the “Bonner Aufruf”³¹ are newer examples with a focus on Africa that argue in the same direction.

At this point of discussion, Lévi-Strauss’ (2012, 48,52,54) observations on anthropology are taken into consideration. He remarks that the major benefit of anthropology is the potential to inspire humility and teach wisdom to the members of rich and powerful nations. Anthropologists show that the way we live and the values we believe in are not the only ones but that other societies found, and still find, fortune with different ways of life and different value systems. Therefore, anthropology calls upon us to moderate vanity, respect other life forms and question ourselves by the awareness of different traditions. Formulas specific to one individual society cannot simply be transferred to another. Every society is encouraged to cease to believe that their institutions, traditions and beliefs are the only possible ones and that these can be imposed on other societies with a mismatching value system just because they are considered as ‘good’. For example, according to Baird et al. (1975, 37), it is a misconception that advanced technology can decrease disaster proneness caused by marginalisation. Technologies that create a dependency on the developed world do the reverse of the above and rather increase vulnerability to natural hazards. Hence, the transfer of disaster technology from developed to underdeveloped countries can rather hinder than help development. Every tradition and belief, following Lévi-Strauss (2012, 55,92), no matter how irrational they may seem, are parts of a system with an inner balance evolved over centuries. Therefore, it is not possible to remove an element of this structure without the risk of also destroying everything else. As a secondary effect there is also the danger that irreplaceable know-how will be irretrievable lost.

In order to explain the distance between societies regarding their technical and economic standard, two types of reasoning must be analysed. First, there is the “thesis of racists” which explains this distance with a disparity of genetic material affecting intellectual abilities as well as moral gifts (cf. Lévi-Strauss 2012, 107f). This reasoning does not necessarily occur on the surface, as Erler (1990, 7f) describes from within development policies. Erler refers to this issue by saying, in a rather direct way, that she unintentionally turned herself into a propagandist of racism through her ideology of help: “If whole nations allegedly fail to cope with their own problems it seems reasonable that they are either stupid or lazy or both.” (Own translation from German) Second, there is the evolution theory, mentioned in the previous chapter, which suggests historical conditions as a causal factor for the inequality of cultures. Thus, the only problem is to find the incidental reasons for this lag of some and help them to catch up. For Lévi-Strauss this distance between industrialised societies and

²⁹ Moyo (2009): *Dead aid. Why aid is not working and how there is another way for Africa.*

³⁰ Easterly (2013): *The Tyranny of experts. Economists, dictators, and the forgotten rights of the poor.*

³¹ Circle of people around Rupert Neudeck and Professor Winfried Pinger founded in 2008, <http://www.bonner-aufruf.eu/>.

societies with a lower technical and economic level is not justified, instead he questions the importance of the concept of progress. The industrialised countries regard cultures that developed along a different path as static, not necessarily because they are but because their path is not measurable within the terms of our reference system. The Western civilisation concentrates mainly on scientific understanding and implementation. This formed the criteria used as indication for the level of development (cf. Lévi-Strauss 2012, 107f,130ff). While Western forms of civilisation may have begun doubting themselves, Lévi-Strauss (2012, 139) draws attention to another phenomenon. Some nations who gained independence in the course of the last century now themselves praise this form of civilisation, this applies in particular to their leaders. There is the belief that outdated practices inhibit development which commonly also encompasses traditional building methods or materials. For example, Duyn-Barenstein and Pittet (cf. 2013, 125,128) describe the situation in Tamil Nadu, India in the reconstruction process after the Indian Ocean tsunami 2004 where flat reinforced cement concrete roofs, as opposed to traditionally thatched roofs, were an “expression of wealth and modernity”. Hence, a number of houses with flat roofs got built even though people were aware that with this type of roof the interior of houses tends to be unbearably hot. The Indian government officially uses the Hindi word *kachcha* which literally means unripe for vernacular houses and other infrastructures built with locally available materials such as mud, wood or palm leaves. *Pucca* is used for houses or infrastructure built with bricks, cement, concrete or any other industrially produced construction materials. Both these terms are not neutral, while “*kachcha* is associated with poverty, flimsiness and backwardness” the term *pucca* stands for modernity. Therefore, the government of Tamil Nadu considered the post-tsunami reconstruction process as an opportunity to upgrade *kachcha* dwellings and replace them with *pucca* houses regardless of possible negative effects.

Development policy emerging from Western history is based on the idea of the world as a whole, with the clear intention to change this world towards an abstractly outlined social, economic and political standard of global progress (cf. Goetze 1997, 208). An objection here is that a culture can survive and flourish only if there is a balance kept between opening and partitioning. It is possible for tradition and modernity to coexist, however, culture must be loyal towards its own values and remain unreceptive for some values from outside. Lévi-Strauss (2012, 144) concludes, for cultures to mutually enrich each other, distances between them must exist.

5.3 Actors involved in housing adjustment or reconstruction processes

“...given the scale of the problem of unsafe settlements and dwellings around the world, the only way forward is to de-professionalise the process by training at all levels’. [...] So this is not an ‘either/ or dilemma: both approaches are required. There is always a vital need for skilled architects, planners and engineers with expertise in safe construction. In disaster recovery situation, they have a particularly vital role in training or offering guidance in ‘advice clinics’ in order to create a multiplier effect. But there is a parallel need for an army of local builders and building craft workers who understand the principles and practice of safe, well-built structures, particularly dwellings.” (Davis and Alexander 2015, 190f)

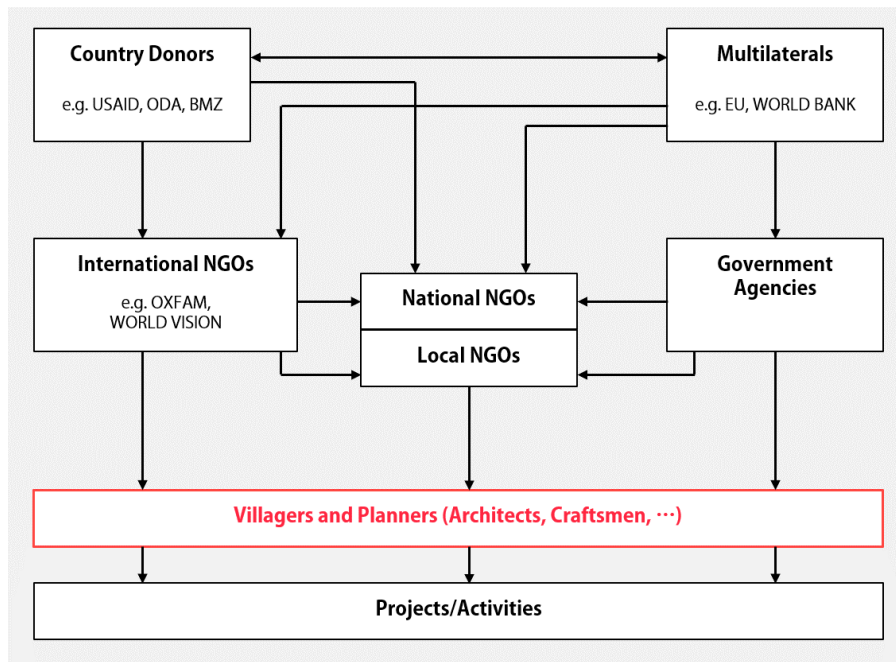


Figure 43. Different types of development agencies, potential partnerships and flow of resources. Source: Gardner and Lewis (1996, 9); modified.

There is an important question in who is involved in housing adjustment or reconstruction processes. Setting the focus on reconstruction projects, there are different arrangements of groups involved. Figure 43 shows the different types of development agencies, potential partnerships and the flow of resources. According to Charlesworth and Ahmed (2015, 132), the involvement of a wide range of stakeholders and professionals is a key reason for the effectiveness of reconstruction projects. “This is a paradigm that can be expected to grow in significance over the future as disaster become more complex and the global forces of climate change and urbanisation continue to create unprecedented challenges.” (Charlesworth and Ahmed 2015, 132) From reconstruction case studies, it is recognised that it is of vast importance to include villagers and planners such as architects, craftsmen, masons and so on to the rebuilding process.³² However, so far there is no defined process that could be used in this context and that could help to prevent possible mistakes which have been made in former projects. In rural and urban environments in developing countries it is still common that people build their houses without any professionals and above all without architects. In other words, people living in these ‘non-western’ countries do have the expertise to build houses. This is contrary to ‘western’ societies where building processes are usually guided by formal professionals. These opposing approaches can lead to difficulties and pose problems when it comes to reconstruction. This is an issue that plays a decisive role when answering the question of who should be involved in a planning process for post-disaster housing (cf. Brenner 2017, 201). There are five different approaches for reconstruction defined by Jha et al. (2010, 101), namely the ‘Cash Approach’, ‘Owner-Driven Reconstruction’, ‘Community-Driven Reconstruction’, ‘Agency-Driven Reconstruction in-Situ’ and ‘Agency-Driven Reconstruction in Relocated Site’. All these approaches differ primarily regarding the selection of participants. In most projects, there are at least three actors, the government, the

³² See also Fengler et al. (2008, 14,27).

community or villagers and a non-governmental agency (NGO). It depends on these actors whether there is a planner or an architect involved. In a study Gertrud Tauber and her team did in Keezhakazakudy-Tsunami Nagar in India, they found that 80 percent of the villagers they interviewed did not even know what an architect was (cf. Tauber 2014, 175f). The fact that this was the outcome of a field research after a pre-disaster housing project, which was done including an architect, makes this finding even more outstanding. The question whether architects or planners are needed in reconstruction processes is widely debated and a number of researchers and practitioners argue that this depends on the project. In any case, NGOs frequently have difficulties in finding good staff, so architects for the planning of these projects are often lacking the skills they need to work in this specific context. Two main factors that cause problems are both inexperience and ignorance, especially towards cultural peculiarities as for example local building cultures. These are both issues that state a problem for any construction project in any corner of the world (cf. Wemhöner 2013, 205) even beyond reconstruction in developing countries and can also constitute a problem regarding housing adjustment.

Another important issue is the relevance of community involvement. The recognition has been made that people's involvement in a project is linked to its success (however defined). This led to the so-called participatory turn in development studies and practice in the 1980s and was the root of community participation in this field (cf. Dodman and Mitlin 2011, 643). Another reason for this big turning point was a 40-year history of development activities following a top-down approach that failed in improving the lives and livelihoods of the world's poor because it did not take the issue of context specificity or local knowledge into account. There is proof "that people have the capacity to build houses that are more likely to respond to their needs than are houses provided by external agencies if adequate financial and technical support and other enabling conditions (e.g. good supervision, massive training of local masons and access to subsidized construction materials) are provided" (Duyne Barenstein 2014, 161). For example, using locally available or recycled construction materials, an owner-driven approach, can be more cost-effective as well as faster compared to other strategies. However, an owner-driven approach does not necessarily lead to a successful outcome. This is due to the fact that application of local knowledge and building technologies may be limited as a result of inadequate building capacity or a lack of information, building codes and guidelines (cf. Duyne Barenstein 2014, 157). Therefore, as stated by Lizzaralde et al. (2014, 23f) the organisational design, defined as the composition of the team that will carry out the projects as well as the appropriate distribution of roles and responsibilities within that process team, "must embody a proper balance between the technical, social, cultural and administrative issues". This means it is of great relevance who is involved in a reconstruction project and it is also important for each of these participants to bring the skills that are needed in order to achieve a positive result. The planner or architect represents one of these participants that can play an active role in the process.

Findings from the reconstruction cases could be used for a housing adjustment process since there are similar actors involved as well as similar problems and difficulties to solve. Placing post-disaster reconstruction in a systems approach, there are five levels of complexity. The politico-social complexity comes from the large number of stakeholders with different origins, cultures and not-so-converging priorities. The structure of financing through international and national public entities and the demands of private-sector-fund raising together with the complexity of deciding how much to invest in immediate relief or in sustainable development leads to the economic complexity. The

technical complexity is the need to choose between imported and local building methods, within several timescales, the context of available skills and technologies and within the constraints of climate and logistics. The system also includes an organisational complexity since decisions have to be made and activities initiated rapidly and coherently, in the best interest of all affected communities. Further, various actors with different organisational cultures, and sometimes limited experience, must work together, often without a clear project leader. Finally, there is a functional complexity since housing requires more than the creation of houses and successful human habitats require multiple services and public and private spaces of different natures and different uses (cf. Lizarralde, Johnson und Davidson 2014b, 248f). In current research it is recognised that the quality of a project “depends as much on the performance of the system itself as on the influences it might receive from the environment” so a decision-maker trained in the before mentioned systems approach will “understand that the important aspect is not so much composed of the elements of the system itself (construction materials, plots, building codes, reconstruction guidelines, control agencies, etc.) but of the relationships between them: the capacity of municipalities, for example, to influence residents to adopt building codes in subsequent additions made to their core units” (Lizarralde, Johnson and Davidson 2014b, 251). It seems to be infeasible to formulate a single theoretical model for a housing adjustment or reconstruction process since every process is rooted in a particular socio-politico-economic environment as stated above. Nonetheless, there are various critical abilities and skills of villagers and architects or planners “that could guide the design of the building process and the assignment of the ‘right’ personnel to the various tasks during the project cycle” (Tauber 2014, 211).

6 Provisional conclusion of the theoretical framework

There is a noticeable rise of disasters following natural hazards. Disasters not only have an instant financial impact but are often followed by additional long-term costs. Underlying economic, social or political problems can be drivers for the risk level and vulnerability of a community such as poor governance, poverty or vulnerable livelihoods. If a disaster exceeds the capacity and resources of a community to manage post-disaster recovery, a donor conference is held where the reconstruction strategy gets developed, commonly with a lack of time for detailed planning. This can lead to poor results, hence, there is a wide recognition for the concept of pre-planning for post-disaster reconstruction prior to disaster events. Due to insufficient time to carry out planning with care and time limited financing, post-disaster recovery responses are rather short-term solutions.

After the Indian Ocean tsunami 2004, a concept of long-term risk reduction entitled 'build back better' was introduced as an attempt to link immediate relief with longer-term processes of recovery and development. However, this concept lacks adequate tools while it is doubtful whether underlying problems of a society can be sufficiently tackled during post-disaster response. This led to the concept of pre-disaster planning where the idea is to focus on the causes rather than the symptoms of a disaster in development planning as well as in the course of relief activities. Pre-disaster planning should come from within the community executed by local actors using local resources, with the assistance of external sources if required.

The focus of international aid lays on emergency response, reconstruction and rehabilitation, while disasters are often treated in isolation from the processes of long-term development and poverty alleviation. Disaster risk reduction DRR is an approach to systematically identify, assess and reduce risks associated with natural hazards. No more than 40 cents in every USD 100 spent by donor governments on development aid are directed towards disaster impact defence. There are voices demanding a more integrated and suitable coordinated financing, aiming at a higher effectiveness. The Sendai Framework for Disaster Risk Reduction released in 2015 is an attempt to cope with this challenge via shifting the focus from disaster management to precautionary disaster risk management. There are four priorities of this framework which build the basis for this thesis: (i) Understanding disaster risk, (ii) Strengthening disaster risk governance to manage disaster risk, (iii) Investing in disaster risk reduction for resilience, (iv) Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

It can be a good opportunity to implement housing adjustment strategies and measures into the reconstruction phase after a disaster rather than rebuilding communities to the same vulnerable pre-disaster condition. The term housing, used in this thesis, describes the immediate physical environment, both within and outside of buildings, in which families and households live and which serve as shelter. Housing is seen as a 'place to live in' including attributes such as shelter and safety to minimise the risk from natural hazards as well as an environment offering the option to lead a fulfilling life by enabling the community to pursue their normal household duties, resume their livelihoods or maintain social networks. Thereby, the conditions of housing interfere with people's lives by enabling, hindering and conducting the processes of daily life. In reconstruction, the provision of housing is commonly seen as a product rather than a process, leading to the construction of single houses even lacking necessary basic infrastructure.

Housing which is poorly suited to local natural hazard conditions is defined by the term 'maladjusted housing' in the following course of this thesis. Maladjusted housing can result from dynamic pressures such as lacking skills or is the result of the absence of a planner. Housing adjustment is not a new topic which, for example, can be seen in local building traditions, some of them being around for thousands of years. However, contemporary society tends to have a strong faith in technology rooted in the common belief of modernity to have the ability to control nature. The objective for housing regarding natural hazards is to carry out anticipatory, public and planned adjustment on which local authorities have a major influence and which fosters the realisation of desired livelihood outcomes for communities.

Measures for housing adjustment should be based on the resources available comprising of, for example, financial means, material, expertise and technologies. Some of these resources are influenced by local characteristics such as culture, religion or building traditions. There are protection, mitigation and adaptation measures for housing adjustment originating from the complexity paradigm which indicates that disasters occur at the interface between the physical system and the societal system both with equal weight. Protection measures comprise structural measures to modify physical events, mitigation measures include financial processes to cope with the encumbrance of loss, and adaptation measures are regulatory measures to the coping capacity. Following this approach, the factor of quality becomes more multidimensional, beyond the quality of construction with the user being put in the centre of considerations. Characteristics of well-adjusted housing are highly versatile, and, in this thesis, they are derived from actual reconstruction projects as well as handbooks and literature for housing reconstruction. For example, for adequate housing, occupants require safe drinking water, posing a protection measure which can be achieved by the selection of an appropriate water supply and sanitation system. A mitigation measure would ensure that the occupants' existence is not threatened in case they lose their house, for example, by providing a compulsory insurance.

Planning is understood as a systematic process for the development of operational objectives and sequences of tasks over a longer period and has a 'early warning function', 'orientation function', 'coordination function' as well as a 'moderation function'. In other words, planning is the conceptual anticipation of future actions while the task of planning theory is to systematically explain and support this activity. In planning, objectives must be defined and results must be evaluated. Neither the view of a problem, nor the problem definition or the solution to a problem are objective because they are based on an underlying planning approach of the observer or planner who defines the problem and determines the target. This definition and determination, coupled with certain background knowledge, has an impact on the choice of methods. For example, maladapted housing can only be defined as a problem if there is knowledge about expected changes in climate and their impact on natural hazard vulnerability. Further, discipline-specific knowledge commonly dominates the solution of problems which can be seen, for instance, from the fact that architects or engineers mostly propose constitutional solutions as opposed to social solutions. Hence, the definition as well as the possible set of solutions for an adjustment problem depend on the planning approach of the planner or the actors involved. Put another way, new potentials and new solutions can arise if an approach across disciplines is used. In order to develop appropriate methods, first the definition of a problem must be agreed on. Planning is always completed by people and within a certain political, social and economic context. Solutions should be based on this context, hence, there cannot be one solution that fits all.

Planners should be aware of their knowledge gaps resulting from an outsider role, especially when interfering with the social, economic and environmental development of a community. An insufficient elaboration and analysis of targets, and root causes or an assumption of familiar work practices without reflection, commonly lead to the development of unsuitable solutions for the complex problem of housing adjustment or reconstruction, in the worst case presenting a danger to the community. While there is no single best approach for the planner's role, there are a number of skills that influence the outcome of their work, most important to respectfully meet other disciplines and being confident in working together with many different actors.

Communities are subject to environmental conditions described as regimes while their disposal to perform tasks relies on their budgets available comprising time, material and physical budgets. Based on this approach of regimes and budgets, there are four instruments of spatial planning defined by Jung (2008): (i) provision of locations, (ii) construct and maintain facilities, (iii) adjustment of organisations operating in or with these facilities, (iv) influencing behaviour. While (i) and (ii) represent the rather conventional planning instruments, (iii) and (iv) are rooted in the impact caused by the behaviour of individuals who use the space. This impact and transforming effect is often bigger than the effect of other planning instruments. Measures for housing adjustment can be found within all four levels of planning instruments while the regime and budget model can be used to estimate the limitation and facilitating of activities.

International help in the context of natural hazards, for example in the form of development or relief aid, is coupled with exogenous international influence. The striving for development roots in convictions of modernity which channels the present state of the world in a particular direction by constant interrelated structural, cultural, psychological and physical changes. For the past two centuries, based on a self-understanding, societies commonly hold up the Western civilisation as a model for progress. Modernisation extends the interdependencies of people over ever-expanding distances determining their current life but also their opportunity to survive. Through their thoughts and ideas the representatives of modernity devided the network and connections of the world of things and the world of human beings. More specifically, they split between culture and nature, human beings and objects as well as between natural/cultural sciences and society. This forms the foundation of capitalism which is based on the hope for unlimited capture and control of nature.

A number of disasters are most likely self-inflicted by humans partly caused by countries of the Western society who destroyed big parts of the world, driving other peoples into misery, while saving their own people and landscapes. As an effect, on the one hand, these peoples commonly reach for remedy by imitating the West, on the other hand, countries in the West feel able to teach these peoples lessons. However, by definition, for a society to develop it needs to have control of its own resources, being independent of external science or knowledge. The underdeveloped population tends to be isolated from its resources by the governing elite which forces it to accept new strategies potentially leading to higher vulnerability and enhanced disaster risk. Relief aid after a disaster, reaching these populations from outside has the potential to exacerbate this situation.

Development policy evolved after World War II leading to global conferences on this issue starting in the nineties. These policies have a pragmatic motive, aiming at averting potential damage to industrialised countries and a moral motive rooting in an ethical obligation to help people in need and oppression as well as to act justly. Besides that, there is a pragmatic justification of development

policies driven by economic and political interests, for example, development policy measures are commonly used as an export promotion in developing countries representing attractive new markets. Some voices say that development aid in the name of modernity does more harm than good by keeping nations in dependence and simply transferring technology from developed to underdeveloped countries. On the other hand, while the Western societies started to doubt their own system, other nations, particularly their leaders, praise this form of civilisation, turning their back on traditions. Traditions, however, can be important for the inner balance of a community, hence, removing them presents a danger of destroying the structure while losing irreplaceable know-how. A coexistence of tradition and modernity can be achieved by creating a balance between opening and partitioning so culture can survive and flourish.

Houses in developing countries are often built without any built environment professionals³³. At the same time, planners commonly lack the skills needed to work in this specific context caused by inexperience or ignorance, especially towards cultural peculiarities such as local building cultures. Additionally, housing projects tend to be more successful if the community is involved. Both processes, post-disaster reconstruction and pre-disaster adjustment of housing must be put in a systems approach since the quality of the outcome depends on the performance of the system itself as well as on the influences received from the environment. For example, the capacity of a municipality to influence residents to adopt building codes is an aspect more important than the building code itself.

³³ As defined by Lloyd-Jones et al. (2009, 10); the term 'built environment professionals' is used to refer to architects, planners, engineers and surveyors.

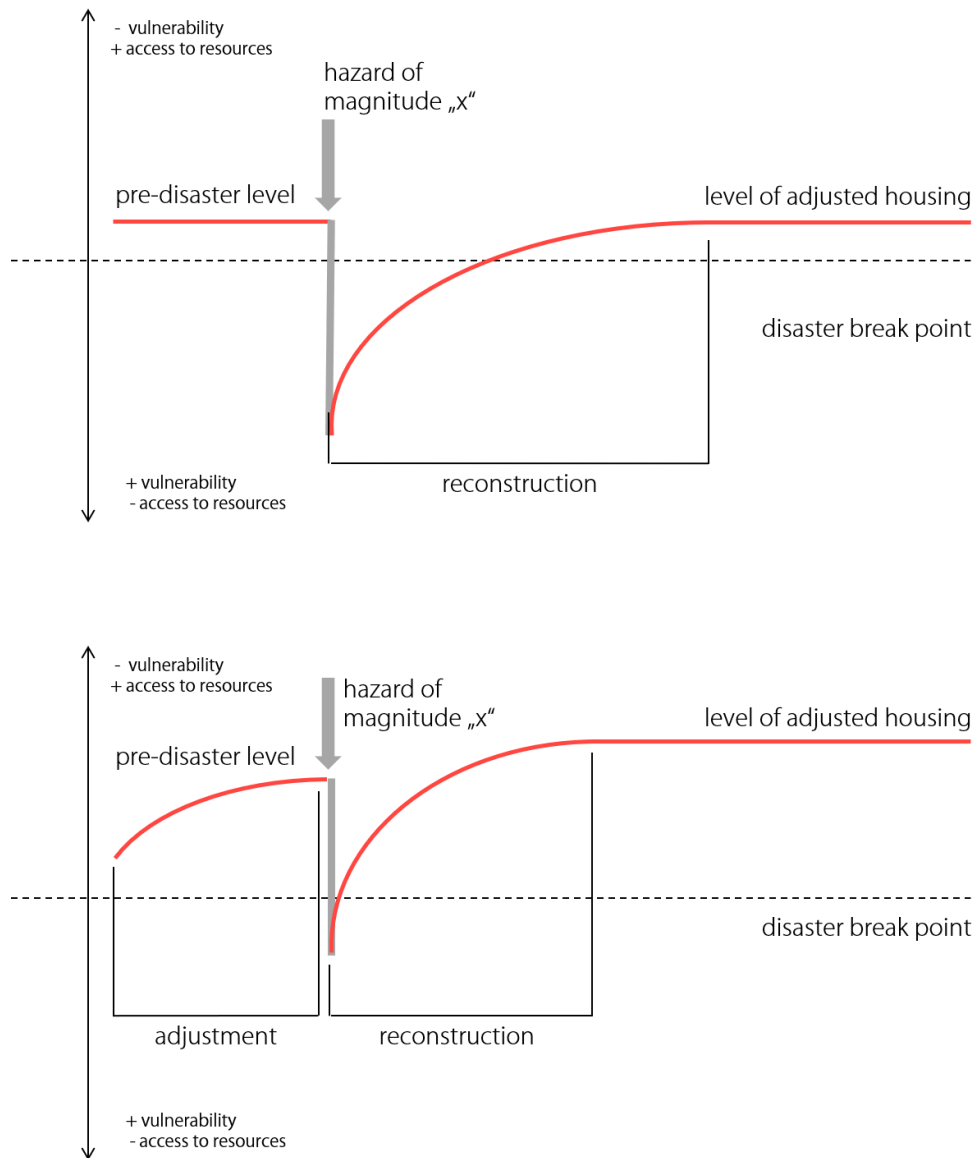


Figure 44. Model illustrating the concept of pre-disaster housing adjustment. Source: Lizarralde et al. (2014, 5); modified.

Based on these theoretical considerations the conclusion is drawn that, regarding adjustment of housing to natural hazards, action must be taken in the forefield of a disaster, both in everyday planning as well as preparing for a potential reconstruction. This is illustrated in Figure 44, where pre-disaster adjustment has the potential to not only lessen the disaster impact but also raises the level of adjusted housing reached after reconstruction. For this it is important to involve local actors, best case having the planning process designed and measures developed and carried out from within. External influence, for example through development aid, should be kept to a minimum at most limited to financial assistance and advisory function. While it is important to include planners as discussed in Chapter 4.3, they need to be sufficiently prepared and trained for this working context. First, the definition of the problem must be clearly defined and agreed on by all actors

involved in the process, then in a second step, appropriate measures can be deduced. Here it is crucial to follow an appropriate, relevant and adequate planning approach with regard to the planning task. It is not possible to formulate a single theoretical model for a pre-disaster housing adjustment or post-disaster reconstruction process since every process takes place in a particular socio-political, economic environment. Thus, in the following, a planning process for pre-disaster adjustment and post-disaster reconstruction of housing will be developed for the example of Banda Aceh, Indonesia, based on the experience from the reconstruction phase after the Indian Ocean tsunami 2004. Measures proposed at a later stage will be compiled on the basis of the instruments of spatial planning and the regime and budget model. The possibility for a potential transfer of parts of the generated planning process will be briefly discussed at a later time (Chapter 10.2).



7 Empirical study

"...the essence of a case study [...] is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what results." (Schramm 1971, 6)³⁴

There is a wide range of studies and publications on the reconstruction in Aceh and Nias after the tsunami 2004 and the earthquake 2005. They can be crudely structured as follows: (i) Assessments commissioned or conducted by implementing agencies, (ii) scientific studies, (iii) publications of government organisations. Among the main topics investigated are, on the one hand, immediate, medium- or long-term effects of the tsunami and reconstruction itself such as the scale of destruction, coastal front resettlements or changes in land-use. On the other hand, challenges and lessons learned during reconstruction, for example, time issues, quality of houses or aid management. Beyond that the focus was on various related special topics ranging from early warning, natural buffer zones through mangrove belts to indigenous knowledge, community resilience or piece building. The majority of these studies were carried out during the reconstruction process or immediately after, significantly less were conducted with the passage of time up to ten or more years after reconstruction concluded.

Steinberg (2007) and Arup (2006) for example, examine the impact of the disaster and the immediate efforts of rebuilding. Steinberg (cf. 2007, 150) concludes that the reconstruction process has been much slower than intended in the beginning and as the speed of implementation picked up during 2006 this had a negative effect on the quality of outcomes regarding an integration of housing with residential infrastructure or livelihood support. Arup did multiple studies and reviews of the Aceh housing programme focusing on life safety criteria of houses built by various donors mainly regarding the adjustment to natural hazards. For example, in 2007 the Disaster Emergency Committee (DEC)³⁵ commissioned seismic and humanitarian experts from Arup to review houses, schools and medical centres that had been built by DEC members after the tsunami for quality, partnerships, beneficiaries and construction management. Based on these results Arup published the independent report 'Lessons from Aceh: key considerations in post-disaster reconstruction' (da Silva 2010). Likewise, a number of organisations involved in reconstruction reported, reviewed and published their own reconstruction efforts, as for example UN-Habitat (2007a), (2007b), IOM (2005), Oxfam International (2006) or World Vision (2007).

Other authors as Fengler, Ihsan and Kaiser (2008) examine the organisation, structure and handling of reconstruction and rehabilitation efforts. Long-term studies are presented, inter alia, by Fan (2013) analysing reconstruction projects in Aceh, Myanmar and Haiti focusing on the capabilities of a 'building back better'-concept or Reddy (2018) focusing on lessons learnt and possible solutions for managing aid in long-term reconstruction and rehabilitation.

BRR and International Donor Community (2005), for example, produced publications in the course of the reconstruction process were recent progress in the reconstruction and rehabilitation of Aceh

³⁴ Also cited in Yin (2014, 15).

³⁵ The Disasters Emergency Committee brings together 14 leading UK aid agencies to raise money at times of humanitarian crisis, including e.g. Action Against Hunger, British Red Cross, Oxfam, Plan International, Save the Children and World Vision.

and Nias is discussed, inter alia,. Later, BRR (2009) produced a series of books on the processes and lessons learnt '10 Management Lessons for Host Governments Coordinating Post-disaster Reconstruction'. Furthermore, handbooks and guidelines on housing design were developed based on the proceedings and findings of reconstruction in Aceh and Nias mainly focusing on the physical aspects of reconstruction. For example, UNDP and UNISDR (2007) produced a handbook which provides simple information to homeowners, house designers and builders, and building monitors to teach design and construction principles for areas prone to natural hazards. The design and construction principles in the handbook have been taken of practices in the reconstruction of houses in Aceh and Nias. UNEP and Swiss Resource Centre and Consultancies for Development-SKAT (2007) published a manual to provide guidance to help improve the design and reconstruction of houses and minimise the negative impacts of poorly constructed houses on the environment.

Findings from these studies and publications are an integral part of the theoretical framework and an underlying for the empirical study design of this thesis. The focus lays on the role of housing adjustment to natural hazards in the planning process for housing in Banda Aceh, both during reconstruction and rehabilitation after the tsunami 2004 and currently. The author, as an independent researcher with an engineering background and a particular planning approach collected subjective viewpoints of actors that were or are somehow involved in the planning process. It was anticipated that the temporal distance to the reconstruction phase allows to prospect rather unbiased and reflected answers.

As previously stated, reconstruction after a disaster as well as pre-disaster housing adjustment pose complex problems with many actors involved and complex institutional frameworks. The knowledge and findings from the theoretical framework, primarily studies on post-disaster reconstruction were used to abduct first assumptions. Then, an empirical study was conducted in order to test these assumptions and detect more theoretic knowledge (see Figure 45). The empirical study was done as a field study in a selected research area including 33 interviews. It was organised and conducted by the author, with the assistance of International Centre for Aceh and Indian Ocean Studies as well as the team of the Nias heritage museum. The research area was investigated on the author's own initiative via scooter partly accompanied by a local translator. The interviews took place in Banda Aceh, Nias and Jakarta and were conducted face-to-face, in one case over Skype between February and April 2016. All data collected was analysed qualitatively following a deductive and inductive coding approach. The deductive codes applied were derived from the research questions, whereas inductive codes directly evolved from the collected data allowing for the unexpected³⁶. The following subsections will outline a detailed prescription of the methodical approach in order to reach a certain transparency and validity which both present quality criteria of qualitative data collection.

³⁶ Based on Glaser and Strauss (1967).



Figure 45. Research design; own diagram.

Research area

Inclined towards Yin (2014, 9), the descriptive case study is used as a method to find answers to the research questions ‘why’ and ‘how’ through focussing on contemporary events. Following the idea of longitudinal case studies, the case is studied for two points in time, first, the event of reconstruction, second, everyday urban planning. The research is focused on the city of Banda Aceh in Indonesia with a reconstruction phase 2005 until 2009 following the Indian Ocean tsunami 2004. Further, projects in Aceh province and Nias island were also concluded in the analysis. Aceh province, Banda Aceh and Nias island formed a unit for the reconstruction after the tsunami 2004 and earthquake 2005. Therefore, it is necessary to view these areas simultaneously.

Issues of examination were the reconstruction process after the tsunami 2004 and the current planning process for housing in Banda Aceh at the time when the field research took place (2016). Regarding the reconstruction process, the research questions were:

Who was involved? Why?

What was done? How was it done?

What was the result?

What went well/wrong? Why?

What role did the issue of natural hazards play (Disaster risk reduction)? Why?

What were lessons learned? Why?

Concerning the current planning process for housing in Banda Aceh, questions were:

Who is involved? Why?

How is it done?

What role does the issue of natural hazards play (Disaster risk reduction)? Why?

What role does a possible future reconstruction process play? Why?

Do lessons learned from reconstruction play a role in the current planning process? Why?

Banda Aceh was picked as a research area for various reasons. First, the reconstruction of housing finished more than ten years ago which provides long-term experience. This time lag is also likely to allow people involved a more critical view on the reconstruction process as well as the results, hence, events can be reflected upon from a distance. Also, ten years later it is rather possible to have a scrutinising view on the integration of lessons learned. Second, the reconstruction in Banda Aceh after the tsunami in 2004 stimulated a large surge of international aid. The influence of international organisations on reconstruction projects states one important aspect of examination. At the same time, a vast amount of international and national funds was made available. Third, as discussed in Chapter 8.1.1, Banda Aceh is still vulnerable to natural hazards and at the same time the city has a

growing population which adds to the problem. The reconstruction programme in Banda Aceh was coupled with the reconstruction in Nias island, for the sake of completeness the area of investigation includes Nias island, however, the main focus lies on the city of Banda Aceh.

Assumptions

1. Assumption: Adjustment of housing to natural hazards can reduce the extent of a disaster. This link does not receive sufficient attention/consideration in the current planning process in Banda Aceh.

This assumption relates to the current planning process for housing in Banda Aceh.

2. Assumption: Knowledge from the reconstruction process must be included in the current planning process for housing. This is not yet fulfilled.

Here, a link between the reconstruction process and the current planning process is made. The underlying question concerns the handling with and implications of lessons learned from the previous reconstruction process in Banda Aceh based on both, problems or shortcomings as well as successes during the process.

3. Assumption: The planner must have a clearly defined role throughout the entire planning process, take responsibility for occupiers and ensure adjustment efforts. This has not yet been accomplished.

This assumption aims at the role of the planner in the current planning process for housing in Banda Aceh.

4. Assumption: Traditional building methods provide a solid basis for adjustment of housing to natural hazards. Obstacles can be eliminated. However, they do not play a role in current planning.

Traditional building methods are a field of interest when it comes to housing adjustment regarding natural hazards. Here, the assumption is made that this ancient knowledge does not play a significant role in Banda Aceh when it comes to planning of housing which is a condition that can be drawn from other examples.

The field research in this thesis was facilitated through an invitation from the International Centre for Aceh and Indian Ocean Studies (ICAIOS) in Banda Aceh and supported by the DAAD.

7.1 Characterisation of research design

The methodology aims to gather qualitative rather than quantitative information from various actors of the planning process for housing development and reconstruction. This study was done in order to gain an in-depth understanding of the current planning process for housing in Banda Aceh as well as the planning process during the rehabilitation and reconstruction phase after the tsunami in 2004. As opposed to a quantitative approach, the qualitative approach operates with verbalisations or other non-numerical symbolisations of the experiential reality that get evaluated interpretatively³⁷ (cf. Bortz and Döring 2006, 296). The non-numerical or qualitative material used in the study are photographs and interview scripts, partly supplemented by presentation slides and sketches provided by the interviewee. Based on Bortz and Döring (2006, p. 297) the qualitative analysis is used to take the variety of content from individual answers of the various interviewees into account.

³⁷ See also Berg (2007, 2); Denzin and Lincoln (1994, 4); Spöhring (1989, 98ff).

Qualitative research procedures, in contrast to quantitative methods, can be used to reconstitute meaning or subjective viewpoints as for example, 'theories of everyday life', 'subjective theories' or 'concepts of reality' (cf. Helfferich 2011, 21). The trend towards more qualitative research developed in the last twenty to thirty years even though the roots of qualitative thinking go all the way back to Aristoteles (384-322 BC) (cf. Mayring 2002, 12). The qualitative approach falls back on the 19th century hermeneutics and phenomenology. The purpose of qualitative research is to describe living environments "from the inside out" through the viewpoint of the acting people. The aim is to improve the understanding of social realities and to draw attention to processes, interpretative patterns and structural characteristics (cf. Flick, Kardorff and Steinke 2013, 14). Popper (1989, 79) states, there is no such thing as pure observations, they are interspersed with theories and are guided by problems and theories. A qualitative research was conducted as a method to examine the past and current situation in Banda Aceh. For example, by obtaining access through actors that were or are somehow involved in the planning process. According to Flick et al. (2013, 25), qualitative research is recommended when developing an under-explored area of reality. The objective is to get sophisticated insights of the respondents' subjective point of view, hence qualitative study was applied. Based on Denzin and Lincoln (1994, 14) three methods for the collection and analysis of data were chosen: interviews, analysis of documents and visual methods in the form of photographs. These are described in more detail in the following.

Interviews

In qualitative research, a difference between the meaning introduced by the researcher and the meaning inserted by the interviewee is anticipated and special subject of research (cf. Helfferich 2011, 22). The purpose of the qualitative interview was to determine the subjective view of stakeholders from the planning process about the past event of reconstruction and rehabilitation as well as the current planning practice. A particularity of qualitative interviews is that the course of conversation is shaped less by the interviewer but more by the respondent (cf. Bortz and Döring 2006, 308).

Based on Mayring (2002, p. 66), a semi-structured open interview was used. Respondents can reveal subjective experiences and interpretations and develop correlations or cognitive structures during the interview. Further, this method is a way for the interviewer to revise definitions and comprehension. According to Mayring, this interview type enhances the relationship of trust between respondent and interviewer which leads to a situation where the respondent tends to be more honest, reflected, precise and open compared to a closed survey method. Using an interview guideline, respondents get directed toward particular issues but are supposed to respond frankly without given answers (cf. Mayring 2002, 68). This type of interview is rather flexible and can be straightforwardly adjusted to the course in each individual case (cf. Flick, Kardorff and Steinke 2013, 25). Open surveys are not interviews in a strict sense since the characteristic pattern of questions and answers is lacking. Therefore, they are often termed as research talks and field talks (cf. Bortz and Döring 2006, 308). However, in the following the surveys are still referred to as interviews. A guided interview or semi-structured interview is the most common form of qualitative surveys. The guideline and issues raised therein presents a framework for data collection as well as data analysis which allows a comparison of various results. Yet, it leaves enough flexibility for the interviewer to spontaneously include new questions or issues during the interview. Additionally, there is the possibility to filter issues in the process of data analysis which were not anticipated during the conceptualisation of the interview guideline (cf. Bortz and Döring 2006, 314).

Observation

An observation of the reconstruction sites and new or rebuilt houses in Banda Aceh, Aceh province and Nias island was done. These observations were recorded in pictures and covered damage, changes and extensions made by the inhabitants, form function and design, improvements to the structure, replacement of elements, traditional housing methods, location and surroundings, disaster risk mitigation measures as well as traces of devastation. The photographs, as well as the data analysis described below, rank among nonreactive research. In the course of accomplishment there is no exercise of influence on the investigated objects (cf. Bortz and Döring 2006, 325).

Data investigation

Books, maps, presentations and other material has been analysed in a further step. In some cases, the presentations were handed out by interview partners in order to add more information and give a more precise inside view. Some findings from this data are used to support and validate interview statements. This procedure is based on Schildermann and Parker (2014, 251) in order to reduce the risk that conclusions drawn from the relatively small number of interviews would not be representative of the larger project and to increase the credibility and validity of the findings.

7.2 Description of instruments

Interviews

The interview guideline was divided into four sections based on the four assumptions described at the beginning of this chapter. Each of these assumptions was then subdivided into three or four suppositions linked to a number of corresponding questions aiming to support the main assumption based on the respondents' answers. The questions targeted the respondents' personal experiences and knowledge concerning the reconstruction process and current planning process. As described above, the interviews were open and therefore the questions from the guideline were not always entirely used, respectively, some issues were outside the realm of particular respondents. Questions were also held flexible, some were reformulated to customise them to both the comprehension of respondents as well as the course of conversation with the aim of a comparable understanding of questioning (cf. Bortz and Döring 2006, 326). A detailed interview guideline can be found in the appendix, Chapter A.1.

Observation

Examinational material for observation consist of numerous photographs taken in Banda Aceh, Aceh province and Nias island.

Data investigation

The data analysis included several presentations and documents passed on by interview partners, namely Edi Purwanto, former BRR, Dr. Ella Meilianda, programme manager at TDMRC, and Risma Sunarzy, Profesional Advisory Board at Aceh Disaster Management Agency (BPBA).

7.3 Sample structure

Interviews

In-depth interviews were conducted with 33 different actors. They cover the main areas of investigations, mentioned above, with the following characteristics:

A: Actors that were involved in the reconstruction and rehabilitation process after the tsunami through the city of Banda Aceh [BA], the reconstruction and rehabilitation agency BRR [BRR] or either a local or international organisation [O].

B: Actors that are involved in the current planning process of housing in Banda Aceh either through their role within the Banda Aceh city planning authority [BA] or in their capacity as planners [P].

C: Actors that are part of the educational system providing training for future planners.

Each respondent can be assigned to at least one of the above fields [A-C]. In many cases one actor covers two or three fields. The following table (Table 7.1) lists the respondents with the corresponding field, their position in April 2016 when the interview took place, their position during the reconstruction phase as well as the location.

Table 7.1 Respondents and field of expertise; A=involved in reconstruction; B= involved in current planning process; C=part of the educational system for planners; own table

Respondent	Current position ³⁸	Position during reconstruction	Location	Field
Dr. Aulina Adamy, ST., Msc.	Lecturer at University Muhammadiyah Aceh, Banda Aceh	Architect and project manager; Acehnese born, grown up in Jakarta, worked for Indonesian Architect Association (IAI); later worked for BRR: Public Building and Facility Department as assistant manager and project manager for particular projects, especially escape buildings.	Banda Aceh	A[O] C
Ms. Yusrida Arwita	DK3, Manager in Tibang city forest		Banda Aceh	B[BA]
Mr. Tauku Bustamam	BPBA, Reconstruction and Recovery		Banda Aceh	B[BA]
Dr. Muhammad Dirhamsyah	Teaching staff master of disaster science at Syiah Kuala University, Banda Aceh, TDMRC	Former director of the tsunami and disaster mitigation research centre TDMRC; Resource person for the content of Tsunami Museum on 2006 Committee IMT-GT	Banda Aceh	B[BA] C

³⁸ At the time the interview was taken.

Mr. Said Faisal	Executive Director of the ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre); Senior Advisor to Minister/ Head of National Agency for Disaster Management of Indonesia (BNPB)	Deputy for Education and Health at BRR Aceh-Nias, Economics and Insurance background	Jakarta	A[BRR]
Ir. Bahagia	City Director Head of secretariat at the mayor office	City regional planning working in infrastructure for the government; Government of NAD Province – Division of urban and Housing	Banda Aceh	A[BA] B[BA]
Mr. Zakaria Hafizh	Community Cooperation Coordinator of CoMU Project at Bappeda, Banda Aceh	Student, Mechanical Engineering, Energy Management and Systems Technology	Banda Aceh	B[BA]
Mr. Haiqual	Lecturer at Architecture Department of Syiah Kuala University, Banda Aceh	Involved in different NGOs, Oxfam, UN Habitat	Banda Aceh	A[O] C
Dr. Izziah Hasan	Head of architecture department University of Syiah Kuala, Banda Aceh	Social safeguard adviser at Asian Development Bank (ADB) for earthquake and tsunami emergency support projects	Banda Aceh	A[BA] B[P] C
Mr. Teuku Indra		Assistant Lukman A. Gani (Director for Housing and Settlement division), BRR	Banda Aceh	A[BRR] B[P]
Mr. Irdus		Head (Euchik) of village Gampung Pande; local, survivor and beneficiary	Banda Aceh	A[BA]
Dr. Ir. Mirza Irwansyah	Dean of Faculty of Engineering of Syiah Kuala University, Banda Aceh	Local Governance Support Programme LGSP-USAID/Unsyiah, Regional manager, Donor/Consultant; Department of Architecture Syiah Kuala University, Banda Aceh	Banda Aceh	B[P] C
Ir. Iskandar	Aceh Environmental Agent Head of Aceh Investment and Promotion Board	In charge of Rehabilitation and Co-ordination at Bappeda, Former head of Bappeda (2010-2012); Deputy for Economic and Business at BRR Aceh-Nias, Agricultural background	Banda Aceh	A[BRR] B[BA]
Mr. Teuku Kamaruzzaman 'Amponman'	Teuku Kamaruzzaman&Partners, Legal Counsellors	Secretary Rehabilitation and Reconstruction Agency for Aceh and Nias (BRR Aceh-Nias)	Banda Aceh	A[BRR]
Mr. Marco Kusumawijaya	Founder and Director of RUJAK Centre for Urban Studies, Jakarta; architectural designer, urban designer and planner, researcher and consultant	Architect with Urban Poor Consortium (UPC), Jakarta based, in Aceh 2005 (March-Sept.) with UPLINK, Implementing agency	Jakarta	A[O]
Dr. Saiful Mahdi	Executive Director, International Center for Aceh and Indian Ocean Studies (ICAIOS); Founder and First Chair, Statistics Department, Syiah Kuala University, Banda Aceh; Senior Lecturer in Statistics	Head of International Center for Aceh and Indian Ocean Studies (ICAIOS)	Banda Aceh	B[BA]

Prof. Dr. Ir. Kuntoro Mangkusubroto	Professor of Decision Analysis; Founder and Chairman of School Advisory Council School of Business and Management ITB, Jakarta; Professor of Institut Teknologi, Bandung, Indonesia; Member of Advisory Board at WWF-Indonesia, High Level Experts and Leaders Panel on Water and Disasters	Head of Rehabilitation and Reconstruction Agency for Aceh and Nias (BRR Aceh-Nias);	Jakarta	A[BRR]
Ms. Mardalena	Head of the subdivision of Infrastructure Planning (including Housing) Bappeda		Banda Aceh	B[BA]
Mr. Fuad Mardhatillah	Lecturer Education Philosophy University of Syiah Kuala and Islamic University, Banda Aceh	Head of Social, Culture and Religion Department of BRR Aceh-Nias	Banda Aceh	A[BRR] C
Dr. Ella Meilianda	Programme manager TDMRC; Lecturer at the Civil Engineering Department of Syiah Kuala University, Banda Aceh	PhD in coastal morphology, understanding the morphological development of the tectono-tsunami-affected coasts	Banda Aceh	B[BA]
Ms. Erna Meutia	Lecturer at Department of Architecture and Planning at Syiah Kuala University, Banda Aceh; building structures and architectural science courses	Consultant for Asian Development Bank – Japan Fund for Poverty Reduction (ADB-JFPR) housing project	Banda Aceh	A[O] C
Ms. Elvi Zulfisni Meutia	Head of Housing and Settlement Department, Civil Service, PU		Banda Aceh	B[BA]
Mr. Yasir Noeriman	PU Banda Aceh, Building code division		Banda Aceh	B[BA]
Ms. Linda North [Mr. Yahdi Istens]	Founder of an NGO for Environmental Protection, Aceh	Involved in different international NGOs; Founder of a local NGO for reconstruction in home village of her husband Mr. Istens; local	Aceh	A[O]
Mr. Parmakope	Head of UPTB GIS Bappeda, Banda Aceh; UPTB GIS developed GIS Web application with information on tourist sites, government offices in Banda Aceh, gas station locations, ATMs, markets	GIS training programme through German Corporation for International Cooperation	Banda Aceh	B[BA]
Mr. Eddy Purwanto	United Nations Development Programme (UNDP) Indonesia Country Office, Jakarta	Head of Infrastructure and Housing Department, BRR	Jakarta	A[BRR]
Mr. Rusmadi	Aceh Disaster Management Agency (BPBD), Department 1: Preparedness	Fire Department, Banda Aceh	Banda Aceh	B[BA]
Dr. William Sabandar	Chairman of the National Team on Clean Energy Development, Ministry of Energy and Mineral Resources (ESDM), Jakarta	Head of BRR Aceh-Nias for Nias island	Jakarta	A[BRR]
Dr. Nirarta 'Koni' Samadhi	Country Director at World Resource Institute (WRI) Indonesia, Jakarta	Professional Planner, Lecturer and Consultant, involved through UNDP; later involved in BRR, Nias island	Jakarta	A[BRR]

Dr. Laina Hilma Sari	Lecturer at Department of Architecture and Planning, Syiah Kuala University, Banda Aceh	Monitoring programme supervisor UN Habitat	Banda Aceh	A[O] C
Mr. Asrul Sidiq	Researcher at International Centre for Aceh and Indian Ocean Studies (ICAIOS), Banda Aceh Research in regional and rural development planning, urban planning, community development, economic geography, and disaster management Lecturer at Department of Architecture and Planning, Faculty of Engineering, Syiah Kuala University, Banda Aceh	Student at Bandung Institute of Technology, Regional and City Planning	Banda Aceh	B[BA]
Ms. Risma Sunarzy	Member of the Professional Advisory Board at Aceh Disaster Management Agency (BPBA); DRR/Environment Training and Education Coordinator on Yayasan Lamjabat	Georisk Education Staff, German Federal Institute for Geosciences and Natural Resources	Banda Aceh	B[BA]
Mr. Yubarsi	Department 3: Rehabilitation and Reconstruction BPBD, Aceh Disaster Management Agency		Banda Aceh	B[BA]

The interview partners were recruited through previous literature research as well as consultations with actors in Banda Aceh. Additionally, respondents were asked to name further possible interview partners from within the field. Thus, a pool of possible interview partners from the three fields described above was formed. From this pool, the final respondents were chosen following theoretical sampling based on the general problem area. Glaser and Strauss (1967, 45) define theoretical sampling as “the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyses his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges”. In qualitative research, it is of less interest how a problem is statistically distributed but rather which problems occurred and their characteristics. Therefore, it is aimed at typical cases concerning the research questions rather than a large number of cases. Further, cases can be selected “arbitrary” considering the discovery or extension of a theory. Once a “theoretical saturation” is reached, the inclusion of further cases can be stopped (cf. Lamnek 1993, 194f). Out of the 33 people interviewed, 19 can be assigned to the field [A], actors that were involved in the reconstruction and rehabilitation process after the tsunami; 4 through the city of Banda Aceh [BA], 9 through the reconstruction and rehabilitation agency BRR [BRR] and 6 through a local or international organisation [O]. Field [B], actors that are involved in the current planning process of housing in Banda Aceh, is represented by 18 interview partners; 15 have a role within the Banda Aceh city planning authority [BA] and 3 are planners [P]. Actors that are part of the educational system providing training for future planners, field [C], is represented by 8 respondents.

Observation

Villages and areas for observation in Banda Aceh, Aceh province and Nias island were selected based on literature review as well as following recommendations from interview partners.

Category I: Villages that were reconstructed after the tsunami in Banda Aceh and the earthquake on Nias island.

Category II: Traditional houses.

Category III: Disaster risk mitigation, e.g. evacuation buildings.

Category IV: Traces of devastation, e.g. stranded boats.

Data investigation

Data was collected from both interview partners as well as the archive in the Tsunami and Disaster Mitigation and Research Center (TDMRC) library.

7.4 Implementation of investigation

The examination took place between February 10th, 2016 and April 1st, 2016 in a field research in Banda Aceh and Nias island.

In the course of preparatory work, the research area within South-East Asia was picked based on the preceding literature review. Thereupon, first contacts were made through Professor Dr. Jörn Birkmann, director at the Institute of Spatial and Regional Planning at University of Stuttgart and former Head of the Vulnerability Assessment, Risk Management & Adaptive Planning Section (VARMAP) at United Nations University Institute for Environment and Human Security, Bonn (Germany). A discussion with his PhD students Sari Siswani from Banda Aceh and Gusti Ayu Ketut Surtiari from Yogyakarta took place on the 23rd of July 2015 at the University of Stuttgart. Following, first contacts with the International Centre for Aceh and Indian Ocean Studies (ICAIOS) in Banda Aceh were made through Saiful Mahdi and Asrul Sidiq, leading to an invitation as guest researcher in November 2015 to assist the implementation of ICAIOS training programmes and volunteer with ICAIOS in community services in order to carry out an investigation in the field. In the following months preparations for the travel, stay and survey were made including a list of possible interview partners and the design of an interview guideline based on the research questions.

Interviews

The interviews were conducted face-to-face in the field primarily in Banda Aceh, some in Jakarta and with one exception which was held via skype. A number of interviews were accompanied by an Acehnese translator. The first contact was made by email or WhatsApp with a short explanation of the research objectives. When a first consent was given, appointments were arranged via phone calls, email or WhatsApp. In the case of no reply the initial inquiry was followed up by a phone call within three working days. The interview site was selected by the respective respondent, which in most cases was their own office or a coffee place. In two cases, the interview took place in a private home.

A pre-test was held on the 16th of February 2016 with Izziah Hasan and Erna Meutia at the Syiah Kuala University in Banda Aceh which took 88 minutes. Based on this, the interview guideline was finalised and used for all following respondents. The interviews were held in English or in Bahasa

Indonesia with the assistance of an Acehese translator. Most interviews went for 50 to 100 minutes with two exceptions that ran 112 and 133 minutes respectively, while four interviews were at 40 minutes or below. The interview with Erna Meutia constitutes another exception since it only went for 8 minutes. This was an additional discussion where unresolved issues were discussed. All interviews were recorded and later directly transcribed using 'f4transkript' software for technical assistance. The transcription was completed in order to make the separate steps of compression during the procedure from textualization to evaluation transparent and comprehensible. An approach of drawing conclusions about the planning process from the stories told in the interviews, without proceeding strictly linguistic, does not require a detailed transcription with breaks, sounds and noises. Additionally, verbatim reports were produced comprehensively for each interview which outlined an estimation about the conversational situation, a description of the environment, the situational relationship between respondent and interviewer. This was completed to have a description of the situation available if relevant for the evaluation (cf. Bortz and Döring 2006, 311).

Observation

Photographs were taken personally with a single-lens reflex camera while visiting villages and areas in Banda Aceh, Nias island and Aceh province on a motor scooter. On Nias island, part of the observations took place with local guide and translator Gaya Gee on a motorbike.

Data investigation

Data was collected during the field research in Banda Aceh in both hard or soft copies and later analysed.

7.5 Data analysis

The data analysis in qualitative research is based on the understanding that people already assign meanings to their acting and interpret their real world in advance when they act. They do this in order to react on their surrounding environment and interacting partners and, with this, understand and interpret the acting of others to provide it with an intended meaning (cf. Lamnek 1993, 198f). Qualitative social research, in essence, is a discovery procedure and not an interpretive art (cf. Kleining 1982, 228). According to Lamnek (1993, 198), this denotes that text interpretations are not an end in itself but means for the generation of findings. In contrast to quantitative research, assumptions and theories are generated from the data gained in the field while a limitation at verification of hypothesis gets rejected³⁹. The theory is based on empirical data where the provisional assumptions about correlations, obtained through field investigations, induce to an extension of the research field. At the same time, the range of the hypothesis initially formulated to attain purpose is explored through systematic comparative analysis. Hence, the separation between theory formation and theory verification, which is common in traditional social research, is rescinded. Qualitative social research underlines the value of empiricism for hypothesis genesis as well as theory development. This discovery of hypotheses takes place inductively, from the

³⁹ See also Glaser and Strauss (1967, 5): „In contrasting grounded theory with logico-deductive theory and discussing and assessing their relative merits in ability to fit and work (predict, explain, and be relevant), we have taken the position that the adequacy of a theory for sociology today cannot be divorced from the process by which it is generated. Thus one canon for judging the usefulness of a theory is how it was generated – and we suggest that it is likely to be a better theory to the degree that it has been inductively developed from social research.”

observations to the theory (cf. Kleinig 1982, 223,225). “By comparing where the facts are similar or different, we can generate properties of categories that increase the categories’ generality and explanatory power.” (Glaser and Strauss 1967, 24) Glaser and Strauss suggest an approach to the analysis of qualitative data where provisionally testing a hypothesis by coding the data first and then analysing it is combined with the generation of theoretical ideas as new categories or hypotheses and constantly redesigning a developing theory while analysing the data. “The purpose of the constant comparative method of joint coding and analysis is to generate theory more systematically [...], *by using explicit coding and analytic procedures.*” (Glaser and Strauss 1967, 102)

According to Mühlfeld et al. (1981, 332), it cannot be assumed that there will be a fundamental methodologically sound technique which is applicable to each investigation via qualitative methods. Indeed, these attempts can give instructions for the design of the survey phase, for example with interview techniques and the evaluation, while here a content-related new conception must be developed for each case based on theory and text. Lamnek (1993, 197) illustrates: For the interpretation and classification of existing text elements, abstract rules detached from the specific research question can hardly be imposed. An evaluation is always unique and therefore must be designed for a particular research question. This is not a matter of applying a previously fixed method but survey and evaluation methods must be developed closely to the research question (cf. Glaser and Strauss 1967, 5).

Interviews

The data analysis was done on two levels based on Bortz and Döring (2006, 301). On a first level, the transcribed text was analysed in a deductive procedure based on the underlying assumptions to decide whether relevant issues appear. A second level was the interpretation of the text where important aspects were filtered out and categories were determined in an inductive procedure. The interviews were analysed following an own developed method leaned on the six stages of content-analytical evaluation defined by Mühlfeld et al. (1981, 336). Initially, the evaluation starts from answering the central questions from the interview guideline with attention on the greatest possible level of detail and diversity in the replies. Initially, the focus is on identifying problem areas which can be attributed to the individual questions in the guideline rather than on a detailed interpretation of the interviews in terms of an individual live story. This means, unlike other evaluation methods of narrative interviews, not every sentence from the transcription must be taken into consideration. The final selection of individual text passages must be made at a relatively late stage of the evaluation so as few information as possible gets rated as irrelevant from the start and therefore gets excluded. The following shows the pattern as described by Mühlfeld et al. (1981, 336):

1. *Step* On the first reading all text passages that are spontaneously evident to give answers on the corresponding questions from the guideline get marked.
2. *Step* When reading through the second time, the text passages are classified into the system of categories while this gets extended.
3. *Step* Re-reading of the text for a third time with marking and listing of special text passages while in the case of repetition or similarity the most concise passage is taken as a basis.
4. *Step* Formulation of a text which presents the procedure of processing.
5. *Step* Compiling the evaluation with text and excerpts from interviews together with a fourth re-reading.

6. *Step* Marking of the evaluation text for the presentation, no further content-related or interpretive step.

1. *Step* In the first step, the text passages were allocated to the corresponding assumption from the interview guideline as a first level of order. This was done for each interview. As a modification from the process described by Mühlfeld et al. (1981, 336), in a next step the direct quotes were paraphrased following the qualitative content analysis of Mayring (2015, 72) in order to simplify the handling in the following steps. Here, text passages with a similar content were aggregated into one paraphrase while the original quotes were retained in the evaluation table to ensure the preservation of initial information. In most cases “consequences” were formulated in the style of memos defined by Strauss and Corbin (1990, 197) as “written records of analysis related to the formulation of theory”.

2. *Step* In the second step, a system of categories was defined and text passages were allocated to them, the list of categories got extended during the process. In a few cases text passages could be allocated to multiple categories. Also, for some categories it was necessary to introduce sub-categories to further detail the specification. For example, for assumption [18] from the interview guideline “*The planning process for housing reconstruction was partly successful however, had gaps and shortcomings.*” the following categories were generated for the aspect of shortcomings:

- | | |
|---------------------------------------------------------|--------------------------------------------------|
| A. Unclear landownership | B. NGOs taking over control |
| C. Missing/unsuitable master plan | D. Lack of building code/regulations |
| E. Relocation did not succeed | F. No time for planning |
| G. Community was unprepared | H. Bad quality housing |
| I. Additions/modifications are made by the people | J. Houses were not occupied |
| K. The poor live in the dangerous coastal area | L. NGO shortcomings |
| M. More houses got built than houses destroyed | N. There were no assessments done afterwards |
| O. Limited experience of the institution in charge | P. Problems that came with international helpers |
| Q. Lack of institution/no preparation | R. Costs went up |
| S. All plots in the settlement area are privately owned | T. Expensive temporary shelters |

From this, some categories got further detailed in sub-categories, as for example “*C. Missing/unsuitable master plan*” was split into the sub-categories “*Village planning*”, “*No master plan*” and “*Infrastructure*”.

The following categories were generated for the aspect of success:

- | | |
|-------------------------------------------|-----------------------------------------------------------------------|
| A. Community/local actor involvement | B. Houses were built earthquake resistant |
| C. Escape roads and buildings implemented | D. Raising disaster awareness |
| E. New know-how | F. One agency with full authority for coordination and implementation |
| G. Monitoring | H. Everyone received a house |

The full table of *Step 1 and 2* can be found in the Appendix under Appendix B.

The proceeding of *Step 3 to Step 6* can be found in the following Chapter 8 Findings, where the results from the evaluation process are presented.

8 Findings

In this chapter the context of the previously introduced research case, Banda Aceh, will be presented followed by an analysis of the qualitative study results. These comprise of the main findings regarding the reconstruction process after the Indian Ocean tsunami in 2004 including lessons learned as well as the current planning process for housing in the city of Banda Aceh.

8.1 Context in Banda Aceh

Figure 46 indicates the research area, Aceh and Nias. Aceh is a province of Indonesia on the island of Sumatra with the capital Banda Aceh. The capital consists of nine districts Meuraxa, Jaya Baru, Banda Raya, Baiturrahman, Lueng Bata, Kuta Alam, Kuta Raja, Syiah Kuala, and Ulee Kareng (cf. BPS 2010, 214-217). Each district is divided into individual villages called “desa”, each with a village head acting as the local authority. The province Aceh has a population of around 4.5 million and enjoys a certain degree of autonomy from the central government of Indonesia in Jakarta. In 2003 the Islamic sharia law was introduced to the largely Muslim Acehnese population (cf. da Silva 2010, 27).



Figure 46. Research area Aceh and Nias; own diagram.

History

The following is based on Heiduk (2006), who did a conflict-analysis for the province of Aceh. The initial sultanate of Aceh was conquered by the Dutch and after 30 years of war, between 1873-1903, integrated into the Dutch East Indies. During the Second World War, the archipelago of Indonesia was occupied by Japan, which ended in 1945. After Indonesia's independence, the newly established state was to be secular, rejecting Islam as the basis of the state. Moreover, “all political and economic power was centralized on Java, in the hands of the central government in Jakarta” (Heiduk 2006, 7). As a consequence, Aceh started to revolt against the central government along with other outer provinces in Indonesia with the result of special status for Aceh, “granting to the province autonomy rights concerning religious, cultural, educational and legal affairs” (Heiduk 2006, 7). Aceh remained with this status until 1976 when the Gerakan Aceh Merdeka – Free Aceh Movement (GAM) was initiated and demanded complete independence of Aceh. The reason for this development was a lack of self-determination in political and economic issues, linked to an ongoing industrialisation where the majority of profits made with Aceh's natural resources, oil and gas, ended up in Java or foreign

countries while only five percent was returned to Aceh. The separatist rebels of GAM fought for an independent Aceh from 1976 until August 2005 when they signed a peace deal with the central government after the tsunami disaster. Following the tsunami, “in the face of Indonesia’s biggest humanitarian catastrophe” both national and international pressures persuaded the conflict parties to negotiate which resulted in a peace agreement after 30 years of armed conflict (cf. Heiduk 2006, 7f). “Massive international attention was focused primarily on the tsunami recovery efforts, of which the conflict was seen as one dynamic. The scale of the devastation on supplies and on the rebel troops, changes in the leadership of the army, and personal interventions by President Susilo Bambang Yudhoyono and Vice President Jusuf Kalla all contributed to a favorable environment for peace talks. A peace agreement and disarmament were followed by elections for provincial governor in December 2006, won by Irwandi Yusuf, whose base of support consisted largely of ex-GAM supporters.” (BRR, 2009, p. 18) These years of conflict claimed between 15,000 and 25,000 lives, displaced over 400,000 people and turned Aceh into the fourth-poorest province in Indonesia. On top of this, it “destroyed the productive sector, hampered the delivery of basic services in many areas, weakened institutions, eroded the social fabric, traumatised a large portion of Acehnese society and created deep political fault-lines between Aceh and Jakarta” (Fan 2013, 5). Further, before the tsunami occurred, Aceh was closed to most international aid agencies except for the International Committee of the Red Cross (ICRC), the UN Office for the Coordination of Humanitarian Affairs (OCHA) and a small number of locally-staffed NGOs (cf. Fan 2013, 5). According to da Silva, the conflict resulted in “high levels of corruption, weak local government and underinvestment in public” (2010, 27).

Population

The city of Banda Aceh has 239,000 inhabitants (cf. Loose, Jacobi and Wachsmuth 2014, 544). The average life expectancy is 71.34 years (2014), compared to 72.59 years in Indonesia. While a population growth in the Province of Aceh can be observed with 4,523,100 in 2010, 5,002,000 in 2015 and an expected 6,541,400 for 2035. The percentage of urban population rose from 28.1% in 2010 to 30.5% in 2015 and is predicted to rise to 43.2% for 2035 (cf. BPS 2017). A majority (63,15%⁴⁰) of Acehnese are working on the agricultural sector as fishers or farmers, settled in the fertile and flat coastal area as the centre of the province is mountainous (cf. da Silva 2010, 27).

Institutions

There are a number of institutions in the city of Banda Aceh that are affiliated with housing. Bappeda, which stands for ‘Badan Perencana Pembangunan Daerah’ is the regional body for planning and development. As shown in Figure 47, the administrative organisation of Indonesia consist of many levels starting with the president on the highest level, together with central government ministers and departments over the provincial government departments to the head of district or mayor and finally sub district heads and village heads on the lowest level. There is a body for planning and development, on the national, the provincial and the regional level.

⁴⁰ Statistics of Aceh Province 2016 as cited in Aswadi et al. (2017, 175).

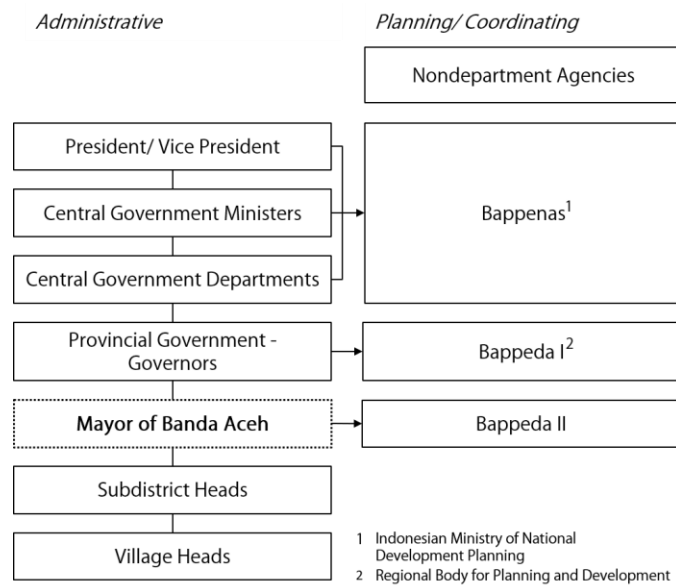


Figure 47. Organisational structure Bappeda Banda Aceh. Source: White et al. (1989, 67); modified.

The same applies for The Ministry of Public Work, PU (Dinas 'Pekerjaan Umum'). The Indonesian Ministry of Public Work and Housing 'Kementerian Pekerjaan Umum Republik Indonesia' has an equivalent on the provincial as well as on the regional level with 'Dinas Pekerjaan Umum Kota Banda Aceh'. The Ministry of Public Work is responsible for building permits as well as the regional building code. BPBA, 'Badan Penanggulangan Bencana Aceh' or the Aceh Disaster Management Agency is a branch of the National Disaster Management Board BNPB which was established to fulfil the demand of the 2007 regulation by enacted law number 24 regarding disaster management. The aim was to provoke change in the Indonesian disaster management system as a consequence of the tsunami 2004. Later, each region received a Regional Disaster Management Board called BPBD to act as an activator for disaster management and risk reduction (cf. Qisthi 2012, 1). The organisational structure of BPBA is presented in Figure 48.

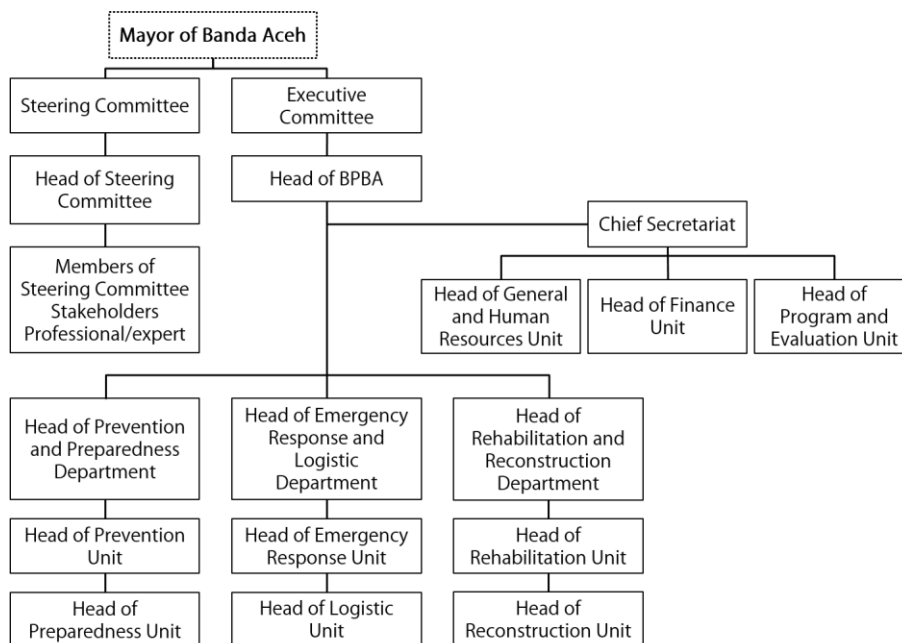


Figure 48. Organisational structure of BPBA. Source: BPBD Qanun No.3/ 2011 (2011); modified.

Two further institutions in Banda Aceh, playing a role for housing regarding disaster risk reduction, are the Tsunami and Disaster Mitigation Research Center TDMRC linked to Syiah Kuala University which was founded in the aftermaths of the tsunami 2004 and the Aceh Environmental Agency 'Bapedal'. Bapedal also has a national instance and "is the first specialised environmental regulatory body to be established in Indonesia with implementation powers to monitor pollution and the negative impacts of development on the environment" (MacAndrews 2006, 85).

8.1.1 Tsunami 2004

On December 26th, 2004, a magnitude 9.2 seaquake shook the Indian Ocean and Sumatra's northernmost province of Aceh and the islands of Simeulue and Nias closest to the quake. The quake caused a major undersea movement along Sumatra's western fault line, which triggered a series of tsunami waves approximately 20 metres high. These tsunami waves had an impact on the coast of Sumatra and most bordering countries of the Indian Ocean as demonstrated in Figure 49 and Figure 50 (cf. Steinberg 2007, 150). "Some 230,000 people from 14 countries lost their lives and millions were left homeless, making the tsunami one of the deadliest disasters in recorded history." (Fan 2013, 5) A tsunami is a sub-type of an earthquake which is a geophysical hazard following the definition in Chapter 2.1.1. The quake originated around 30 kilometres below the Indian Ocean with the epicentre about 150 kilometres south of Meulaboh and 250 kilometres from Banda Aceh. Since the eruption of Krakatoa, a volcano between Sumatra and Java, this earthquake was the worst natural event in Indonesia in terms of energy released (cf. Bappenas 2005, 4).

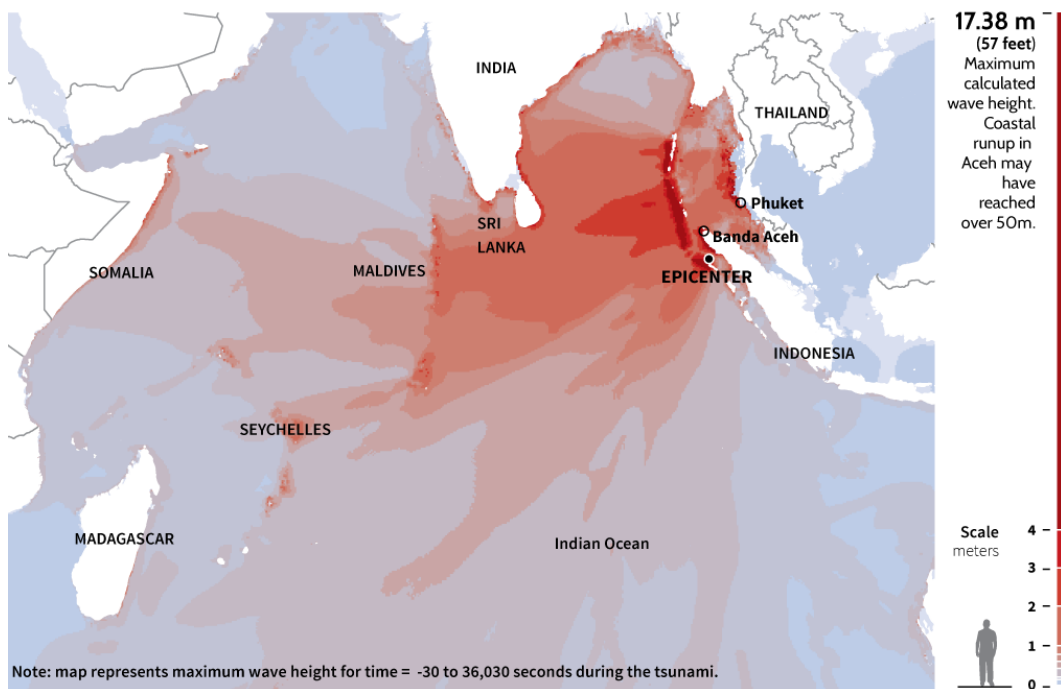


Figure 49. 2004 Indian Ocean tsunami wave height. Source: Jacobsen (2014).

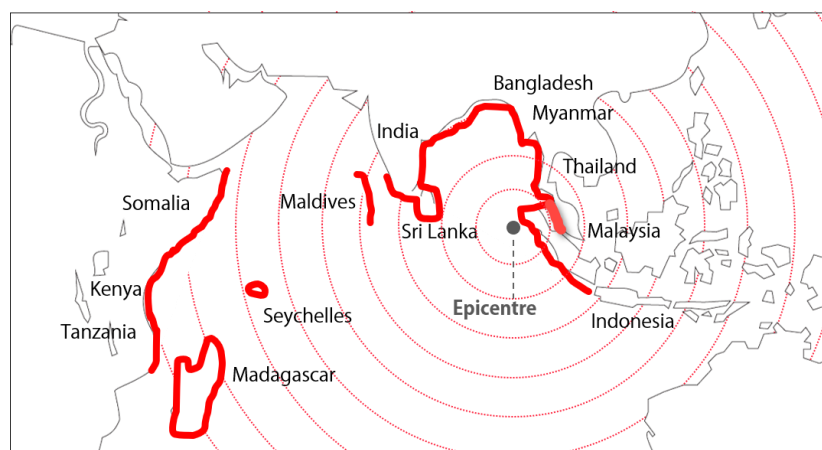


Figure 50. Tsunami 2004, countries affected. Source: da Silva (2010, 8); modified.

Tsunami comes from the Japanese words “tsu” for harbour and “nami” which means wave. The destruction of the tsunami was also felt in India, Bangladesh, Myanmar, Thailand, Sri Lanka, Malaysia, Maldives, Seychelles, Somalia, Tanzania, Kenya and Madagascar, but the country most affected was Indonesia, recording almost half of the total damage and losses worldwide. Almost all of this damage occurred in Aceh where over 120,000 lives were lost and another 90,000 people declared missing from a population of 4.25 million. In addition, close to 500,000 Acehnese lost

their homes and 750,000 lost their livelihoods. “Aceh’s local authorities also suffered extensive losses. According to Indonesia’s National Planning Agency, over 3,000 civil servants died and another 2,275 were reported missing, and 669 government buildings were destroyed.” (Fan 2013, 5) According to the United Nations Office for Disaster Risk Reduction, quite a number of lives could have been saved through an evacuation of people to higher ground. However, at that time there was no operational tsunami early warning system in the Indian Ocean neither was there education and preparedness on how to react after an earthquake. Moreover, “for most coastal population living there in 2004, the experience of responding to a tsunami had long faded from living memory”. The tsunami caught locals as well as tourists both unaware and unprepared. In contrast, the coastal population of Simeulue, Indonesia and Andaman Islands, India did understand the hazard and knew how to respond to a tsunami. The knowledge to evacuate to higher ground is deeply rooted in their culture, therefore, they largely evaded the effects of the Indian Ocean tsunami 2004 (cf. UNISDR 2015b, 23f).

On the 28th of March 2005, another earthquake occurred off the coast of Simeulue island with an 8.7 on the Richter scale. As shown in Figure 51 the epicentre was 1125 kilometres from Gunung Sitoli, the district capital of Nias island, North Sumatra province and 84 kilometres from Sinabang on Simeulue, Aceh province. The earthquake was followed by a local tsunami similar to the event of December 26th but much smaller in comparison. Nias island has a population of around 730,000. Around 1,000 people were killed in the event when houses and shops collapsed while the damage was concentrated close to the beach. This was the same situation in Simeulue with a population of 80,000 where around 100 people lost their lives (cf. EERI 2005, 1).

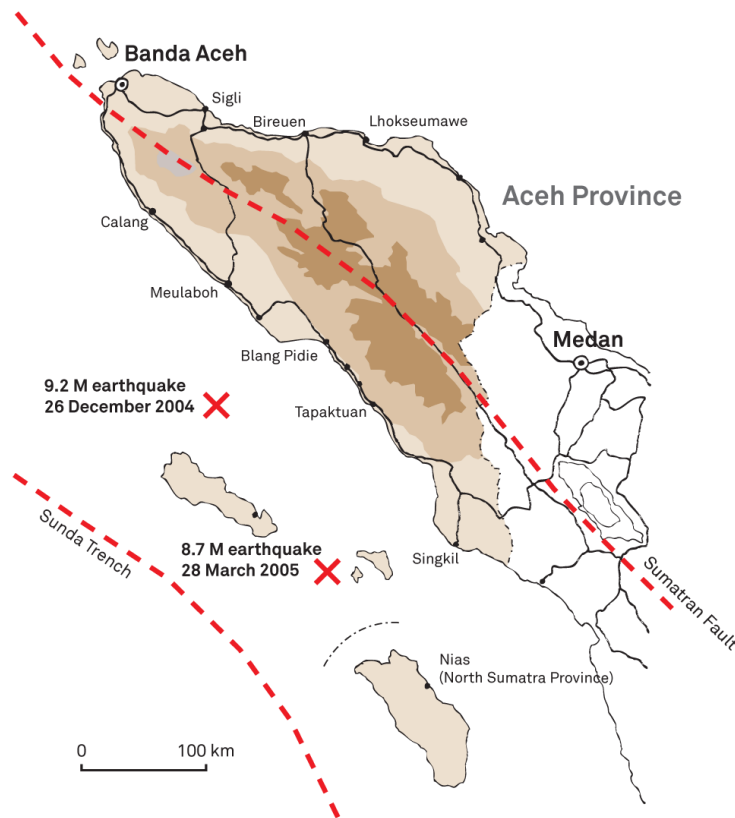


Figure 51. Map of Aceh and Nias. Source: da Silva (2010, 28).

Consequences for Aceh

In Aceh, most people lived in simple timber houses along the coast when the tsunami hit, hence their livelihoods as well as their property got severely damaged. In contrast, in the port towns such as Banda Aceh, Meulaboh, Calang, Lhokseumawe and Singkil masonry and reinforced concrete was more widespread in house construction. All eight key ports and the coastal road, which were the economic driving force of the region were destroyed in the tsunami. This cut off the west coast of Aceh from the capital Banda Aceh and hampered the supply and distribution of materials while some communities thenceforward could only be reached via a mountainous road from Medan or on the airway to Meulaboh (cf. da Silva 2010, 26).

The government of Indonesia, under the State Minister for National Planning Development Agency Bappenas, undertook a rapid damage and loss assessment with donor support immediately after the disaster occurred using “information from government ministries, agencies on the ground, satellite imagery, aerial photography and pre-tsunami survey data” (da Silva 2010, 28). This was published in January 2005 and estimated the cost of damage at USD 4.45 billion with housing being the most affected sector. Damage to public and private property weighted at 66 percent of this, the remaining 34 percent lay in the loss of public assets or revenue within the economy (cf. da Silva 2010, 28). Another damage assessment was completed by the International Organization for Migration IOM in April 2005 with the following results presented in Table 8.1.

Table 8.1 Damage assessment IOM. Source: da Silva (2010, 28); modified

Category	Destroyed (area/units)	Destroyed (percentage)
Damaged housing and settlements		
Settlement areas	173,683 ha	34.8%
Houses	116,880 units	57%
Damaged public buildings		
Health facilities	693 units	66%
School buildings	1,662 units	46%
Government buildings	1,412 units	70.6%
Markets/kiosks	1,416 units	75%
Damaged infrastructure		
Arterial roads	654 km	27.5%
Provincial highways	603 km	38%
Bridges	2,267 units	66.5%

8.1.2 Vulnerability to natural hazards

As discussed in Chapter 2.2.2, vulnerability is a function of the natural hazard risk which a system is exposed to, its sensitivity and its adaptive capacity. Aceh province has a long history with various natural hazards, mainly geological hazards such as earthquakes, volcanoes, tsunamis and meteorological hazards such as floods, storms and landslides. The location of Aceh on the Sumatran fault and east of the Sunda trench, which is accountable for some of the world's largest earthquakes including the one that triggered the tsunami in 2004, causes a high seismicity (cf. da Silva 2010, 42). Figure 52 shows a tsunami risk map for Banda Aceh done by the local Tsunami and Disaster Mitigation Research Center (TDMRC) in 2012.

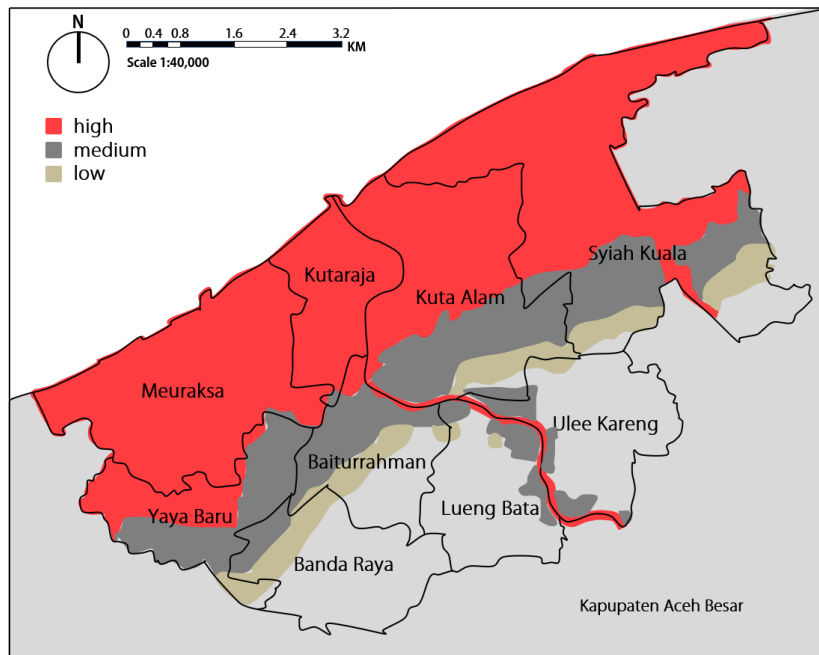


Figure 52. Tsunami risk map Banda Aceh. Source: Meilianda (2014, 13); modified.

The climate in Banda Aceh is classified as tropical with a significant amount of precipitation throughout the year and an average of 1,734 millimetres per year. With an average rainfall of 90 millimetres, June is considered the driest month and December the wettest month with 236 millimetres. The temperature in Banda Aceh varies by just 2.4°C across the year. April, the warmest month of the year has an average temperature of 28.3°C, the coldest month, January, reaches an average of 25.9°C (cf. Merkel 2012). Due to the high rainfall, areas along the rivers and the bases of mountains are vulnerable to flooding which is amplified by deforestation. Along the coast there is a risk of tidal flooding which has been increased through changes in the topography and the loss of former sea defences as a result of the Indian Ocean tsunami (cf. da Silva 2010, 43). The natural buffer zone of mangroves which used to be a shield for tidal floods as well as small tsunamis is no longer present in its original form. Around the coastline of Sumatra large areas of mangroves have been felled over the last years. Reasons for this were the fiber, the usage as fuelwood and shrimp ponds that were built along the coast as a possible income resource. Today, the impacts of losing mangroves has been admitted by the Forestry Department's Director of Reforestation and Land Rehabilitation but a reforestation is mostly very difficult (cf. Whitten, et al. 2000, xx). Another risk which, a resultant from topography, is the mountainous region with steep slopes where several zones are particularly prone to landslides. Here, bulldozers cleared slopes of vegetation during reconstruction in order to make room for post-disaster housing. This resulted in unstable slopes vulnerable to collapse during events of heavy rainfall. This risk is still being increased by ongoing deforestation (cf. da Silva 2010, 43). In Aceh, both legal and illegal logging poses a severe problem where not even national parks are secure. People involved in this are mostly not impoverished farmers but rather tenants that act for urban entrepreneurs. "For example, the best parts (lowland, relatively undisturbed forest) of the original area of Leuser and Kirinci National Parks were given out as official and unofficial logging concessions." (Whitten, et al. 2000, xxf)

8.2 Reconstruction after the tsunami 2004

Due to the magnitude of the disaster, as well as decades of conflict in Aceh, the weak local government and remote central government could not shoulder the reconstruction effort on their own. Two days after the tsunami, on December 28th, 2004 President Susilo Bambang requested assistance from the international community and invited them to Aceh for emergency relief. Within a week after this, 50 international organisations were on the ground and by January the number increased to over 200. The Acehnese tradition of “gotong royong” which stands for voluntary mutual assistance led to rescue and relief efforts in villages prior to the arrival of international organisations (cf. Scheper, et al. 2006, 69).

With a total of USD 14 billion by December 2005, the international financial response to the Indian Ocean tsunami was the largest on record to a natural disaster. This, notably large amount, originates from the unprecedented private response with USD 5.5 billion donated to NGOs and UN agencies. Compared to this, pledges from governments and international financial institutions were a total of USD 8.5 billion which is less than the USD 9 billion for Hurricane Mitch in 1988 or USD 9.4 billion for Iraq in 2004. “The scale of the response from the general public was due to a special combination of factors: a huge and blameless natural disaster; its occurrence just after Christmas; the number of Western tourists killed; and the extensive media.” (Flint and Goyder 2006, 21-24) All this turned the disaster into a ‘popular’ emergency. For example, in Germany it was the highest private donation made for any incident since 1945. This unprecedented funding was seen as an opportunity to not only replace destroyed housing but to ‘build back better’. In order to illustrate this dimension, there was USD 3,000 available for each of the 3.7 million people in areas with mayor impacts. While in comparison, in 2005 2.2 million people in Eritrea affected by a drought had an allocation of USD 50 per person. Also, the number of implementing agencies involved in the response after the tsunami, with at least 202 NGOs, was likely the largest recorded with many of them lacking previous experience in emergency relief or reconstruction (cf. Flint and Goyder 2006, 21-24)⁴¹. As presented in Table 8.2, donor pledges for Aceh and Nias reached USD 5.1 billion in grants and loans. The Donor Conference took place in Jakarta on January 18th, 2005 the day after the damage and loss assessment was closed (cf. Fengler, Ihsan and Kaiser 2008, 16). Most international aid agencies had never worked in Aceh or Nias and therefore, knew neither the context nor had any stakeholder networks which made an assessment of local capacities problematic. Hence, the majority of NGOs flew in foreign specialists which enabled a faster response at the early stages but “proved an inappropriate and unsustainable approach in the transition to recovery and reconstruction” (Scheper, et al. 2006, 68).

⁴¹ See also Fengler et al. (2008, 20f).

Table 8.2 Event time frame. Source: Fengler et al. (2008, 16); modified

Date of event	The nature and impact of reconstruction challenge	Damage & Loss or Needs Assessment	Donor Conference
December 26, 2004 Indian Ocean tsunami	The impact of the tsunami: - 130,000 people killed - Damages & losses: USD 4.5 billion - Impact on economy: 97% of province GDP or 2% of national GDP	January 18, 2005	Jakarta, January 19, 2005 Donor pledges: USD 5.1 billion (grants and loans)
August 15, 2005 The signing of peace agreement	The impact of the conflict: - 15,000 killed by conflict		

Table 8.3 displays the institutional arrangements for post-disaster reconstruction in Aceh and Nias. For the first three months, the Indonesian government tried to coordinate the relief and reconstruction from Jakarta through 'BAKORNAS' (PBP), the National Coordinating Agency for Natural Disaster and Refugee relief which, according to da Silva (2010, 30), "was inadequately prepared to coordinate a disaster response", and the National Planning Agency Bappenas. The later was responsible for the coordination of long-term recovery and reconstruction. For this, they developed a master plan for the reconstruction of Aceh and Nias, mainly referred to as the 'Blueprint', set in law on April 15th, 2005. Further, on April 16th, Bappenas established the Rehabilitation and Reconstruction Agency BRR with a four-year mandate "to coordinate and implement the master plan reporting directly to the president". The functions of BRR included "planning, approval, matching needs to resources, facilitation, disbursement of funds, monitoring and evaluation". Later implementation was added to this list due to slow progress which created a competition between BRR and other agencies regarding local contractors, labour and materials. Since it took some time to put up this institution, "many NGOs had started reconstruction before the establishment of BRR and continued their activities regardless of the new organisation" (da Silva 2010, 30).

Table 8.3 Institutional arrangements for post-disaster reconstruction. Source: Fengler et al. (2008, 18); modified

Date of event	Type of institutional arrangements	Implementing agencies
Tsunami: December 26, 2004 Peace agreement: August 15, 2005	Decentralised special agency (Badan Rehabilitasi dan Rekonstruksi/BRR). In the first year, BRR had a centralised structure	Reconstruction agency, central government (limited), provincial and local government, donors, NGOs

BRR consisted of an Advisory Board, a Supervisory Board and the Implementing Agency. Members of the Advisory Board represent stakeholders such as communities concerned, academicians, universities or the government at central and regional level. This was to ensure these stakeholders' aspirations were represented and reflected in the rehabilitation and reconstruction process. The Supervisory Board was supervising the implementation of the process, on the one hand by inspecting the performance of the Implementing Agency and on the other hand by handling community

complaints. Finally, the role of the Implementing Agency was to formulate BRR’s operational strategy and policy, prepare an action plan, implement rehabilitation and reconstruction activities and ensuring that the funds were used faithful and without corruption.

The structure of the Implementing Agency is presented in Figure 53. Due to the decentralisation strategy of the central government, from 2007 onwards funds were allocated through the regional offices opened by the BRR in 23 municipalities and districts under the mandate of the Chief Operation Officer COO (cf. UNEP 2007, 54). According to Fengler et al. (2008, 19), this decentralisation was established to work closer together with the local government for a better integration of local planning and the prevention of duplication. “Institutional arrangements for reconstruction depend on the scale of the disaster and country context. Special reconstruction agencies are only second-best solution. The best solution is strong local governments managing reconstruction supported by central government agencies. However, in most developing countries special reconstruction agencies are often the only feasible option when strong local governments with a proven track record in reconstruction are absent.” (Fengler, Ihsan and Kaiser 2008, 20)

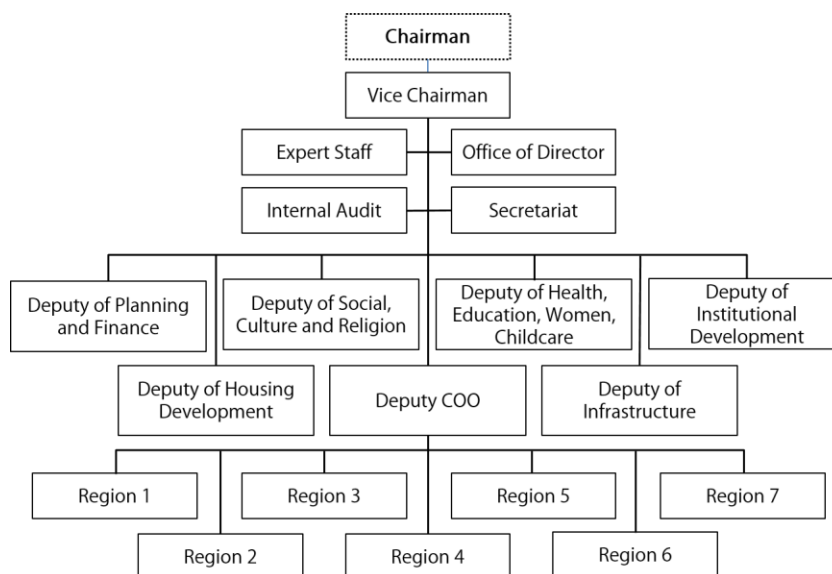


Figure 53. BRR organigramme. Source: UNEP (2007, 53); modified.

Since the master plan was completed in Jakarta a number of stakeholders were not involved in the planning process including agencies already working in the field in Banda Aceh at that time. Therefore, it did not provide a strong basis for an appropriate and consistent response. In this master plan renters and squatters were initially overlooked and it took until February 2007 for a policy of free land and housing for renters and squatters to be announced (da Silva 2010, 31). Another issue was land tenure as the tsunami not only destroyed the built environment but also land boundaries, personal identification documents and most records of land ownership. For this the Reconstruction of Land Administration Systems in Aceh and Nias RALAS programme was established by the central government together with the World Bank in April 2005 (cf. da Silva 2010, 30f).

In June 2005 BRR announced that each affected household will receive a permanent 36 square metres house within a year. Until completion the communities should be adequately housed in either

barracks, transitional shelters or with host families. Semi-permanent houses that had since been constructed had to be upgraded or replaced. “This timeline proved unrealistic and did not reflect the realities on the ground, led to false expectations by the media, donors, government and beneficiaries and placed considerable pressure on implementing agencies.” (da Silva 2010, 30) Due to this political and media pressure, numerous agencies in Aceh promised rapid construction of a large number of houses in multiple locations. Later, as a result of challenges being overlooked such as land tenure issues, these promises had to be scaled back which led to an exacerbated relationship between BRR and the implementing agencies (cf. da Silva 2010, 46).

As mentioned above, the concept of ‘build back better’ discussed in Chapter 2.4 also played a role in the reconstruction process of Aceh and Nias. The promoted aim was not just a reinstatement of what the tsunami had destroyed “but also to bring an end to the civil conflicts in Aceh [...]; build the capacity of institutions; expand access to services such as health and education; reduce poverty and strengthen livelihood security; advance gender equality; and empower and open up spaces for civil society” (Fan 2013, 1). This concept was initiated by the UN Special Envoy for Tsunami Recovery and former president Bill Clinton saying: “We need to make sure that this recovery process accomplishes more than just restoring what was there before.” (Fan 2013, 1) The term ‘build back better’ was widely used in Aceh but meant different things to the various actors owing to a vague definition. As a consequence, each actor followed an own understanding and definition of the model ‘build back better’. For example ‘reduce poverty and strengthen livelihood security’ sounds sensibly, however, in order to render this vision tangible it must be precisely defined to deduce appropriate measures. The absence of a suitable definition and shared understanding causes challenges and undermines the strength of a model. The importance of that was put in a nutshell by Bunge concluding: “Sense or content is inversely related to extension or truth domain.” (Bunge 1996, 249) For the Indonesian government, the concept included the reconstruction of safer housing and improved infrastructure but also peace between Jakarta and GAM culminating in trust building between the central government, local authorities and local communities. BRR added a reformation of governance in Indonesia by focusing on transparency and accountability. According to Fan (2013, 9) the humanitarian agencies involved in reconstruction in Aceh understood the concept’s primary objective in the empowerment of local communities and not so much in terms of physical reconstruction. “In many cases, though, there was nothing distinctly new about what was called ‘build back better’, and actual interventions largely built on existing ‘good practice’ in the humanitarian sector.” (Fan 2013, 10) There was a wide variety of approaches on humanitarian aid including cash for work or the provision of information on disaster risk reduction. While the above mentioned exceptional high amounts of funding gave the opportunity to go beyond standard life-saving response, it created pressures for agencies to spend money fast in order to meet donor deadlines without the ability to do detailed investigations or implement long-term programmes. (cf. Fan 2013, 8-10).

The large amount of funding also led to the decision that everyone receives a ‘one-size fits all’ house regardless of their real needs, focusing on reconstruction over recovery with the provision of ready-made houses. This led to the situation where agencies without previous experience in the field of housing reconstruction abandoned other options for assistance and started to build houses instead which had an influence on the effectiveness of their response, mainly regarding the quality of housing. The agencies took it upon themselves to design and construct houses. “This illustrates the importance of providing sufficient background information on the post-disaster situation as part of

the programme plan. This information enables managers to make informed decisions about proposed activities in relation to the capabilities of their organisation and the particular context.” (da Silva 2010, 31,44)

At that time in Indonesia national standards existed “covering the specification, methods and testing of concrete, aggregates, cement, timber, structure and building safety” (da Silva 2010, 31) as well as an Indonesian seismic code based on the American Universal Building Code. In July 2005, BRR published the building code for the province Aceh which provided technical requirements for houses including the minimum size of 36 square metres, minimum space per person of 9 square metres, type and minimum dimension of foundations as well as types of tolerated concrete mixes. However, seismic resilient design was not included neither was there a reference to national or international standards. Also, the building code did not refer to UN guidelines, Sphere Standards or other international standards. “Evidence on the ground suggested that neither were being enforced and that many houses being built, including those of BRR, did not comply with national standards. Although in principle BRR was meant to approve housing designs and site plans prior to implementation, they did not have the necessary resources or technical expertise to do so.” (da Silva 2010, 31) Additionally, other guidelines on various topics were produced by the United Nations Humanitarian Information Centre UNHIC as well as by UN Habitat in cooperation with BRR causing confusion as to what was considered appropriate and which codes and standards should apply. The various standards and guidelines developed related mainly to the quality of construction rather than the building performance, a distinction introduced in Chapter 3.4. According to da Silva, “greater consistency in response might have been achieved if quality had been better defined at the outset.” (da Silva 2010, 31f,56)

Even though a tsunami poses a much lower risk in the long term, compared to other more frequent hazards, this is the focus on the disaster risk reduction (DRR) agenda, for example early warning systems. “The risks posed by flooding and earthquakes and the need for appropriate surveys, site selection and seismic resilient design was not strategically addressed as part of the overall response, leaving families vulnerable to future events. Surveys to map flood risk and identify land suitable for reconstruction were not always carried out and a significant proportion of houses were constructed without any consideration of seismic design. Coastal defences were not reinstated, leaving areas that were previously protected exposed to tidal flooding.” (da Silva 2010, 28,46) In addition, both monitoring and evaluation in Aceh mainly focused on quantitative indicators to assemble quality as the number of houses completed or occupied (cf. da Silva 2010, 28,46).

Scheper et al. (2006, 70f) conclude, the massive international tsunami response exposed structural weaknesses in the humanitarian aid systems which provide valuable lessons for work in future disasters. More creativity and flexibility are required to engage national and local capacities in the recovery process and in building skills for disaster-risk reduction. Given the vulnerability to natural disasters of Aceh and Nias island, the awareness and planning of both government and international aid agencies for programming to reduce disaster risk was surprisingly low at all levels.

Table 8.4. Main findings regarding adjustment of housing; own table

SETTING	First rescue and relief efforts in villages took-place by locals prior to the arrival of international organisations.
	Large amount of funding was available. This presents an opportunity to go beyond standard life-saving response. At the same time it created pressure for agencies involved to spend money fast.
	Large number of international organisations involved.
	Structural weaknesses in the humanitarian aid system exposed.
	Relief and reconstruction was coordinated from Jakarta by the government for the first three months. The institution then in charge for the reconstruction process (BRR) had to first be put into place; three months after the tsunami hit.
NGOs started to implement in the field before the official institutions were present.	
KNOWLEDGE	Most international aid agencies had not worked in Aceh or Nias before; no context knowledge, no stakeholder network.
	Land tenure issues, renters and squatters were overlooked in the beginning.
TIME	BRR created a time pressure in June 2005 by announcing each affected household will get a house within a year; this led to political and media pressure. This timeline proved unrealistic.
	There was no time for detailed investigations. There was not enough time for assessments after the disaster hit and before the reconstruction started. Further, it was not possible to comprehensively assess the local capacities in the time given.
QUALITY	The master plan 'Blueprint' was prepared in Jakarta, not in the field; set in law April 2005. It did not provide a strong basis for an appropriate response.
	BRR published a building code in July 2005 with technical requirements for houses. No seismic resilient design, no reference to national or international standards. Other guidelines were produced by agencies involved causing confusion.
	Other hazard risks (apart from tsunami) were not strategically addressed; floods, tidal flooding, earthquakes. Leaving families vulnerable.
	Monitoring and evaluation of BRR focused on quantitative indicators; number of houses completed or occupied.
	'Building back better' was set as an aim. However, the concept was not defined tangibly.
Planning and programming to reduce disaster risk was low at all levels; government and international organisations.	

The following subchapters present the results from the evaluation process of the empirical study in Banda Aceh and Nias island. All interviews were analysed against the background of housing adjustment to natural hazards during reconstruction as well as in everyday urban planning. A first set of suggested measures derived from these findings are presented after each category. The main categories are cumulated and outlined, each supported by a selection of significant direct quotations from the interviews. As described in Chapter 7, a full analysis, including all relevant statements assigned to the respective category, can be found in Appendix B. All original interviews can be found in the document "Transcript Interviews".

8.2.1 Shortcomings/problems in reconstruction after the tsunami 2004

The following discusses shortcomings and problems in reconstruction after the tsunami in view of adjustment of housing to natural hazards as a result from the interviews taken with stakeholders from the reconstruction process in Banda Aceh and Nias after the Indian Ocean tsunami 2004. Everyone quoted in the following is one of the 33 interview partners from the investigation for this thesis in the field. The results are divided into three main thematic sections as shown in Figure 54, 'responsibilities' the question of who was involved, 'process' which covers what was done and 'quality of the results' focusing on how it was done. Within the sections the results are sorted according to the respective categories generated.

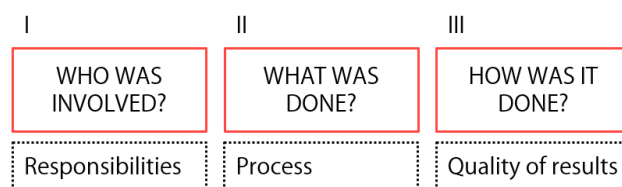


Figure 54. Categories shortcomings; own diagram.

Responsibilities [Who was involved?]

There were multiple actors involved in the reconstruction process after the Indian Ocean tsunami 2004. The focus here, presented in Table 8.5, lays on limitations of local institutions: Local government of Banda Aceh; the national level: National government of Indonesia and later BRR (first operates from Jakarta, later on site); international level: International organisations governmental or non-governmental.

Table 8.5 Shortcomings of responsibilities; own table

LOCAL ACTORS	NATIONAL ACTORS	INTERNATIONAL ACTORS
Lack of local institution for reconstruction and rehabilitation process	National institution was formed too late	Problems that came with the international helpers:
Lacking coordination from the local government	No experience of the institution in charge	- short-term NGOs causing the withdrawal of NGOs with long-term projects
		- NGO staff renting available houses in Banda Aceh
		- unfamiliarity with Aceh
		- NGOs hiring mainly non-Acehnese for higher positions

LOCAL ACTORS

Lack of local institution for reconstruction and rehabilitation process

The tsunami hit Banda Aceh largely unprepared. There was no local institution set in place for the reconstruction in case of a disaster neither was there a determined planning for this situation, as for example a master plan for the city, a local building code or regulations. Following the tsunami, the

situation in Aceh was rather chaotic since the local government was not functioning and a lot of the data and information was lost in the tsunami. From the local government, there was no sufficient preparation for a possible disaster of such magnitude. Consequently, at the beginning a few international NGOs coming into Banda Aceh took control, this partly led to several problems as some NGOs had no or insufficient experience in reconstructing houses, as discussed later. “Absolute chaos and there was really no coordination amongst anybody at all and the local government of course was completely decimated and anyway not functioning because there had been conflict for how many years? Two years, a military operation from the militants but even before the military operation it was still a very heavy military in Aceh and also the previous governor was put in jail for corruption so there wasn’t any transparency or any real functioning local authorities in existence here. So, when all the international NGOs came in they were expecting to work with the local government and it was very frustrating for them that there wasn’t anybody really with any capacity here. And also, there was no information. Because say for example like Meuraksa the sub-district offices that held information about people was gone. And it wasn’t stored anywhere. Nothing on computer at that time, it’s just files in an office, all gone. And that is what happened at many places, just no information.” (North 2016, 3/§121-132)⁴²⁴³

Lacking coordination from the local government

With so many NGOs coming into the country it was hard for the insufficiently functioning local government to keep control and coordinate work. This inadequate coordination led to bad results regarding the number, the type and the structure of houses. “Because at that time the coordination is rather a bit confusing. Some NGOs come directly to the community talking to people how many unit house and sometimes they just built house for the people because the people is very sad at that time.” (Meutia 2016, 1/§22-27) “And at that time so many NGOs they go directly, no coordination with the government, they go directly. So maybe at that time our government had no experience about dealing with disaster after disaster. [...] So, everything can go bad coordination we know but less coordination the result is not so good. So, I think just like the NGOs, sometimes the NGOs not report what they are doing to the government. Especially here in Banda Aceh to the mayor office. If we doing good coordinations the government will know all, this NGO is doing this here and if they build house, how many house and what kind of house, what is the structure of the house. I think if we have good coordination directly after the disaster it will be better [...]” (Meutia 2016, 2f/§80-89)

NATIONAL ACTORS

National institution was formed too late

Since the local government was not ready to deal with a disaster of such magnitude, in the beginning the responsibility was held by international and local NGOs. It took too long to implement a local coordinating agency and hence reconstruction started without a master plan. Some NGOs took over and started off making individual reconstruction arrangements before BRR (Badan Rehabilitasi dan Rekonstruksi) was formed by the national government in April 2005 to take overall command of planning and organisation. “[...] we kind of have limited coordination from the government initially,

⁴² Linda North: Local, Involved in different international NGOs; founder of a local NGO for the reconstruction of her husband’s home village in Aceh.

⁴³ The indication of source refers to the document “Transcript Interviews”, where all original interviews can be found, with a name index at the beginning guiding to the particular interview. The number refers to the page within the individual interview, followed by the line number indicated with ‘§’.

but then it was organised by what we call the rehabilitation and reconstruction agency, BRR. But even though it was established, but then the disaster was really huge to deal with in a very short time, but on the other hand there are a lot of... How to say... Helps coming from outside with different agencies and NGOs coming over to Banda Aceh and to help rehab and reconstruct the housings and other infrastructures. What I understood early on that stage the coordination was not really good. So, like the NGOs that wants to build housing immediately, they just directly connected to the district, the village leaders, and asked them to collect the data of how many households and how many families need to have new houses, and because of this mechanism then there're always some... [...] background stories behind it which is not really... Is not supposed be that way. And after a while, BRR has established and has been well-structured, in the internal. So, then all this kind of donation of building houses was coordinated through BRR. But still when we think about early on, at the same time in parallel, the government started to... ..by the help of other foreign agencies trying to re-plan the master plan of the city. Make the master plan of the city. Which seems to be not really connected with the housing construction because the land use that was set on the master plan was not... So, the housing construction was not obeying the master plan that has been newly set. So, then it means that in reality now, we see that the area, the coastal areas which is supposed to be empty for buffer zone, but then more houses were built even more in quantity than before the tsunami.” (Meilianda 2016, 1/§30-48)⁴⁴

No experience of the institution in charge

BRR, the institution put in by the national government to manage and control the reconstruction and rehabilitation process in Banda Aceh had no particular experience in reconstruction. Concurrently, there was no time to look at other examples for reconstruction processes beforehand as well as for assessments of the results afterwards. The process had to be created ad hoc and lessons learned were not evaluated for future similar situations. Members of BRR with a leadership role explain the situation on the ground: “[...] we don’t have any guidance at that time. This is the new institution and we have no example yet. This is the task, this is the destroying, please come down and make something that – in terms of rehabilitation and reconstruction.” (Mardhatillah 2016, 2/§55-58) “I didn't have time to [look at other countries or other reconstruction projects]. The only place that I went was Kobe but they are too advanced for us to follow. And they are too - yes, they are too advanced. So, I didn't go anywhere. Just follow my instinct.” (Kuntoro 2016, 3/§125f;§128-130)⁴⁵ “They have a short time because BRR is only for four years so there is only for reconstruction and rehabilitation so there is not enough time to do the monitoring.” (Kamaruzzaman 2016, 5/§215f)⁴⁶

Missing local building code or regulations

The donors decided themselves how to build the houses. When the reconstruction process started there was no supervision, no standard they had to follow regarding the quality of materials or building codes. Everyone used different qualities and different standards according to their own perspective. “The planning, what I understood, it's really determined by the donors who wants to build this housing complex for example. So, there were no supervision of which standard they have to really follow. For example, for the quality of the materials, for the building codes whether it has to be reinforced. So, it's, withstand the earthquake, so different qualities and different standards.

⁴⁴ Ella Meilianda, programme manager at the Tsunami and Disaster Mitigation Research Centre TDMRC in Banda Aceh.

⁴⁵ Prof. Dr. Ir. Kuntoro Mangkusubroto, former head of BRR.

⁴⁶ Teuku Kamaruzzaman, former leader of GAM and later vice-head of BRR.

What we see during the rehab recon, and they only set this kind of condition according to their own perspective.” (Meilianda 2016, 2/§65-70) Only later in the process BRR tried to introduce standards and supervision of questionable success. “BRR already learned themselves that eventually they coordinated better than before. But it's a bit too late because during the process early or already in the early stage after the tsunami, then the housing was started to build and then without following certain regulations. But then later on I understood that the BRR has put some kind of supervision. Yeah, but it's already half way to go to the end.” (Meilianda 2016, 2/§74-78)

INTERNATIONAL ACTORS

Problems that came with the international helpers

There were a few problems that came with international NGOs. Some groups that came in caused the withdrawal of certain NGOs working on long-term development projects in the region before the tsunami. “Ok so you’ve got an international NGO that comes in, some may have already been in Indonesia before the tsunami but they are all working on long-term development projects, they are not here on emergency response. Then emergency comes. So, the first people up into Aceh are the long-term development people who are committed to Indonesia, who know more and understand a lot more about what is going on. Some have been in Aceh some have not. Then, in comes all the emergency response people and they have a totally different attitude. So, what I saw was, a lot of the friends that I had in the agencies, who were the development people, they all left. Cause they just couldn’t cope the situation. Because all the emergency response people that came in – it was like a big game for them – you know, flying in helicopters and boats here or there. I remember there was one guy who was asked what did he think about his experience – why was he here and he said for money and glory. Because they were paid a lot of money.” (North 2016, 11/§473-482)⁴⁷

There are cases where international NGOs and media were renting big houses that were not hit by the tsunami which made the renting prices in Banda Aceh drastically increase. As a result, it was not viable for Acehnese survivors to rent these empty houses and therefore they had to stay in tents. “[...] we thought, cause I already had some money from my years working at international NGOs, we thought we could rent a few houses in Banda Aceh because at that time it was really cheap. It was about 10 million Rupiah which is about 8,000 dollars I guess for a big six/seven bedroomed house. But the media got here first like CNN and BBC and all those people with loads and loads of money and wanting places to stay and were prepared to pay anything to find somewhere to stay and then followed swiftly by all the UN agencies who also have so much money or they began to have money actually because they didn’t have much money before the tsunami and they were renting all the big houses that were not hit by the tsunami. [...] So, our idea of renting houses was then completely out the window [...]” (North 2016, 2f/§83-95) “And the doctors that came over they were put in these great big houses, very nice houses and they actually said they didn’t expect to be in those conditions. They expected that they would be the ones in tents, not the communities in tents and them in these big houses.” (North 2016, 16/§699-702)

Some international organisations that came in were not familiar with Aceh and therefore did not know how to handle the situation. “[...] the international organisations did not think about it from the perspective of an Acehnese person who had just gone through a conflict and probably lost people

⁴⁷ Linda North, former relief worker for International Medical Corps based in Aceh, herself lost approximately 300 in-law family members in the tsunami.

through that and now lost most of their family. Everything is gone. During the conflict time, the way that Indonesia works in conflict is putting villages against each other, so you got people who are bullied and tortured into informing about other people. [...] So, you are not working in a village that is a healthy village. [...] We had that at the organisation when I was in, that some people they survived and they rush out of the area and they had cars and so after the tsunami they had a hand phone and they had a car and then the organisation didn't believe that they were people who had lost everything because they had a car. That was another thing I think is that people came in with the mentality of it's gonna be like Africa or something but it wasn't in Band Aceh it wasn't like that actually and I remember at one UN meeting, UN OCHA and I hate to say that it was a British woman as well, she said that she was really surprised at the levels of reading and writing amongst Acehnese women. [...] I mean here everybody goes to school, people read and write. You see women, they are out, they have their own businesses they drive their own cars, they drive their own motorbikes. [...]. So that's one. One is not enough understanding about the condition and situation in Aceh. The day of the tsunami, the day before, how was it here and then the day after how was it." (North 2016, 10/§427-437)

NGOs mostly hired non-Acehnese people for the higher positions because there were not a lot of Acehnese people with experience, this led to difficulties regarding communication with beneficiaries. "[...] they hired mostly non-Acehnese people for the management positions within their organisations because Aceh hadn't had a lot of NGOs there weren't a lot of people with experience. So if you say the senior manager was national and that's probably Javanese not always but probably and then they hired more people under them and generally the Acehnese would be at the bottom, the drivers, the security, the cleaners. In some cases, there were Acehnese who could – who were a bit higher level than that. So, then you've got national staff who can't speak Acehnese with local staff who can speak Acehnese going to the communities to speak Acehnese – the level of miscommunication with the villagers was just ridiculous. [...]. What was fed back up and what was come down could be completely different. So, a lot of miscommunication." (North 2016, 12/§490-500)

Resume RESPONSIBILITIES

Summing up, the role of the actors involved was not clear. There was no sufficient preparation on local, national or international level, no conformable building guidelines and no structured procedure. Therefore, it was hard for the national or local organisation in charge to control and govern international institutions on site. In the case of an emergency there is not enough time to thoroughly plan and structure the course of action.

Table 8.6. Actors; own table

Findings	Suggested measures
A functioning local government can take the lead in a reconstruction process.	Ensure the functioning of the local government at all times. Discuss and prepare plans for worst case scenarios. Responsibilities should be widely dispersed.
Key information must be available and stored safely.	Identify key information which must be collected, stored and updated regularly. Assess options and possibilities for safe storage of information.
Local government must keep control, coordinate and monitor NGOs coming in.	Develop a strategy for the local government to keep control, coordinate and monitor NGOs and other implementing agencies.
Institution in charge (international/national/local) must be formed instantly.	Have an institution in place on all levels that can act immediately in the case of a disaster.
Institution in charge should have sufficient knowledge and experience.	Pick the members of the institution according to their experience. Provide regular training courses. Have regular assessments.
A reconstruction process should be pre-prepared.	Pre-prepare a reconstruction process. Elaborate all areas that can be prepared irrespective of specifications such as the type or extent of the disaster.
Long-term agencies have a good knowledge of the local conditions which should be used.	Work closely with long-term development/agencies (NGOs). Involve them in the preparation of instruments for worst-case scenarios.
International workers should not cause an increase in rental rates.	Install a concept to offer places for internationals to stay for when there is a sudden need while keeping renting prizes for locals down; give the renting priority to locals.

Process [What was done?]

The question regarding the process of reconstruction is what are the short-term and long-term aims that should be reached. Is a successful reconstruction seen as the reestablishment of the status quo or is the aim to reach an improvement in the long term or both? Table 8.7 shows the structure of the findings discussed in the following.

Table 8.7 Process shortcomings; own table

HOUSE DESIGN	MASTER PLAN
NGOs used different designs and programmes	No/unsuitable master plan for Banda Aceh before and during reconstruction
Additions/modifications are made by the people	Village planning
No time for planning	Disaster risk plan – withstanding future hazards
	No time for planning

HOUSE DESIGN

NGOs used different designs and programmes

In the designs and the programmes used, there were many large differences between the NGOs which, in some cases, led to jealousy and rivalry between the beneficiaries. The government took no responsibility for coordination and only implemented rules regarding the amounts spent as well as the size of the houses. Each NGO had their own strategy mostly developed from previous experiences. “All these agencies were in there and they all were doing different things and they all had different programmes. For example, if you had an Oxfam house you might get some livelihood assistance as well. If you had a – I can’t say that this is what they had I just want to demonstrate to you the difficulties there was - If it was a World Vision house it was a very different design of a house.” (North 2016, 6f/§263-269) “So, I think [...] 36 square meters per house. But some of those houses included a bathroom and some of them didn’t. Two bedrooms. Some included a kitchen area, some didn’t. So, there was all sorts of differences between the houses and as I said, as well as the housing came other programmes like livelihood, small business projects. Some got water and sanitation, some didn’t. So, all different [...]”⁴⁸ (North 2016, 7/§294-298) “At the beginning Oxfam would like to involve community participation. So, Oxfam maybe construct the structure and then the community or the owner, the villagers continue build until complete. But while other country like Turkey come and built completely one. So, people more interested in this compared to Oxfam strategy at that time.” (Haiqual 2016, 1/§31-34)

Additions/modifications are made by the people

Since the original core houses were too small, people made additions and almost all houses have since been modified⁴⁹. Every NGO had their own template, so had the BRR. There were usually three or four templates that people could pick from, but it was always only 36 square metres per house which was too small for many families, therefore afterwards people made the necessary additions themselves. Mainly kitchens got expanded or added, since the kitchen is a very important room in the Acehnese culture. The additions affected the disaster risk performance of the houses while, the core house often has a good quality regarding earthquake safety, the additions that people did themselves are in bad quality and are already showing signs of failure. The occupiers modified their houses with their own [old] knowledge and therefore afterwards the houses are unsafe again. “Because after ten years later we see so many modification. Maybe only five percent of the houses were not modified. I can say 95 percent are modified because most of them built like, for example they just installed the light plywood at the back, [...] the kitchen or maybe just put a very low zinc sheet⁵⁰ to make a barrier to give more function and space for them [...]” (Sari 2016, 1/§14-22) “[...] the government and the donors actually agreed that they will be building, what we call the core house which is 36 metre square minimum but some donors did 40 or 36 plus they say. And that’s very small but many people of course changed the layout, add room, add a second floor, add different things. We tried to look at that. Initially we wanted to see the quality, also to see the quality of the building, I think there is some data on that but mostly our data is on the morphological change of the houses, which is very interesting in terms of many things including cultural issues, demography issues, but also the DRR issues how actually adding new rooms affect the risk reduction.[...]But many [...]

⁴⁸ Also described by (Haiqual 2016, 4/§152-156), Haiqual worked for international NGOs such as Oxfam and UN Habitat

⁴⁹ Status at the time the field research took place February-April 2016.

⁵⁰ Additional rooms are attached to the building from the outside. These additions are made from plywood or zinc plates.

basically most houses have changed usually by adding new rooms and most addition happened to the kitchen because culturally Acehese women want big kitchen.” (Mahdi 2016, 1/§31-42) “But most of the core house [...] the one that I have recognized is the core one is very good up to now there is no cracks. But one that has been modified full of cracks. So, what I am thinking, NGO has been working very well, they followed the guidance because UN Habitat provide the guidance that they revise that all the NGOs should follow this guidance. But then maybe not all of the occupants observe how the labour work on their houses so they cannot take any knowledge. So once they modify their house they just do with their own knowledge, the old one. So that’s I think why the modified one is full of cracks but the core one is still good.” (Sari 2016, 2/§54-61)

No time for planning

A lot of the aid money was short term and had to be spent within a year, so that the donor committed. Short term money led to hasty decisions and rushing to solutions with no time for planning. In reconstruction this time pressure often leads to considerable problems when it comes to the quality of the results. During the reconstruction process, a lot of houses were built without a plan. Thus, some houses were not built correctly, with a hazard resistant construction and according to people's needs, even when architects or contractors were involved. There was a limited time to elaborate on people's actual needs and to develop a concept together with the beneficiaries. Some small NGOs who tried a bottom-up approach with the people got replaced by big NGOs that came with standard solutions and a faster result. “The other problem is that a lot of the aid is so short term, it’s got to be spent within a year so the donor commits – we need you to spend the money. [...] What a waste of money.” (North 2016, 16/§678-680;17/§706) “I think still the debate is about we need to build fast and meanwhile theoretically the best way to build is not a very fast way. It’s always the dilemma during reconstruction. We need to build fast in the perspective of the donors, in the perspective of the contractors, the consultants and of course the villagers the beneficiaries.” (Adamy 2016, 7/§291-295)⁵¹ “And then what I can see most of the problem here, they don’t even have the planning, they don’t have the planning drawing and then secondly when they build they don’t build correctly. Like how to build it correctly in a construction way or standard. We can see this a lot. Even during the reconstruction process when they hire a very famous expensive architect, contractor whatsoever.” (Adamy 2016, 8f/§351-355)

In the beginning, people had to stay in tents and, since it was the rainy season, everything had to happen very quickly. Also, the temporary shelters in Aceh and Nias were indeed temporary, therefore, everything had to happen fast with compromised quality in terms of planning. The three-step process used, ‘emergency shelter’ to ‘temporary shelter’ to the ‘permanent house’ has proven to work well for big disasters such as a tsunami or an earthquake but at the same time is a very expensive method. “Because the people in tent was not patient. When you are entering the community, people was waiting for long time. And during the time it was wet.” (Purwanto 2016, 4/§184f) “[...] you don't have the luxury to plan that ideally. But you move people quickly from temporary housing to the final housing, meaning that you try to establish normalcy to achieve normalcy in a short period of time.” (Koni 2016, 1/§9-19)⁵² “In a big disaster like this I propose to use that three-step method although it's expensive. It's very expensive.” (Kuntoro 2016, 4/§154f)

⁵¹ Acehese architect and project manager who grew up in Jakarta and worked in Aceh in reconstruction for the Indonesian Architect Association.

⁵² Professional planner formerly involved in BRR on Nias island.

Some temporary shelters with imported material were more expensive than permanent houses, with a budget of USD 11,000 to 12,000 compared to USD 5,000 (cf. Kusumawijaya 2016, 8/§324-328). In the context of Nias, the quality of some temporary houses was so good that they were modified slightly and kept as permanent houses. Some emergency shelters were made from wood and steel and looked better than some of the original remaining houses. After the permanent houses were built, these shelters were meant to get disbanded. But the people in Aceh and Nias did not want to do this and instead kept the shelters as an additional room or a kitchen or something alike. This led to a situation where some families had multiple houses which sometimes led to jealousy. Therefore, later in the process, building emergency shelters was not an option anymore in Nias which added to the time pressure for reconstruction. “And at that time, they were still struggling because there is a shortage of timber, you might see at that time even - is it IOM⁵³ or what - still build temporary shelters, with imported pine wood and steel from Europe. Amazing. And the cost of these temporary shelters are more than the cost of our house. I think their budget is like 10,000 Dollars together with all the management cost would be 11 to 12,000 Dollars per house and our budget is only 5,000.” (Kusumawijaya 2016, 8/§324-328) “Because the quality, some of the temporary houses produces by agencies at that time I give a little bit of money so they can still be used as the permanent houses instead of - temporary houses normally get destroyed after the permanent houses but instead of destroyed they can be used in Nias. Actually, they can be used for permanent houses so I modify a little bit, put some money and that's becoming permanent houses.” (William 2016, 5/§201-205) “ICRC and IFRC they have emergency shelter which is made of pine wood and steel frame. It's so beautiful, you love it when you see it. I mean, I'm from Indonesian background, I like to see that. So, the first thing that they do, ICRC and IFRC when they came to Aceh and Nias, they built that emergency shelter. And then us and other agencies later on built the final house. And what would you do with this? Sphere⁵⁴ said it has to be disbanded because you already have the final one. But people in Aceh and Nias doesn't want to dismantle that, because they can use this for other purposes, which is permanent activities, like kitchen, extra bedroom and this and that. So, one of my first decision is to not allowing the Red Cross to have that kind of approach because it makes the survivor, a family, has two houses. Because this temporary, sorry, emergency shelter is considered as a house, because it is better than their original house already, because they are poor. So, we don't want to give them two houses, we will give them only one houses. So, when I took office, one of my first decisions is not to use that Sphere approach⁵⁵ in regard to the housing.” (Koni 2016, 5f/§262-273)

Post-disaster reconstruction, especially housing, is very much human-oriented and hence it is essential to have a social scientist or anthropological specialist in the team from the very beginning. Due to a lack of time, cultural aspects were not included in the planning process in Aceh or Nias. For example, during the reconstruction in Nias there was little time to work on an earthquake resistant design option following traditional techniques. A universal design was needed so people could move from temporary shelters to permanent houses as soon as possible. In the aftermaths of a disaster there is also limited time for engineering and designing and, therefore, there should be a regulation, building code or standard beforehand, suitable for the location. The time for engineers to engage

⁵³ International Organization for Migration, UN IOM.

⁵⁴ Sphere Association; the Sphere movement was started in 1997 by a group of humanitarian professionals aiming to improve the quality of humanitarian work during disaster response. They framed a Humanitarian Charter and identified a set of humanitarian standards to be applied in humanitarian response (Sphere Association 2018b).

⁵⁵ The Sphere standards have become a reference tool for national and international NGOs, volunteers, UN agencies, governments, donors, the private sector, and many others (Sphere Association 2018).

should be before a natural disaster with a pre-defined design. “[...]post disaster reconstruction and rehabilitation, it's very much human-oriented. Even building schools, health facilities, roads, housing, especially housing, it's all human-oriented kind of activity. So, you need to get it right from the start. And the lesson that I captured during my service in Nias is, if you go there for the first time [...] you better have a social specialist and anthropological specialist as the main component of your first or advanced team. Yeah. Then they would be able to map out things that has to be done, and things that cannot be done. Like for example, contractor versus community-based, is something that is learned after the fact. Which actually can be prevented should we deploy social scientists or anthropological scientists instead of engineer.” (Koni 2016, 3/§116-124) “But to tell you the truth, I don't put the theme on cultural things in the planning process otherwise it takes such a long time to plan. I opened room for, for me unnecessary thing. For me the most important thing is get the house ready as fast as possible.” (Kuntoro 2016, 9/§390-393) “Should we take [traditional techniques] into account, the design would be different, but we don't have the time. What we need to do is a universal design. That's also a lesson learned that we have. That's why it's not just engineer that needs to go there in the first or within the advanced team, but you have to have social specialist and anthropological specialist. That is why, and then, you can capture that. We don't have the luxury of having time to have a participatory kind of a planning or inclusive planning because we need to move people from temporary housing to the final housing and create a sense of normalcy back. Because that is the thing that is deemed important for Indonesia, for Aceh and Nias case. We don't know about other cases, but going back to normalcy stage is important as soon as possible.” (Koni 2016, 6/§225-233)

MASTER PLAN

Non-existent/unsuitable master plan for Banda Aceh before and during reconstruction

After the tsunami, the local government of Banda Aceh did not have a spatial plan for the city that included mitigation to hand over to the NGOs or BRR. There was a time pressure since the international organisations were only in Banda Aceh for a limited time which left limited time to prepare a new master plan. After the tsunami, there were no existing maps for Aceh, therefore, as a first step, maps had to be re-made. This was completed together with GTZ (German Association for Technical Cooperation, since 2011 GIZ, German Association for International Cooperation) by training staff and building up a GIS centre. The planning had to start from zero since there were no maps archived and therefore time pressure became an influencing factor. Additionally, unclear land ownership for reconstruction of houses and roads led to delays with the result of upset communities. In order to clarify land ownership and land borders, the data had to be sent from the Land Agency Office in Jakarta. There was no authority in Aceh with this information. Moreover, after the tsunami, land was washed away and land certificates were lost which increased the problems regarding landownership. The process of land certification was very expensive and took a long time, hence the reconstruction process was slowed down. Later, the certification process got abandoned after spending ten million dollars of aid money on it. “The difficulties is the NGO has a limit of time let's say 2005 to 2006. But at that time Banda Aceh for spatial case we don't have a spatial plan at that time. We have to review our spatial plan that have to input the disaster and mitigation plan. Takes three years, 2006, 7, 8 and 2009 we have a spatial plan.” (Bahagia 2016, 4/§145-148)⁵⁶ “[...]after tsunami we had to first make some maps for the reconstruction because before tsunami there is a civil servant making maps and he died in the tsunami. [...]. We worked closely together with the GTZ

⁵⁶ Ir. Bahagia, Dipl.SE, city director and head of secretariat at the mayor office (2016)

[...] of Germany. GTZ support us with some equipment like computer, server, equipment for survey, GPS and some training for the civil servants. So, after that we make the GIS centre. Because before the tsunami Bappeda there is no GIS centre, only two or three staff making maps. They not use the GIS they only use the autoCAD for the maps because they died and I cannot open the computer because I cannot use the autoCAD so the GTZ trained us to use the GIS. So, after that we can make some map and we give to the UN, we give to the NGO for them for make planning for the housing.” “[...]we collect the data before because there is no data in the database before. So, we go to the field, take some survey, we making the track for the road. No roads. We take the public surveys like where is the school, where is the hospital before? Because tsunami damaged the whole area so there is no sign. So, we surveyed and we take the point, this is the school, this is the housing. After that we give this to NGOs and UN and the agency from the central government also.” (Permakope 2016, 1/§5-15,§20-25) “After the tsunami, it was really flat and no clues at all where the guide lands was. Luckily, we had land office, called Badan Pertanahan Nasional or Land Office. So, they got a data and through, what you call that, coordinates data, this means, here, here, here belongs to Mr. A or Mrs. B, that’s one of the most important data recorded by the Land Agency Office. But we have to call them from Jakarta, not from Aceh.” (Irwansyah 2016, 2/§67-72) “And then international organisations like World Bank and other waited for the government, especially when the government said they will do, also the land certification. And houses will only be built on land that has been certified. From very early beginning we said you could not do this, first it will take a long time and second you should not tie this up with post-disaster situation. And they eventually of course abandoned the land certification process after spending like ten million dollars, the World Bank money. [...] So World Bank, ADB (Asian Development Bank) I think were late because they are waiting for the land certification which was eventually abandoned.” (Kusumawijaya 2016, 5f/§216-225)

The planning institution of the national government (Bappenas) did a blueprint for Banda Aceh. Although when they came to Aceh, they could not implement this plan since all the boundaries were gone and there were no detailed maps of the area. The blueprint was made in Jakarta without knowledge of the field and therefore could not be used. Aceh itself did not have adequate maps of the city or the area since most maps and data got lost in the tsunami. So, BRR had to start reconstruction without ample preparation. “First thing doing reconstruction was actually Bappenas, national planning board [...] actually make the blueprint. But when we are coming to Aceh, all our men was actually refuse to build the housing because of land dispute. Because land actually was away and there is no boundary or exact map [...]” (Purwanto 2016, 1/§27-31) “But once I was there in Aceh and try to study the master plan, I don’t see that the master plan was well prepared. That’s understandable because how do you prepare a master plan of a coastal area that span more than 800 kilometres of the Sumatra Island, Simuelue Island, another two islands smaller than that. And then later on with Nias island. So basically, I did not use that master plan as my reference. So, I make my own master plan and basically my master plan is a very - my term is quick and dirty. Because I had to move very fast. The maximum of length of people to live in a tent is not more than a month. If you ask them to stay for more than six months you can imagine what kind of, what opposition they will give you.” (Kuntoro 2016, 1/§4-17)

Village planning

BRR also started with a bottom-up process called ‘village planning’ where they planned each separate village⁵⁷ individually together with the community. Villagers gave a proposal on how they

⁵⁷ A village in Banda Aceh city is equivalent to a neighbourhood.

would like to have their village to be rebuilt and about who should get a house and then this was discussed. Commonly, everything got rebuilt in the exact same way as before the tsunami. This means today, the roads are still labyrinths and might lead to problems if they have to be used as escape roads. The villagers did the village map and later the reconstruction was done according to this map⁵⁸. In some cases, the village map was reconstructed based on google maps (cf. Irdus 2016, 2/§58f). The village maps, that were done together with the communities and given to the NGOs and agencies that did the housing were sometimes ignored by them or the people living in the village. Thus, the reality looked different from what the plans were showing. “At that time BRR start with the bottom-up. They go to the village and invite the people and then make village planning what we call a village planning because we don’t have at that time a spatial planning.” (Bahagia 2016, 4/§145-148) “We ask the community where to put the school and the clinic, [...] and also, we plan the road according to the community.” (Purwanto 2016, 2/§59-65) “Even though the people [...] we have bring them together to discuss about the map, what they come up is together. But sometimes in some villages what we have planned here not occur in the field.” (Mardhatillah 2016, 3/§108-110)

During the reconstruction in Banda Aceh the houses were built first and then the infrastructure was established, including roads, drainage, gas lines and electricity. Since there was no master plan for the villages or an overall plan for the city the infrastructure was planned on the spot after the design of the houses was decided on (cf. Irdus 2016, 4/§140ff). In some places, the roads were planned and put in after the houses were already built. Mainly because of time pressure. Thus, houses that were previously raised to prevent damage from flooding were automatically levelled again. “Maybe now you cannot see that we raised, because they already built the road, and before we built there is no road, so we can see, like, it's very high above the ground.” (Hasan 2016, 4/§161-164) “But I think the rehab recon⁵⁹ in Higashimatsushima better from Banda Aceh city because in Higashimatsushima city before they make the housing, the building they make the infrastructure. They make the roads, the drainage, the line for the gas, line for the electricity. They make the good maps before implementing the planning. Why, because Japan has good data.” (Permakope 2016, 8/§317-322)

With the village planning instrument, it can be hard to have all the villages connecting with an overall city plan afterwards. With this, the government gave away the control of the city development. Further, there is the question how well the local community is aware of issues such as future hazard risk and can implement this in their ideas. It's very questionable whether this instrument or process led to a better situation regarding natural hazard risk reduction since it mainly follows the concept of reimplementing the status quo.

Disaster risk plan – withstanding future hazards

Disaster risk reduction was targeted through individual projects on a case by case base, both spatial and functional. Escape hills, mangrove planting, a drainage system for flood control and training were some of the projects that were implemented. There was no overall disaster risk reduction plan for the whole city of Banda Aceh. Since BRR had to let go of the original blue print, disaster risk reduction options that got included were mainly escape buildings, with the aim to make it possible for people to escape in the case of a future disaster. In some cases, land consolidation was needed to allow a widening of the paths as means of escape in the event of a future disaster. This turned out to be a rather complicated process since people did not want to assign parts of their land. Instead

⁵⁸ Kuntoro (cf. 2016, 1/§21-34;1/§38-41;2/§49-52).

⁵⁹ Rehabilitation and reconstruction.

they only agreed to relocate their fences, so the public can use it, but the land is still owned by private individuals. "At that time the evaluation even on the what we call on the project on the case by case basis depending on which area they are working on [...]. In one of the place for example in Banda Aceh the escape hill being built so in the case that the tsunami come again then there is a place that people can go and then utilize this to save lives. And also, some of the project related for example mangrove, which is also and then I believe there is some as well related to the drainage system for managing flood. But most of the project, I mean the project is not only about infrastructure various kind including the training and so on." (Farsal 2016, 2/§63-71)⁶⁰ "[...] about the mitigation just in Banda Aceh, I speak just in Banda Aceh because I responsible in Banda Aceh. In the generally Banda Aceh city have the escape building as the primar escape solution. The escape building is just access in the escape.⁶¹ I don't know in the others, they are generally like that." (Indra 2016, 1/§29-36) "[...] the people do not want to give their land for the widening of the path, except but people can use it. So, I think they set back the fence so the path they can use is wider but still it belongs to them. So, it's not giving the land to the public but giving the public the right to use it as a path." (Kusumawijaya 2016, 2/§62-70)

Originally, the government of Banda Aceh wanted to implement a two kilometre no-building zone. But since the people were not prepared to move they were protesting against this option which made it too difficult to relocate people out of these areas and there was no time in this situation to raise awareness and convince them. This made it infeasible to change the setting of the city towards more risk reduction regarding natural hazards. Hence, now there are still settlements in the dangerous coastal area but with a different construction method. Today, as shown in Figure 55 and Table 8.8, there are even more houses in the coastal settlements than before the tsunami event. "[...] the government that panicked⁶², that want to free two kilometres of the coastal areas not to be built and our approach is really to get people to go back to their original villages. But it is not that we don't agree that you need to limit construction but that for the future. [...] But you cannot impose that now. And actually, as the government itself eventually realised if they want to impose that just immediately after the tsunami they will have to remove 20,000 families. So that's why eventually the government did not go ahead with that idea, free the two kilometres' zone from the coast." (Kusumawijaya 2016, 1/§16-23) "But the problem after disaster, before we finished the master plan NGO come and build the house in coastal area for people. We can say that now. Break it after that we can't do that." (Yubarsi 2016, 6/§251-257)⁶³ "Actually, after tsunami the central government wants to move the villagers to inland, two kilometres. But the people in especially the ones near the sea they said, "we are fishermen, we have to stay near the sea". (Permakope 2016, 5/§255-258) "[...] people want anything in hurry. So, they use us in the institution BRR to do what they want. We don't have enough time and capacity to change their mind. Many people provoke us, just bring it. [...] But people they have no capacity to be patient. And then the politician also trying to go for people." (Mardhatillah 2016, 4/§152-154,169f)

⁶⁰ Executive director of the AHA Center (ASEAN Coordinating Center for Humanitarian Assistance on Disaster Management).

⁶¹ Banda Aceh has escape buildings for the case of an emergency. These escape building are only accessible in an emergency.

⁶² The government was overwhelmed by the power and effect of the tsunami and therefore wanted to clear the coastal area to prevent harm through a potential new event in the future.

⁶³ Aceh Disaster Management Agency (BPBD) head of the Rehabilitation and Reconstruction Department.

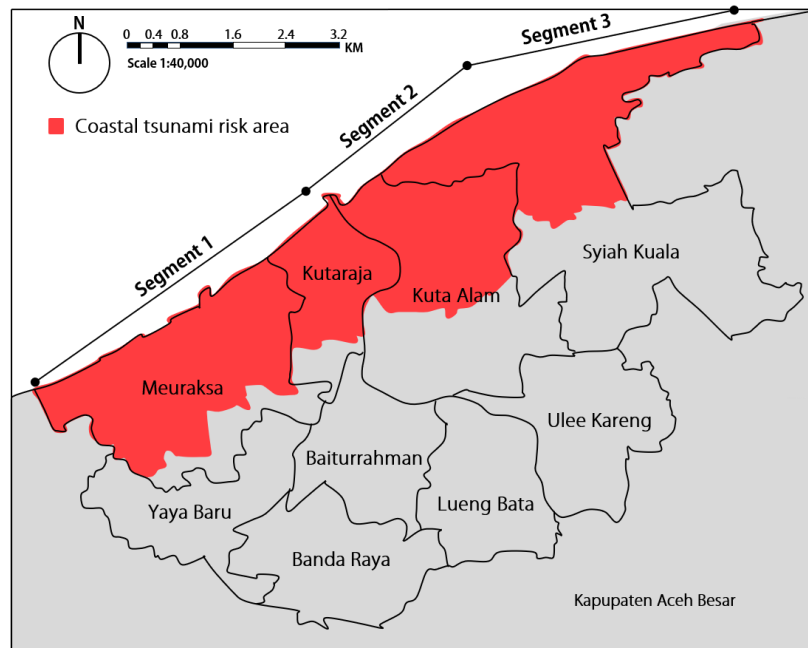


Figure 55. Coastal area Banda Aceh. Source: Meilianda (2014, 12); modified.

Table 8.8 Total amount of houses in coastal area Banda Aceh. Source: Meilianda (2014, 18); modified

Year	Total amount of houses		
	Segment 1 (see Fig.56)	Segment 2 (see Fig.56)	Segment 3 (see Fig.56)
2005	1408	1662	0
2009	8209	3213	104
2011	9165	3885	314
2014	9605	4528	319

No time for planning

Due to the time pressure during the reconstruction period, the main focus was not on the planning or assessments but on results at the ground level. "What is important at that time is 'how do we get this done?'" (Farsal 2016, 5/§205-210) "You just do - for me my mantra is that let the people see that you are really doing something on the ground. Whether the serious one or not so serious one but at least they see you do something on the ground⁶⁴ because that will calm them down. If you just tell them that we are still in meeting, we are still doing the planning process and they don't see anything except your office, although there is light in the evening, late in the evening they don't consider that as work but as doing nothing. So, I cannot wait. So, I am not suggesting to use the normal process or let them know and also take part of the whole thing - no. Then I make a disaster.

⁶⁴ Help, reconstruction becomes visible for the beneficiaries. In contrast, while planning or defining a strategy on how to realise the reconstruction task, there are no visible results which may lead to resentment and create the impression of passivity or failure to act.

In a major disaster, you just do as fast as possible whatever you can do although the consequence of that is mistakes and costs - and additional costs.” (Kuntoro 2016, 5/§200-208) “I think in my situation you cannot have a brilliant planning. There is no way of having this. So, what you have to do is actually planning as you go [...]. You will make mistake but that will enrich your planning. There is not such a planning that is comprehensive planning in that kind of situation. You do, you try, you talk to the community and then you do the planning.” (William 2016, 6/§234-238)

Presumptively, one reason for the time limitation was due to the recent history of Aceh being in a conflict with the Indonesian government. Hence, the national government seemingly did not want to have international workers to be in Aceh for long. Aceh was at civil war when the tsunami happened and it was therefore necessary to end the violence before international workers came in to help. About 1.100-1.200 GAM⁶⁵ leaders were hired into BRR to bring peace to the region. “Because Aceh learned from the long conflict and a lot of NGOs also here in Aceh so maybe from the central government we felt insecure with a lot of international will be in Aceh so there is only for – kind of a politic issue – so it’s only four years emergency to construct.” (Kamaruzzaman 2016, 6/§229-231) “I have to take steps so that there's no shot anymore that kill one of the foreign people, anyone. And there are 8,000 foreign people at that time. So that is my approach. That's why I decided - not including, basically they are not part of it - I put them in my payroll the districtal members. I bribe them. There is a list of names. BRR was designed for 300 people, at the end it's - maybe 300 to 400 - but at the end there are more or less 1.500. And Jakarta shout at me 'what happened?' he works to hard but basically, I hired around 1.100 1.200 GUM, sub-district level, leader that kind of things. I had to bribe and pay them because otherwise they will shoot. So that's why - another progress during my stay there for four years there is no single killing of volunteer or even my people in my agency.” (Kuntoro 2016, 9/§368-373)

Resume PROCESS

To summarise, it can be noted that there was mainly a time problem after the tsunami event in Banda Aceh which influenced the whole reconstruction process as there was neither a pre-existing master plan for the city of Banda Aceh available nor a planning process or guideline for reconstruction. There was also limited time to prepare citizens for the potential modifications concerning land-use and relocation options. In this situation it seems to be challenging to change the overall situation in order to decrease vulnerability to natural hazards in the long term. It appears equally difficult to design for a particular location and achieve rapid results without reverting to standard design solutions. Hence, the reconstruction that was done in Banda Aceh was mainly a reestablishment of the status quo.

⁶⁵ “Gerakan Aceh Merdeka”, the Free Aceh Movement; separatist group seeking independence for the Aceh region of Sumatra from Indonesia.

Table 8.9. Process; own table

Findings	Suggested measures
HOUSE DESIGN	
Designs and programmes used should not lead to jealousy and rivalry.	Government coordinates the design and programmes and makes rules. This can be done prior to a disaster.
Houses should be prepared for extensions.	Prepare the house design for future extensions. This should be included in the building code.
Additions to the houses must be made in good quality.	Train house owners on house quality issues; implement rules for additions.
Have pre-prepared plans for measures suitable to be implemented with short-term funds.	Pre-prepare plans for measures suitable to be implemented with short-term funds.
People's need must be elaborated before the start of reconstruction.	Analyse people's needs to the extent possible before a disaster occurs; keep the data updated. Prepare a process and system for a quick assessment of people's need in the event of a disaster.
Allow time for bottom-up solutions.	Pre-prepare for bottom up solutions to the extent possible; train people on methods, implement training courses.
Have a strategy for temporary houses.	Prepare a strategy for temporary houses: material used, quality, long-term role, reutilisation. Define various scenarios.
Include cultural aspects in the planning process.	Create knowledge, know-how; pre-prepare options, varieties.
Regulation, building code suitable for the location should be developed.	Develop regulation, building code suitable for different locations. Work with options.
MASTER PLAN	
Have a pre-prepared master plan.	Pre-prepare a master plan and keep it updated. Include reconstruction related special issues such as optional areas for relocation. Consider this master plan in the general master plan for everyday planning
Have the information of land ownership updated and available.	Have the information of land ownership available and update it regularly; prepare a process for the case of land owners losing their land.
Masterplan for reconstruction must be made in the field including local stakeholders.	Prepare the master plan in the field, include local stakeholders. Base it on the master plan for everyday planning. Define the local stakeholders that should be involved in the process as well as the methods.
Use village planning and mapping as an instrument of planning and involvement.	Practice village planning and mapping regularly; prepare a master plan for each village and involve the community.
Have a basic infrastructure map pre-prepared.	Pre-prepare a basic infrastructure map.
DRR should be a part of the master plan.	Prepare a disaster risk reduction plan; include the DRR plan in the master plan for reconstruction and everyday planning.
Prepare for a possible location of people during reconstruction.	Inform people; have areas ready for relocation. Develop a concept for housing at these new areas.

Quality of the results [How was it done?]

This subchapter discusses the outcome of the reconstruction process regarding the quality of housing, as listed in Table 8.10. It has already been mentioned in the previous chapter that the main focus was to restore the status-quo and further, that the ability to act was partially restricted in the situation after the tsunami. In the following, the influencing factors on the quality of the results are discussed in detail as a finding from the interviews taken.

Table 8.10 Quality shortcomings; own table

HOUSE DESIGN	URBAN PLANNING
Building standard	Adjustment to natural hazard risk
Influence on construction today	Relocation to safer ground
Bad engineering results	
Lacking consideration of natural hazards	
Involvement of people	
Incapability of organisations	

HOUSE DESIGN

Building standard

In the beginning, BRR did not have its own building standard, hence this was placed in the hands of the international or national governmental and non-governmental organisations as well as the donors who choose both materials and construction methods. This led to a mixture of different building codes and donors had a significant influence on the outcome. Caused by the time pressure, neither BRR nor the Ministry of Public Work (PU) could perform a conscientious supervision of materials used or constructions, thus BRR and local government had no substantial control over the quality of houses being built. Later BRR used the United Nations building code where the main requirement for a building is to withstand an earthquake of seven on the Richter scale. In short, the responsibility for safety and quality was mainly in the hands of the donors and organisations. However, not all of these organisations had experience in building houses which often led to poor results. Besides this, mistakes were even made by the organisations who had experience in building houses in other locations of a different context. “The planning, what I understood, it's really determined by the donors who wants to build this housing complex for example. So, there were no supervision of which standard they have to really follow. For example, for the quality of the materials, for the building codes whether it has to be reinforced. So, it's, withstand the earthquake, so different qualities and different standards.” (Meilianda 2016, 2/§65-78)⁶⁶ “We just used very basic building standard. The buildings withstand a 7 Richter scale and the house space is between 36 square meters and 54 square meters. Only two. The 36 and 54 is very strict. But the 7 Richter scale I can say that we did not have a special effort to check. We just trust the NGO or agency that built houses to comply with that. And I understand that not all of them are following the best way they can, but that was my asset. [...] And I believe they don't follow that as well. Why? Because it was very costly. If you want to build a house with 7 richter scale strength then it will cost you a lot. So, I don't push too hard on that because for me you build as many houses as needed and you still have the budget to do that. It was very bad that they come back to me ‘Pak Kuntoro I want to build another 30 houses, 3,000

⁶⁶ Programme manager of the Tsunami and Disaster Mitigation Research Center of Syiah Kuala University in Banda Aceh, coordinated the assessment of post-tsunami recovery ten years after the tsunami.

houses but we don't have the budget⁶⁷. Then I will be at a bad position.” (Kuntoro 2016, 2/§95-123)⁶⁸ “The donor is [...] a very rich man, has a lot a lot of company [...] he enforced us, the team, to build asbestos house.” (Adamy 2016, 4/§139-146) “[...] because everything was priority, [...], we didn't have time to check materials by materials, you know what I'm saying? [...] I don't want to blame the donors, not blame to the donors but I think blaming to the us. Us mean Public Works, whoever worked as a supervisor there. Also, BRR, BRR, Rehabilitation and Reconstruction Board of Aceh, were supposed to supervise the housing project, for example, from the donors.” (Irwansyah 2016, 4/§158f,168-173)⁶⁹

Influence on construction today

As previously stated, BRR or the local government had little control over chosen materials and construction methods. In some cases, if seemingly strong material was used but the construction was carried out poorly, this led to a false sense of security for the beneficiaries, for example regarding earthquake risk. Further, the choice of reconstruction materials and methods influences the building choices of today. Thus, if occupants assume bad quality houses to be of good quality this subsequently leads to a reproduction of badly performing houses. “[...]when I came there [Nias], schools were broken, not because of the earthquake it's because they are constructed wrongly. And that requiring you going down, telling them this is how you do, this is how to do, not because they don't want. They don't know what to do so that's the role of NGOs, my people, facilitators to educate the community, this is how you do the houses. You have the guideline but you don't educate them. You don't go down and then tell them, they don't follow the guideline. They will just leave and then the contractors or the labours will do the same because they've been doing wrong things for long time so you have to train again and this is the way.” (William 2016, 5/§181-187) “So up to now the most of the people will choose this one [house built from bricks] because they are thinking it is very solid and then it will be very strong but actually it is not as strong as we are thinking if the enforce is not well attached. Because for example this house [constructed from wood] look like very light and people will think that it will not sustainable for many years so people will choose this one [the house built from bricks]⁷⁰.” (Sari 2016, 5/§186-189)

Bad engineering results

The combination of insufficient guidelines and supervision resulted in several bad quality results. The earthquake standard, which was brought in by BRR through the United Nations building code at a later stage of the reconstruction process, was in some cases not met. Some of these houses were checked and reinforced during the ongoing reconstruction phase, commonly through different agencies or organisations than the ones that originally built them, placing a waste on monetary and human resources. Controlling huge projects with a large number of houses being constructed at once presented many difficulties, hence these houses tend to have worse quality. Another issue regarding the quality of results, mainly concerning material quality and construction execution, was corruption. In Nias, the BRR had to deal with builders trying to maximise their profit by compromising quality. A rather bad example for the incapability of BRR or the local government to control material used is the case where panels containing asbestos were used for the reconstruction

⁶⁷ It was important that enough houses got built. In order to achieve this, building standards as for example earthquake stability have been deliberately set aside.

⁶⁸ Head of BRR.

⁶⁹ Dean of the Faculty of Engineering at the Syiah Kuala University, Banda Aceh.

⁷⁰ Houses built from brick can cause a false sense of security. For example regarding earthquake safety a well constructed wooden house can be a lot safer than a badly constructed house made from brick.

of a whole neighbourhood shown in Figure 56 and Figure 57. “And then another thing is, once they build the house, for example BRR, so they built up to one hundred or two hundred houses in one area for example. So, the first ten house have been built very good but the last most of them not because sometimes in the middle of the process they change the contractor⁷¹ or any conditions can happen in the middle and then the rest are most of them not as good as the first one because too many houses.” (Sari 2016, 2/§68-73)⁷² “And so many material in the house is not compatible to the planning. The quality I think. The quality of concrete, the quality of anything – they reduced the quality. Most of the houses.” (Mardhatillah 2016, 6/§253-255) “[...] so there are these houses which was already built with a different agency, and then there came another one from foreign country, to have a look to evaluate themselves [...]. So, what they did, the second agency that came to evaluate, and so, they introduced the method of reinforcement of the house. So, the house was built. So, they introduced the idea of reinforcing more the housing, with the frame for example, additional frame, additional whatever. So, this for me is a bit strange because then it should have been in the beginning when they started to build the house, they think about it. [...] Not like complementary action afterwards. So, there are things happening like that during this rehab recon⁷³ which is very interesting.⁷⁴” (Meilianda 2016, 13/§544-553) “That's why we [BRR] really, really shift from contractor-based to community-based housing delivery system [on Nias island]. With contractor-based, you provide funds to contractor to build a house. And you know that Indonesia, is a very corrupt country, even in this construction, post-disaster kind of setting. Yeah? So, what the contractor, did at that time is maximize profit by sacrificing quality or standard. I was there for the first time as building inspector. So, I go around the island and inspect the house. Most of the time, you find bad quality, even house without foundation or a column without proper, what you call it, steel rod. Not just numbers but also the size. Immediately, the concept that I propose was shifting from contract to community-based housing, because then the survivor would have a new economic kind of activities.” (Koni 2016, 2/§55-63) “We found out that in a certain area the building agency used asbestos. And there was a big criticism from the international NGO and from Australian Red Cross and that kind of things.” (Kuntoro 2016, 5f/§220-225)

⁷¹ In some cases the contractors undertook too much and were unable to deliver or went bankrupt. So they could not finish the construction of houses they were commissioned to.

⁷² Surveyed houses in Aceh for UN Habitat.

⁷³ Rehabilitation and reconstruction.

⁷⁴ Houses were built by one agency without measures for earthquake stability. Later these houses were analysed and refitted by another agency.



Figure 56. Settlement with panels containing asbestos, Banda Aceh. Source: Lucas, 2016.



Figure 57. Panel containing asbestos on the ground, Banda Aceh. Source: Lucas, 2016.

Lacking consideration of natural hazards

The beforementioned bad results do not consider missing adjustment to natural hazards since, besides earthquake risk, this was not on the agenda of either BRR, the local government or most organisations involved in the reconstruction. Regarding this thesis a special focus was placed on this aspect. As stated, the main focus during reconstruction was placed on earthquake safety although the houses in Banda Aceh did not collapse due to the earthquake event but got washed out afterwards by the tsunami. However, tsunami risk did not play an important role in the reconstruction process, an aspect discussed later in this chapter in the sub-point urban planning given the planning scale. Further, neither climate conditions nor flooding as a hydrological hazard were anticipated in the design of houses. The reason mentioned for this was again time pressure, good solutions took too long. There was no time to plan or design options regarding any types of hazards or conditions except earthquakes, which was already included in the basic standard designs of most organisations involved. Flooding for example, is still a problem in Banda Aceh today if houses are not on stilts or the drainage is poor. During the reconstruction phase, some houses did get built on stilts, but this method was introduced rather late. Thermal comfort also did not play a role in the designs, so houses were not adapted to climate conditions and later air conditioning was necessary. In the process of reconstruction, traditional knowledge seemed to be forgotten. “For example, my house in Kabapang, three times a year we get flooding up to 30 centimetres so we have to stay on the bed so this is why if I build my house I will raise up my floor. I don’t know maybe the drainage is not good so that’s why the flooding is very a problem right now in Aceh.” (Sari 2016, 5/§197-201) “But always this kind of project's [adjusted to natural hazards] not really sustainable, they're just project based and then they stopped. [...] What I mean is that they only introduced this idea and they built the design [...] then this idea is not spread throughout other communities, so it's not sustained.” (Meilianda 2016, 6/§221-243) “We would like to have more houses on stilt [for expected flooding events], but we were late in introducing that type. So the difficulty is to have people appreciating all this concept. [...] The houses in tsunami Aceh are destroyed because of this combination of earthquake and tsunami. Tsunami you cannot do anything for that because it floods but we think that having it on stilts reduces the risk. At least you can go up on the second floor. A lot of people survived on the second floor. And when you have the ground floor empty, it's even quicker for water to go down. So that's why the idea of the stilt houses.” (Kusumawijaya 2016, 10f/§407-445) “I did the assessment on thermal comfort in post-tsunami housing for my PhD thesis. We assess only in Banda Aceh case that is around 120 houses. So, at that time I want like to see – because for example

Turkey the house built by Turkey looked very beautiful and most people just say how lucky they get the house from Turkey and also from Saudi-Arabia. So, the houses are very good from the outer performance. And then I would like to assess the internal comfort whether it is just as good as the people see from outside. Most of them were built from brick, from the heavy weight material. This is just as the one that we are studying in building physic, so for the heavy material during the morning it is cool but during the night – the heat that was absorbed by the heavy material will be transmitted into the internal during the night. So, it happens. So, the people say during the night it is warm so that's why some of them installed an air conditioner and a fan. So, it is just like the one we can predict. So, the result can be predicted before.” (Sari 2016, 4/§141-151)

Involvement of people

Some organisations decided to involve people to build their own house which in some cases led to further issues. Some beneficiaries had a lack of time to be involved in the building process either because they had a job, they were living outside the construction area in barracks or other reasons. Also, often people were lacking the appropriate skill to build a house which potentially led to bad quality results. In some instances, training would have been both necessary and important, although sometimes the only survivor in a family was a child or an elderly person, in such situations community involvement seemed to be a rather inappropriate approach. On the other hand, lacking participation also led to mistakes. For example, there was the instance that houses were built without a kitchen since no female members of the beneficiaries were involved in the design discussions or decision. “[...] in some cases a twelve-year-old child is all that's left and in others it might just be a couple of women and nobody else or it might be one man and that's all. But they wanted the villages to be involved in the building of their own houses. But they don't have any skills about how to build a house and they were pushed into ordering materials and things like that [...] they had no experience to check the quality of the materials [...]. So, a lot of people didn't get a quality house as a result.” (North 2016, 9f/§389-400) “[...] one of the problem like the community is not in the field they are in the barrack and the other in I don't know where. And second not understanding technically and last, they are lazy for do that because I don't know I don't understand about this. We understand what they feel because we learn this process five years in colleague but we pressure them to know in one month. I think it's not possible. This is the problem and the third problem is some of them is busy like civil government, like other job that they have. They have no time to include in this process.” (Indra 2016, 3/§127-132) “So it's already constructed, 153 houses without a kitchen. And then there is a complaining from the females say that when you take a decision to choose the design there is no opinion from female side. So, no kitchen.” (Irdus 2016, 3/101-103)⁷⁵

Incapability of organisations

NGOs usually specialise in one thing and often cannot answer the victims' real requests therefore everyone got the same no matter whether it was needed or not. Several international NGOs did not have experience in building houses and also in other areas worked outside their normal field of expertise. For example, Linda North stated that Save the Children, Oxfam and UNDP all built boats which ultimately sank. Even if NGOs did not know how to reconstruct, but instead were specialised in food or in water, in Banda Aceh, they still started to build houses. For example, some NGOs, not being used to working in coastal areas, built houses during low tide without conducting examinations. Then during the first king tide the houses were flooded or washed out into to sea

⁷⁵ former head of the village Gampung Pande

hence, help and resources, as North described it, were washed out into the sea. Mr Kusumawijaya, a Jakarta based architect involved in the organisation UPLINK during the reconstruction in Aceh, noted other organisations made mistakes even though they did have experience from other countries and other disasters. “On one side the NGO cannot provide everything but on the other side the survivors need diverse things not only one type.” (Mahdi 2016, 2/§60f) “World Vision built boats, UNDP built boats they sank. They all sank.” (North 2016, 12/§508f) “Not all NGO is a construction NGO, they don’t have their field in the construction. So, they forget this when they come help. The NGOs support food or water or something like this. [...] In Aceh, they built the house!” (Kamaruzzaman 2016, 8/§345-349) “The NGOs had no idea about tides, cause these were coastal villages – high tide, low tide. We had Oxfam building houses in the sea because they researched it when it was low tide. And then we came past when it was high tide. [...] The works, materials, everything gone out to sea...” (North 2016, 4/§153-166) “I asked the same question to for example the World Vision, I forgot what they did, the mistake, but I asked, ‘how come you did this mistake’ because I know that World Vision have experience all over the world. Like many other big NGOs. But apparently, the experiences, the knowledge which is gained from the experiences are not stored in their organisation.” (Kusumawijaya 2016, 6/§252-257)⁷⁶

URBAN PLANNING

Adjustment to natural hazard risk

Although the disaster in Banda Aceh was caused by a tsunami, a future tsunami was not an issue for some organisations involved in the reconstruction process. As stated above, the general layout of the city did not change during the process and settlements were rebuilt at the coast. This situation was influenced by the fact that everyone who wanted a house got a house, as there was enough money available. As a result, a lot more houses were built than houses destroyed during the event of the tsunami and consequently led to a worse situation post-tsunami than before, regarding hazard-proneness. During the reconstruction period of four years, the number of requested houses was constantly increasing for the following reasons. Several people got a house even though they were not tsunami victims. For example, ex-combatants who were promoted by the state, or Acehnese who had left their home and came back after the tsunami. Further, former renters now received their own house and property, people got remarried during the process and therefore needed a new house, extended families sharing one single house before got a new house for every family card, and children under age that lost their parents got their own houses built even if they would not be living in them. In general, it was hard to organise who has the right to receive a house and therefore most agencies handled this situation with giving a house to everyone who wanted one. Hence, in the end a lot more houses were built than houses destroyed and nearly all of them were built in the hazard-prone coastal areas. A rather large amount of these houses were initially unoccupied but later got either sold or rented out. Overall, this worsened the situation post-tsunami, regarding safety of people and settlements. Further, a drainage system that was implemented for two billion US dollars is said to not function until today. “In that master plan, it was stated that we should build around 90,000 houses. Wrong - at the end we had to build around 139,000 houses, more than 50 percent. [...] You build houses or things that used to be there before. So, if a village is totally destroyed you will rebuild this village.” (Kuntoro 2016, 1/§18-21) “They need 130,000 houses but we built a little bit more because of the GAM coming in and also part of the conflict resolution. Because the GAM coming back and want to have some house.” (Purwanto 2016, 1f/§44-47) “Maybe before the tsunami

⁷⁶ Jakarta based architect involved in the organisation UPLINK during the reconstruction in Aceh

one didn't have a house, maybe only rented a house but the same treatment was for them, they got replaced to another land." (Kamaruzzaman 2016, 2/§50f) "Four years after the tsunami maybe only 50 percent were occupied but the rest were empty. [...] but right now most of the houses have been fully occupied either the renter or maybe they bought from the post-tsunami victims." (Sari 2016, 3/§107-111) "[...] when the rain is too heavy, the water cannot go anywhere. This is not function. You know, after BRR there is 2 billion, 200 million from the French government to Banda Aceh city to build the drainage but not function at all." (Mardhatillah 2016, 10/§412-419)

Relocation to safer ground

In some cases, the government succeeded to relocate people to safer ground outside the tsunami risk area. For some villages that were destroyed in the tsunami, land was lost and therefore there was no other option but relocation. There was no previous plan on where or how to relocate people, so the option chosen did not work for everyone. Some fishermen were moved from the coast to the mountains and were expected to work as farmers while lacking the necessary skills and therefore struggled to maintain their livelihoods. Houses were built as a constructional answer while non-constructional aspects did not receive enough consideration. As a result, some residents only spent the night in their new house in the mountains but all day on the beach while others moved back to the dangerous areas at the shore and built their own house. A large number of the new houses stayed empty or were rented out to third parties. On the other hand, while they are the poorest members of the community, the future of fishermen in Banda Aceh does not seem very promising due to coral bleaching and overfishing, but so far they are lacking alternatives. "The earthquake is about 200 kilometres from the shoreline. But it also effected the coastal area because it collapsed. [...]. So basically, some area cannot be rebuilt because it's covered with water. And those are the villages that we have to relocate. [...] But those villages that are destroyed totally and cannot be rebuild because they are too close to the water or the sea then they have to relocate obviously. And we have to build new village at a different location. [...]. So actually, one thing that I am proud of, we built for that city of Banda Aceh a satellite city. 10,000 people there. We have to decide everything, we have to buy the land because they cannot provide land there so we have to buy." (Kuntoro 2016, 1f/§41-49,73-77) "Sometimes the fishermen, most of the washed away were fishermen. We have to relocate them inland. They got no skill at all as a farmer, so they wanted to come back to the shore, to the beach, to do their own, their natural instinct job as a fisherman. So, at that time, we lack of knowledge, regarding, transfer knowledge from fisherman to became farmer for example. We couldn't blame the fishermen because they didn't have anything skill about farming. Then they came back to the shore and then they started build barracks and then temporary housing from the cardboard." (Irwansyah 2016, 4/§142-148) "Whatever happens with bleaching there is nothing we can do about that. The fishermen have no idea about what they [are going to] face in the future. No idea. And they are overfishing. But their view is how can they be overfishing – if they were overfishing they would be rich and they are not. They are still the poorest of the community. I mean they are and they've got no alternatives and nothing is being done." (North 2016, 14/§608-613) "Sometimes the infrastructure put - the housings is not near by the livelihood activity, so far from the economic activity. This is one how the houses is still empty and some houses they rented to other people." (Dirhamsyah 2016)⁷⁷

As discussed before, the original blue print with a two-kilometre no-building zone was not implemented so, most people were not relocated from the hazard prone zone. Instead, escape

⁷⁷ Former director of the Tsunami and Disaster Mitigation Research Center TDMRC in Banda Aceh.

buildings were built to save lives in a potential next tsunami event. Moving people away from the coastal zone is a common dilemma during the reconstruction process in the aftermaths of a disaster for various reasons. First, some people do not want to be far from everything they know and the place where they grew up. Second, the beforementioned livelihood options commonly play an important role. Finally, in Aceh, the religion also played a role, where for some faith seems to be stronger than fear. "In Aceh land is very very important element and then link with the dignity. [...] because there are some people who are moving out, we have the areas, the relocation much higher in the mountains, some people willing but some would said no and then said I lost my wife, I lost everything and this piece of land is the only thing I have. So, there is an emotional attachment as well. The way we deal with this then in any disaster and particularly we are talking about tsunami, that what is important is to safe life, therefore in a lot of area in the coastal, particularly in Banda Aceh we have several escape building so if something happened then people can go to this. This is designed to stand the earthquake and high enough – they used the previous tsunami as scale – but then if something happened then people can go immediately to the escape building. This is always a dilemma in many many countries where we talk about the evacuation or resettlement from people that living close to the coastal zone then moving out of that area. And again, we need to see this by the context of each of that country when they handle this. What is the social situation, what is the economic situation and so on before we decide on this one." (Farsal 2016, 9f/§383-401) "People was actually traumatised because of central government take the land for being shore to the investor. BRR fund finding in interview the whole community and while - during the meeting they express the concern." (Purwanto 2016, 1/§32-34) "They live in a place since they are still child. There is many many memories about their relatives, their family their place [...]." (Dirhamsyah 2016, 5/§211-217) "Maybe sometime we must understand about the people of Aceh. The people of Aceh is very we say strong because they think the life [...] - they have the religious concern. For example, we have the Allah, we have the god. They are not afraid if they must stay in the near of the coast or the beach." (Sunarzy 2016, 9/§357-364)

The current situation today makes it difficult for the city planning authority of Banda Aceh to implement changes since the government would have to buy back land from the people which appears to be expensive and therefore slows down the process. Hence, the reconstruction process obstructed future city development efforts and options. Today, it is mainly people with low income that are living in the coastal area while residents with middle incomes can afford to buy land further away from the coast. "For the people that have middle income and up they will buy a new land inland, there is no living in the sea line. So even now, if some people right now are still living there if they have quite enough money they will move. And also, it's very expensive now inland, 5 or 6 time than before. For example, in the sea line is about 300 or 400 thousand Rupiahs. Let's say around 25 US dollar per square metres but inland you can times six or eight, even ten. So, it's quite expensive. So, for low income people will still live there [...]." (Bahagia 2016, 6/§241-248)

Resume QUALITY OF THE RESULTS

The quality of the results regarding housing was again mainly affected by restricted time and a lack of pre-planning. Missing building standards considering all possible natural hazards and an insufficient master plan led to the restoration of the status quo with the same vulnerability. Furthermore, some decisions made during the reconstruction period in Banda Aceh still have an influence on the everyday planning today. Houses from the reconstruction are getting copied in terms of both choice of material and building methods. Moreover, the urban development planning today is somewhat affected and restricted.

Table 8.11. Quality of the results; own table

Findings	Suggested measures
HOUSE DESIGN	
Institution in charge must have a building code adapted to the local conditions available.	Define a building code suited for local conditions; keep it updated.
Suitable material and construction measures must be used in reconstruction.	Define suitable material and construction measures; implement regulations; keep them updated.
Site supervision must be well organised.	Prepare a concept for practical site supervision.
Adjustment of housing to natural hazards should be considered⁷⁸.	Assess risk for natural hazards; provide design solutions; implement regulations.
Involvement of community in reconstruction of housing should be prepared.	Prepare a process for the involvement of communities in housing reconstruction.
Organisations should have the necessary experience to involve in housing reconstruction.	Develop a system to check the qualification of organisations in housing reconstruction; define works that can be done without experience.
URBAN PLANNING	
Hazard risk should be considered in urban planning.	Consider hazard risk in master plan for everyday planning.
Housing in risk areas should be minimised.	Regulate housing development in hazard prone areas; include these regulations in the master plan.
Relocation should be prepared before a disaster strikes⁷⁹.	Prepare relocation scenarios; inform communities.
Measures from reconstruction should not have a negative impact on long-term urban development planning.	Prepare a long-term master plan; use scenarios; keep it updated.

8.2.2 Success in reconstruction after the tsunami 2004

There were multiple successes that were met during the reconstruction process after the tsunami in Banda Aceh. The following reflects the findings relating thereto from the interviews taken with stakeholders from the reconstruction process in Banda Aceh and Nias. Here, the findings are divided into three thematic groups, 'process', 'natural hazard vulnerability', and 'other outcomes' focusing on how it was achieved.

⁷⁸ See Chapter 9.1.2; Table 9.2

⁷⁹ See Chapter 9.1.2; Table 9.1.

Process

One major success named by many interview partners was the role of the BRR as one agency with full authority for both coordination and implementation. Since the regular planning process in Banda Aceh is too slow, an approach allowing it to be different in regulations, management and policy was needed in this situation. "So, by having one single agency with authority including reporting line directly to the president able to coordinate different ministries, different organisations that is one of we see is a very important element of success." (Farsal 2016, 2/§81-84) "That's - normal planning process is full with politics. And the normal time for planning process - say you want that area build in Banda Aceh with all the city planning - I can't wait because the political process in the local parliament will take one year. [...] So, I walk past them. In general, I can say that a major disaster like this then you cannot wait for the normal procedure to start kicking off and let the reconstruction process wait for them." (Kuntoro 2016, 5/§194-200)

Involvement of the community or local actors can represent an opportunity and a key to success. A bottom-up urban planning in the form of village planning reflected the needs of the population and afterwards led to less dispute about land distribution between the villagers. In some cases, in Banda Aceh, designs for houses were discussed with beneficiaries and changes were made according to their requests. Partially, the design was completed to local knowledge and capabilities. It sometimes led to better results and better quality of houses when beneficiaries were involved in the actual construction. This usually came with skill programmes which can be subsequently useful while also helping to keep the assets or funds within the affected area. In one example, households were put in groups of ten to organise themselves and build their houses concurrently which turned out to be expediently for the building process. It has also been stated, for example by Koni, that people could have built their own houses, what they needed was infrastructure and grants. With this approach, for example, houses can be larger if necessary, depending on the wealth of the owner. "[...] knowing the local social structure of the culture is very important. In all the sectors those interventions that are successful are mostly that involve local actors, local leaderships or at least understand the local social structure so they operate to this local social structure. [...] So those organisation that has been here around before the tsunami Safe the Children, Oxfam and other organisation they has been here even before the tsunami. They tend to have more sustainable programmes, more sustainable results of the programme. Why? We think it's because they know the local situation and the social structure." (Mahdi 2016, 4/§141-156) "And you know how we were quick? We divided the construction in two groups. So, every ten households have to organise themselves into one group. So, we will not build house individually which is what is happening in many other cases, also in Taklobat now. So, it's ten houses, ten houses, ten houses into one group and then they organise. I think there are logistic issues that they have to organise themselves and also in terms of supervision. [...] We train all beneficiaries the principles of good construction. No exception. Every family have to send one representative to follow this training to understand what is good." (Kusumawijaya 2016, 8/§347-361) "At one point during the public consultation, what they need is actually not housing. Yeah. We can build our house on our own resources, but we cannot build that road. And the bridge. With good roads and good bridge, then we would be able to come up with economic... What you call it? Capacity to build our own housing. So, we were wrong from the start at some location." (Koni 2016, 3/§125-130) "One thing that I am very proud of and just realised that this is an indicator of success, is up to now there is no social dispute whatsoever when it comes to land. And you can imagine after tsunami hit the area everything is washed, including the land of people. With the approach of this village map they

come to a consensus and because of this consensus approach there is no disputes or concern between neighbours or the village or whatever.” (Kuntoro 2016, 2/§53-58)

Natural hazard vulnerability

Regarding earthquake safety, in most cases in Banda Aceh the status-quo of houses was maintained in the reconstruction. Almost no houses were damaged or collapsed in the earthquake in 2012 with an 8.5 on the Richter scale whereby also in the disaster 2004, most buildings did withstand the earthquake but were destroyed by the tsunami that followed. In some places, escape roads were implemented which was mainly achieved through a widening of the main streets in Banda Aceh. There was also a good example of a village, where the village head had a previously designed master plan implying changes as the straightening of streets that got implemented in the course of reconstruction. Finally, the awareness of disaster today is somewhat higher than before which can be seen in decreasing rents for houses at the shoreline combined with people moving away from these coastal areas. Also, there is a tsunami disaster and mitigation research center TDMRC in the city which was set in place after the course of reconstruction, the local university is offering a master programme on natural hazard mitigation and currently there is also a disaster risk map for the whole of Aceh province. “Actually, in Banda Aceh, our people in Banda Aceh there is not too much buildings damaged from the earthquake, maybe about 85% damaged from the tsunami not from the earthquake. [...] But the construction before us, we a little bit after the big earthquake in 2012 about 8.5 magnitude. No house collapsed. Generally, we have a good construction for housing.” (Yubarsi 2016, 2/§81-83;3/§99f) “Lambung is a good new settlement, new planning because they have the village planning. Before tsunami the road in the Lambung village like labyrinth so when the tsunami come the villager cannot go anywhere because labyrinth. There is no - the road not straight. The head of the village in Lambung before tsunami he wants to make the village like the settlement in the Medan complex. In Medan there is a complex, a resettlement built by the private developer. A private developer built a housing project, good planning, big roads. So, the Lambung village wanted to make the new Lambung like that. So, they made a good settlement.” (Permakope 2016, 9/§377-383) “I think the awareness is increasing in different level of society. You can see how some very close to the – some villages close to the shoreline has been partly or mostly abandoned and the rent of the house in that area is decreasing, meaning the demand for the housing in the more risky area is going down and the houses and the building in not very risky area more expensive these days.” (Mahdi 2016, 5/§194-197) “And also, we create the Aceh disaster risk map. This is the first disaster risk map of Indonesia and BNPB has all the province to make the same things for the disaster risk map.” (Dirhamsyah 2016, 1/§27-30)

Other outcomes

One positive outcome of the reconstruction process after the 2004 tsunami was that everyone received a house, all people affected had a new home at the end of the four-year programme. In cases where the donor could not deliver the announced number of houses or could not finish projects, BRR would step in either with money or in taking over construction. Also, there was new know-how brought into the city by internationals involved in the process, some of which improved the local city planning tools. The introduction of GIS data and technology for example, is now used widely in Banda Aceh and GIS specialists have been educated locally. Working with GIS data, among other things, led to the aforementioned development of a risk map for Aceh. Further, people involved in BRR learned a lot through the reconstruction process, some of the officials are since possessing an advisory function in other disasters as for example in Haiti and the Philippines. “What BRR was trying to do was trying to make sure that all the areas were getting houses enough for the people that were there and they in the end stepped into some areas where they weren’t getting houses or nobody had committed to or had committed and then couldn’t deliver. [...] I mean at the end of the day people needed a house. No matter what. You got a house, that’s it. You might be jealous of your neighbour cause they got something else or that village down there because they got a better deal, but at the end of the day you’ve got a house.” (North 2016, 9/§361-379) “One thing for sure, there are a lot of new innovation, new ways of doing business including how widely GIS data and technology are now available compared to before. GIS something very strange for Acehnese we are talking about maps very easily, we produce map more than before, many more GIS specialist have been produced and they are not only produced by our own university but also produced by experience during the reconstruction.” (Mahdi 2016, 7/§265-270) “The knowledge maybe already here, we already know but the way we are dealing with the problem to do the knowledge we can do better. We can do better and easier. I think that's what I can learn from we dealing with the foreigners.” (Zulfisni Meutia 2016, 10/§427-429)

Table 8.12. Success in Reconstruction; own table

Findings	Suggested measures
PROCESS	
There should be one agency with full authority for coordination and implementation.	Set up an institution with full authority for coordination and implementation during reconstruction.
There should be a special planning process for reconstruction.	Define a planning process for reconstruction; keep it updated.
<i>Allow time for bottom-up solutions.</i>	<i>Pre-prepare for bottom up solutions to the extent possible; train people on methods, implement training courses.</i>
<i>Involvement of community in reconstruction of housing should be prepared.</i>	<i>Prepare a process for the involvement of communities in housing reconstruction.</i>
Educate communities about natural hazard risk; make knowledge widely accessible.	Teach related subjects at schools and universities; provide museums; establish research centres.
<i>Hazard risk should be considered in urban planning.</i>	<i>Consider hazard risk in master plan.</i>
<i>Use village planning and mapping as an instrument of planning and involvement.</i>	<i>Practice village planning and mapping regularly; prepare a master plan for each village involving the community.</i>
There should be an exchange of know-how with international stakeholders.	Actively provide knowledge exchange with international stakeholders.

Findings and measures already named before are in *italic*.

8.2.3 Influence of lessons learned on current planning process

In this subchapter the lessons learned from the reconstruction process after the tsunami 2004 are more closely investigated in terms of their implication on present-day planning suggesting two approaches. It was examined what measures are being taken in every-day planning in order to reduce disaster vulnerability in Banda Aceh concerning housing and the potential destruction in the event of a natural hazard. On the other hand, the question was considered as to what measures have been undertaken in the current planning process in Banda Aceh to prepare for a potential next major disaster and an associated reconstruction process. Both approaches deal with mitigation measures regarding a natural hazard. Measures to minimise the harmful effects of natural hazards on housing of the one part, and measures to prepare for a optimum reconstruction process following a disaster of the other. One constant central theme for both approaches examined was the knowledge gaining and the exchange of knowledge about natural hazard risk reduction and reconstruction of actors locally within Banda Aceh, nationally inside Indonesia as well as internationally in an exchange with other countries.

Institutional changes

On the basis of the experience gained during reconstruction, the National Land Agency BPN now has a copy of land ownership certificates in Banda Aceh. Also, shortly after the reconstruction process in Aceh, in 2007 BNPB, a national agency for disaster risk reduction, was established in Indonesia, with a local representation in Banda Aceh in the form of the Aceh Disaster Management Agency BPBA (Badan Penanggulangan Bencana Aceh) as previously described in Chapter 8.1. BNPB is subdivided into three fields of disaster management which are prevention, rehabilitation and recovery. In the case of a disaster in Indonesia, this institution would be in charge coordinating the emergency, reconstruction and rehabilitation phase. Since 2011, the region of Aceh is represented by the regional disaster management agency BPBD. With ICAIOS, International Centre for Aceh and Indian Ocean Studies, and TDMRC, Tsunami and Disaster Mitigation and Research Center giving direction to BPBD, two research institutes have been formed. Further, Banda Aceh is anchored in several international programmes such as the UNISDR resilience programme and the Hyogo framework for action. „[...]now after the Aceh tsunami the government set up the National Disaster Management Agency [BNPB]. So BNPB cover the full spectrum for disaster management, prevention, rehabilitation, recovery. So now there is an institution I think it's been several years already and so this institution will be in charge because the institution was given the mandate by law to coordinate as well. I believe in the future that this would be the institution that will be in charge for any disaster in Indonesia.” (Farsal 2016, 5/§177-182) “[...] we have TDMRC. We have research, tsunami disaster mitigation research centre. [Indonesian] This activity we have research centre.” (Sunarzy 2016, 2/§69f)

There were also a few critical statements made concerning the organisational situation in Banda Aceh. Regardless all the changes there is still no concept for handling a potential reconstruction after a disaster. The rehabilitation and reconstruction division of BNPB is immobilised until a disaster occurs. So far, there seems to be no direct budget allocation for projects dealing with the preparation of a potential reconstruction and rehabilitation process and it is rather difficult to obtain financial resources. The division will spring into action as soon as the need for reconstruction and rehabilitation is given, such would be the case in the aftermaths of a disaster. There is no comprehensive policy to manage all phases of a disaster, nor an interpretation of the ‘build back better’ approach which may benefit the outcome of future reconstruction projects. TDMRC is

preparing risk maps for Aceh and hands them over to Bappeda, the planning institute of the government in Banda Aceh, to be considered in their planning which is not always the case. The government of Banda Aceh is hoping for some funding from the state in order to address vulnerability issues. “Of course, the problem here is, rehabilitation reconstruction is after the disaster. We have no disaster we can't do more. We go to Jakarta, we meet our BNPB in Jakarta, we try to get some budget to Banda Aceh city not to give. We want some budget for Banda Aceh city to build something here but the problem, budget for rehabilitation and reconstruction must be recommended with our mayor. But this is not disaster condition, when we don't have disaster we don't want to make something. [...] We should have a concept maybe but we didn't do that now. As I told you that is so hard to make a programme for rehabilitation and reconstruction.” (Yubarsi 2016, 3f/§112-135) “[...] if there is no disaster then there is no planning, no budgeting for that. If there is a disaster then have to give a proposal and then budget will coming and then establish for the project.” (Bustamam 2016, 2/§119-121) “[...] one of the basic concept of ‘build back better’ is one of the - everyone wants to ‘build back better’ but the problem is how to interpret the ‘build back better’ approach. An example, because we have a comprehensive time because during reconstructions we have had so many problems so he thinks it would be better for the government to make sums of recommendations, make sums of the emergency stage for the future but because we have no policy, comprehensive policy to manage all of disaster we are not sure if this could be applicable for the future. [...] we will face long-period after 2004 and now so [I am] afraid that there is no significant change for the next.” (Haiqual 2016, 4/§168-174;7/§279-284) “So the mayor and the government just involved in the - there are a lot of activities regarding the resilient city from the ministry, from the state ministry. But this resilient city doesn't mean only for the earthquake and the houses and so on, it's still general and somehow, she's expected that the government expected to get more money from the state regarding these things. They just involve in the activity but it hasn't executed yet, the programme.” (Mardalena 2016, 7/§302-306)

Changes in construction

The University of Syiah Kuala in Banda Aceh has been working on a design for an earthquake-resistant house. Yet, people in Banda Aceh seemingly build what they and how they want, notwithstanding the experiences made during reconstruction. For one thing, some people are not aware of the natural hazard risk while the national building code is also not getting implemented. “But in my very simple rough observation in Banda Aceh people just build whatever they want. They don't learn anything so far. Maybe that's a very rough statement for me I don't know but we need more assessments to have that kind of claim. I see many projects that they still build like there has nothing happened ten years ago. And like they just start from zero again. [...] I don't know if they [the people living in the houses] really think about that [safety regarding natural hazards] again. Even during the reconstruction. I think this could be one of the failure that this risk is only been hold by the people that is involved with the construction but not by everyone. Even now they don't need to involve in the reconstruction process but at least they know that the risk is there. And I don't think that is spread well.” (Adamy 2016, 9/§375-378;15/§634-638) “So for new house there is no following for the [earthquake safety] rule.” (Irdus 2016, 5/§189) “Building code designed by the national level, just last year building code. 2004, 2015, only eleven years after 2004 we have the new building code. [laugh] Takes time.” (Dirhamsyah 2016, 7/§282-294)

Changes in urban planning

Since the reconstruction in Banda Aceh after the tsunami 2004, there are a number of elements added to the urban structure and urban life, as for example, evacuation roads, evacuation drills, a crisis centre and tsunami early warning system. In the coastal area evacuation buildings as shown in Figure 58 and Figure 59 were introduced and built by Japan. The government developed a new master plan for the city including disaster risk reduction elements such as moving the city centre inland to the south, far from the coastline while discontinuing the construction of major infrastructure in the coastal area so people would eventually follow. A mangrove belt along the coastline is planned to reduce the strength of a potential next tsunami coupled with a cease in issuing building permits in these areas. Further, a sea wall is discussed similar to the Japanese ones, so far there is no budget for this measure. A planned drainage system for Banda Aceh is not yet implemented because some people would lose parts of their land and therefore did not grant their requisite consent. Natural hazards are inserted into spatial planning by BNPB and there is a rough risk map on provincial level. However, Bappeda does not overlay these risk maps outlining possible natural hazards, vulnerability, and capability when they do urban planning. Several conditions in Banda Aceh have changed now compared to 2004 when the tsunami hit. For example, the number of motorcycles and cars on the roads strongly increased, therefore a critical question may be raised as to whether the evacuation maps and roads are still reasonable for these changed aspects. Also, some required escape buildings⁸⁰ in the coastal area are still missing, while the existing ones have partly failed to be used by people in emergency drills (see Figure 58 and Figure 59). In addition, city development in Banda Aceh is not following the previously mentioned master plan of the government as houses are still getting built in the risky coastal zone. “That’s all in our spatial plan, it’s already written there that we try to attract the south of the city in the inland. We move the bus terminal from the city to the south side and we also build a hospital. Not provincial, provincial hospital is still there it’s still good but we try to move our hospital. [...] So that makes people more comfortable to live in the south side. Even the land is quite expensive but I think in the middle-class group now, now are going to go by themselves to the south.” (Bahagia 2016, 6f/§255-267) “The green site is for the mangrove area. If I have land here we cannot make a new building because the Public Work cannot give the permit for making a building. Only for the mangrove. That’s our regulation.” (Permakope 2016, 6/§232-234) “[...] it’s so different now to before. Now there is traffic jams everywhere, there are so many cars. At that time, before the tsunami there were hardly any cars and yet still people were crashed and killed on the road in the rush to try and get out. Now everybody either has a motorbike or a car or a pickup truck or something so I don’t know how they’d get out honestly. They wouldn’t. It would be the same. And the escape buildings that have been built they are not used at all, mostly and so it’s not a familiar building and so that was a project once that we were in discussion with TDMRC was about having some activities at those buildings so that it became a familiar place for people to go. So that in the event of a major disaster again they could go to the escape building. Whether the escape buildings would hold I don’t know or not but better than everybody trying to go out on the road.” (North 2016, 13/§538-547) “Not only on the planning for Indonesia, not only for Aceh but the whole country, there is a huge gap between the plan and - first, there is a huge gap between the reality and the planning and then between the planning for the supposed reality in the future. [...] A plan needs a list of instruments to make it implementable, to make it into reality for the

⁸⁰ An escape building is a specific type of infrastructure for public use designed to accommodate a community living close to the shore in the evacuation process due to a tsunami. Evacuation signs point out the shortest way to reach the building. Some of the escape buildings in Banda Aceh also have an incorporated public use as for example a library or a museum.

future. But I think the first problem is also there is a gap between the current reality with the plan. It is often not connected at all, in terms of the process and not only the process but also with the physical reality. The plan become really often in my opinion, unfounded dream. It's not even an utopia, it's a dream. [...] For example areas which are now occupied or settled by people and suddenly projected to be green in the future, without any clear consideration about how you do that and why - of course how to do that is for the future, but why you choose that particular area for example has to do with the process and with more understanding of the reality. It happens everywhere, not just in Aceh.” (Kusumawijaya 2016, 1/§25-31,35-39)



Figure 58. Escape building Banda Aceh. Source: Lucas, 2016.



Figure 59. Escape building Banda Aceh. Source: Lucas, 2016.

Changes in people's attitudes

People are rather aware of how to act in the case of a tsunami due to training in both villages and schools as well as knowledge sharing. Other than that people do not seem to have changed their perspective on their futures and tend to be followers. “One example that when we had a few nights ago we had a earthquake 7.8 in Mentawai [a 7.8 magnitude earthquake which struck on 2 March 2016 in the Indian Ocean, approximately 800 kilometres (500 miles) southwest of Sumatra in Indonesia. Tsunami warnings were issued for Indonesia and Australia but were withdrawn two hours later.] that we see that the people are already aware. The people already moving toward the higher ground and doing the evacuation. Although the areas for improvement still open, so this is like a long-term. So, when we talk about making a disaster resilient community it’s about the long-term.” (Farsal 2016, 3/§121-127) “As you know Aceh have a big disaster, earthquake and tsunami, in 2004 but we know this was not first tsunami in Aceh. We have several tsunami before that. [...] We have tsunami in 1907 in Simeulue and then several tsunami before that⁸¹. But the people don't know what a tsunami is when the tsunami attacked in 2004. Because they don't have sharing experience from tsunami before and then now. And then in 2004 the people panicked and they don't have education and they don't have experience about what is this, why the wave from the ocean come to the land like this.” (Sunarzy 2016, 1/§17-23) “We have done some drilling for evacuation for example but I don’t follow as detailed but I know my kids attend a school [...] that is aware of disaster. I mean they have trained the teachers and the students, they have programmes to increase the awareness about disaster mitigation among the teachers and the students and it’s still going on until now, they know

⁸¹ Tsunami in Simeulue caused by an earthquake; estimated magnitude 7.8 (Kanamori, Rivera and Lee 2010, 369). Tsunamis in Banda Aceh: 16.02.1861 [8.5], 14.12.1885, 31.01.1886, 04.01.1907 [7.6], 26.12.2004 [9.1] (Indian Ocean Tsunami Information Center 2013-2019).

how the process if a disaster happen. When there is an earthquake I don't need to worry about finding my daughter for example anymore I would know that they will come to this escape building. In the case of my daughter attending one of the school around here she will be going to the tsunami museum which is also an escape building. So, it's already planned." (Mahdi 2016, 3f/§129-136) "I didn't see anything that people have learned so much through the tsunami building process. Especially in terms of good perspective, positive perspective to their future. There is no change at all. [...] Because the mindset, how the people are still like it was before." (Mardhatillah 2016, 7/§299-305)

Exchange of knowledge

A number of assessments have been completed after the reconstruction in Banda Aceh, mainly by the NGOs involved, some of them shared the findings with the government's public work agency [PU]. However, most NGOs stopped their work in 2009, five years after the tsunami hit, hence not much research was done on long-term impact of reconstruction projects. The research institute ICAIOS recently undertook an assessment of the reconstruction outcomes ten years after the work in Banda Aceh was finished. BRR, the reconstruction and rehabilitation agency put in by the Indonesian government, was running a database called RAN which is no longer accessible and additionally collected their experiences in a series of 16 books that were handed over to the major agencies involved in reconstruction, donors and the government. These books are now stored in the national archive. Further, BRR worked together with Syiah Kuala University in Banda Aceh resulting in a master programme for disaster mitigation. Until now, leading actors of BRR get asked to share their experiences and involvement in other disaster reconstruction processes within or outside of Indonesia, as for example, in the Philippines or in Nepal. While every disaster is different, and therefore needs an own approach, some experiences may be supporting a proficient proceeding. For instance, one got advice from actors formerly involved in the reconstruction process in Gujarat, India which led to more effective work. Civil servants of Banda Aceh have an exchange with a sister city in Japan, however, large elements of this exchange seem to be focused on issues not directly related to disaster risk reduction. Japan also initiated a project where both students and practitioners from all Asian countries come to Aceh and learn about the tsunami. "Officially most donors, NGOs, aid workers exited April 2009. That was about five years after the tsunami right. But not so much study on the long-term issues after the aid, so we are looking at that. We are using different available data but also, we collect data. Quantitative and qualitative data. So, the aftermath of aid project is trying to look at what happened ten years after tsunami with the aid that has been provided. We are covering five sectors, demography, which I personally supervise, housing and building environment, governance and social society, livelihood and economic issues and also the issue of disaster risk reduction. So, five sectors with local, national and international researchers." (Mahdi 2016, 1/§9-18) "One of the activity of the programme, exchange of participant from Banda Aceh to Higashimatsushima and the other way around to learn each other and then make some activities in the town. For instant, they ask civil servants from Banda Aceh city from certain government sent to Higashimatsushima and learn about waste management and about tourism and other programmes and then after they got idea there they brought the idea here and try to implement it. For instance, basket fishing programme which originally come from Higashimatsushima to catch a crab done by the fishermen. We try to do here as a part of tourism attraction." (Hafizh 2016, 1/§21-31) "I think after the rehab recon everybody is starting to deal with their own business. [chuckle] Back to their real life. We realize that's the pitfall of [chuckle] the process. There's no exit strategy and lesson learned after that, rather abandoned than really used for the planning for the future." (Meilianda

2016, 3/§96-99) “[...] never treat a disaster the same. Every disaster will have different characteristics. So, you don't - ok Padang, and then Myanmar I can bring. You can bring your knowledge, you have the knowledge. This is why it's important to do the reconstruction by those who have experience. But nobody can fully replicate the same approach for the different region. You really need to do the local planning.” (William 2016, 7/§269-272)

Table 8.13. Influence on Planning; own table

Findings	Measures
INSTITUTIONAL	
<i>Have the information of land ownership updated and available.</i>	National Land Agency BPN has a copy of all land ownership certificates in Banda Aceh.
<i>Hazard risk should be considered in urban planning. Adjustment of housing to natural hazards should be considered.</i>	National agency for DRR established; local representation in Banda Aceh: BPBA. Hazard risk is not sufficiently considered in the master plan.
<i>Have an institution in place that can act immediately in the case of a disaster.</i>	Adjustment of housing to does play a minor role.
<i>Educate communities about natural hazard risk; make knowledge widely accessible.</i>	Two research institutes have been formed: ICAIOS, TDMRC. The tsunami museum has the function to educate visitors. Tsunami trainings in villages and schools. There is no sufficient education on natural hazards beyond tsunami and earthquake.
There should be a concept for handling potential reconstruction after a disaster.	The rehabilitation and reconstruction deviation of BNPB does not address the reconstruction process until after a disaster occurs.
There should be a definition of 'build back better'.	No comprehensive policy.
<i>Institution in charge must have a building code available adapted to the local conditions.</i>	TDMRC is preparing risk maps for Banda Aceh; Bappeda does not always consider these maps in their planning. The building code does only consider earthquake.
HOUSING DESIGN	
<i>Adjustment of housing to natural hazards should be considered.</i>	Syiah Kuala University has been working on a design for an earthquake resistant house; people are not aware of the risk; national building code is not getting implemented and does only consider earthquake risk.
URBAN PLANNING	
<i>Natural hazard risk should be considered in urban planning.</i>	Evacuation roads; evacuation drills; crisis centre; tsunami early warning system; escape buildings in coastal area; new master plan including DRR; master plan is not getting updated with new risk maps; insufficient escape buildings - not enough buildings and some have failed to be used by people in emergency drills.

Housing in risk areas should be minimised.

New master plan: moving city centre inland; no new major infrastructure in coastal area; mangrove belt; cease of building permits; houses are still getting built in the risky coastal zone.

KNOWLEDGE EXCHANGE

*Educate communities about natural hazard risk; make knowledge widely accessible.
There should be an exchange of know-how with international stakeholders.*

A number of assessments on reconstruction in Banda Aceh completed; BRR produced 16 books; master programme for disaster mitigation at Syiah Kuala University; leading actors of BRR share their experience internationally; student and practitioner exchange with Japan and other Asian countries.

Knowledge exchange is mainly regarding the past reconstruction process not adjustment of housing in everyday planning.

Findings already named before are in *italic*.

Recommendations

Some of the following points were already pointed out earlier in the context of housing reconstruction after a disaster, however, they were also mentioned with regard to the current planning process. Every disaster is different, therefore, every model would need to be adjusted to the local situation which makes it crucial to understand the local context. It was suggested that the government should take lead and therefore needs to be well coordinated and have the capacity required to be prepared for the phases before, during and after a disaster. For this, risk mapping should be the basis of planning and the different institutions would need to work closely together. Moving people away from risky coastal areas could be considered in a new master plan and it is then especially important to have instruments for an implementation. One way might be to plan on the ground and involve the local community. Further, there should be a model for housing in Banda Aceh that follows the local culture and is done together with the people. To reduce the number of disasters caused by natural hazards it might also be crucial to start education on disaster risk and vulnerability in an early age. Scholarships were mentioned as a good way to reach long-term effects after a disaster event. Moreover, actors coming in after a disaster to deliver assistance also need to prepare. They need the capacity to handle this disaster type, as well as an institutional and regulatory setup. "I think if we talk about the current if we talk about planning for disaster more on the disaster risk reduction I think the first step is to understand the risk. So, the hazard mapping, risk mapping I think is important because it provide evidence, scientific evidence on understanding which area prone to what kind of disaster. So, this understanding will become the basis for the planning. Because we have still plenty example, Japan for example, Japan is in very prone area but that does not stop Japan to continue to have a good economy development. So, by understanding the risk when we can anticipate the risk, we can have a scenario planning if something happen what should we do. So that would lead to if we talk about housing, if we talk about infrastructure, we will need also importantly the soft side, the education starting from a very early year. If people are living in a prone area then they need to understand if this happen what should they do." (Farsal 2016, 3/§100-113) "[...] when we deal with disaster then preparedness become important and my observation it's always multi-sectoral, multi-dimension as well and cannot have a single approach. For example, instead of putting a lot of money in the reconstruction why not put the money more on the preparedness to make even disaster come then less expected casualty and so on. But I think it would be a bit challenging when

we talk about disaster that we put all the eggs in one basket. So, there got to be several ways in anticipating this and we will need to prepare but at the same time if disaster happen we will need to respond quickly and then after respond then we will need to help enough resources to immediately go to the recovery.” (Farsal 2016, 9/§367-376) “Well, for me because BRR is no longer there. If there will be any more or new construction in the future, everything has to be well coordinated through the government.” (Meilianda 2016, 3/§114-125) “I think the partnership is very important because maybe the problem cannot be finalised by one institution but by developed partnership we can finalise the programme comprehensive, something like that. For example, housing, road and maybe common facility, sort of partnership to combine them.” (Iskandar 2016, 4/§114-117) “For example areas which are now occupied or settled by people and suddenly projected to be green in the future, without any clear consideration about how you do that and why - of course how to do that is for the future, but why you choose that particular area for example has to do with the process and with more understanding of the reality. It happens everywhere, not just in Aceh.” (Kusumawijaya 2016, 1/§35-39) “The Nias reconstruction the planning is done locally. The government at the moment, because it's a big country, they still introduce this Bappenas type approach but I think learning from Nias, why you can do such a thing in four years because you are actually doing local planning. And local planning is exactly involving the local community on daily basis. If you do the planning like today, like in Jakarta - why BRR is a success case for Indonesia? Because you put the national organisation on the ground, on the ground zero. This is how you can do the planning on daily basis. But if you are in Jakarta you cannot see the ground. And you will rely on so many levels. So, my advice, even in the development planning is to try to empower the local community and then do the planning.” (William 2016, 7/§279-287) “I think it's not only the city that need to prepare but those who are giving assistance also will need to prepare because we are talking about one city that being hit by disaster and people from all over the world with a good intention to help.” (Farsal 2016, 4/§150-158)

Table 8.14. Recommendations; own table

Findings	Suggested measures
INSTITUTIONAL	
<i>Well coordinated government, capacity to be prepared and take lead for the phases before, during and after a disaster.</i>	>> Chapter 10.1, 217
<i>Hazard risk should be considered in urban planning.</i>	>> Chapter 9.1.2, Table 9.1
Close collaboration between the institutions involved.	>> Chapter 10.1, 217
Moving people away from risky coastal areas included in a new master plan.	>> Chapter 9.1.2, Table 9.2
Plan on the ground and involve the local community.	>> Chapter 9.1.2, Table 9.1
Model for housing in Banda Aceh following the local culture, done with the people.	>> Chapter 9.1.2, Table 9.1
Start education on disaster risk and vulnerability in an early age to reduce the number of disasters caused by natural hazards.	>> Chapter 9.1.2, Table 9.1; 9.2

These recommendations are incorporated into the considerations in Chapter 9 and Chapter 10. However, it is important to note that it takes a range of measures in order to reach an objective proposed. This is further described in Chapter 9.

8.3 Current state of planning in Banda Aceh

The following describes the current state of planning as a result from the interviews taken with stakeholders from the planning process in Banda Aceh, focusing on the adjustment of housing to natural hazards. The results are divided into three main thematic subchapters 'construction', 'planning process' and 'The role of traditional architecture'.

8.3.1 Construction

At the time of the survey there was no existing building code for Banda Aceh besides the 2015 National Indonesian building code. Public Work was in the process of defining local building codes, discussing the implementation of Islamic values as part of the new code, while natural hazards, however, did not receive particular attention. The 2015 National Indonesian building code was considered suitable but never enforced since according to Public Work it cannot readily be undertaken directly due to regional variations, as for example in average rainfall, locally used material, or possible natural hazards. In any case, without supervision building codes serve little purpose. "Actually, nationally we have the standard, but it's never been enforced. [...] But then again, the building code, the existing building code is not sensitive to the earthquake because it is create nationally. We do understand that Indonesia, it has different zone of earthquake. It has to have different approach, of course. So, the tsunami also creates a new understanding that we have to have different building codes from four different earthquake area." (Koni 2016, 9/§374-381)

According to Yubarsi (2016, 8/§323-325), most Acehnese build their houses earthquake proof, hence there was not much work to be done. This could lead to a false sense of security while other natural hazards, such as floods, are regularly overlooked. Furthermore, other alterations with an influence on hazard risk such as climate change or illegal logging are not discussed. Air conditioning becomes necessary for most houses in Banda Aceh and paved plots lead to floods. "I think housing construction here is enough. No housing collapsed after the big earthquake after the tsunami. In 2012, we have two earthquake with one 8.5 and one 8.2. We didn't hear house collapse, we are good in earthquake construction." (Yubarsi 2016, 8/§323-325) "I mean if you look now at Aceh from the perspective of the coastal areas and potential for disasters it's even increased. It's not reduced because now we have all this illegal logging so lots of the forest has gone from the hills so every time it rains it's flooding so we have flash floods in some areas or total flooding. Here this area Kamada there used to be a big sand bank outer sea which protected the coastal areas and now in two years the beach is completely gone it's just been washed away, the sea wall which was build is falling apart. [...] So, there is nothing to protect the villages from the water right now and that's just climate change and rising sea levels. [...] And nobody is doing anything. There is no discussion about climate change here and what that might mean for coastal communities." (North 2016, 14/§583-594)

8.3.2 Planning process

As stated above, for a building code to be sensible it requires monitoring during or after the construction phase. In Banda Aceh, Public Work (PU) oversees the establishment and implementation of spatial planning and a building code. According to those interviewed, there are no evaluations or assessments regarding natural hazards in the planning process for housing and an enforcement system to ensure the adherence of building regulations is lacking in Indonesia. In the current procedure, the home owner must provide the basic design of the house to Public Work where the plans are getting checked for spatial regulations. Houses must be built on the piece of land the

people own therefore regulations are needed. One instrument named is the limitation of building permits in tsunami risk areas. PU also offers planning advice and a help desk, to connect the developer with a planner. Bappeda delivers risk maps for Public Work, there is already a spatial plan for Banda Aceh which is being reviewed every five years while detailed 1:5,000 spatial plans are being prepared from an existing 1:25,000 plan. However, planning is yet to be connected as spatial planning, risk maps, geological maps and disaster maps have no direct impact on housing. The one-stop service at Public Work hands out the building permits but does not usually use the data from Bappeda as the basis for examination. This situation, combined with a lack of monitoring after handing out the building permit, can lead to unsafe buildings through non-compliance with building standards. The system of building monitoring rests on trust, depending on, among others, the education of planners and the corruption of the government. Often people do not trust consultants to deliver a high-quality building and therefore do the construction themselves while Public Work has not enough staff to supervise this private construction. “We don’t have more people to make a supervise for the private building. That’s our gap right now.” (Bahagia 2016, 3/§103-110) “[...] there is no government body that overlooks what you are doing or checks whether that’s good or not. Nothing to do with whether you are building it in a hazardous area or there is the potential of a disaster in the future so no [for houses that are newly build there are no evaluations or assessments concerning natural hazards which are part of the planning process].” (North 2016, 13f/§569-573)

When it comes to public buildings, planning must often be rushed because of the financial regulations of Banda Aceh where money delegation for construction must be decided and spent within one fiscal year. In many cases an adjustment of buildings is dependent on the financial capacity, for example a decision would be whether to build one school resistant for an earthquake with a magnitude of 9 on the Richter scale or three schools built for an earthquake measuring 7. A risk analysis should be made. However, sudden events are hard to predict and, especially if there is no history of disasters, it is hard to convince people in charge to take action. Further, the Ministry of Public Work has a programme to build houses for the poor using a prototype, which again is not adjusted to natural hazards other than the risk of earthquakes. The demographic system in Banda Aceh is currently very dynamic with a clear lack of regulations. “For the area which is predicted but not happened yet, this is something more effort might be required because will need to be convinced that scientifically or by whatever means that this will happen and we will need to prepare. So, all of the local government become very important because at the end the planning will directly impact the local government. So, the local government will need to be very much aware about the potential risk in their area and when the local government do the planning then these factors will need to be considered.” (Farsal 2016, 7/§289-297)

8.3.3 The role of traditional architecture

Until now, traditional architecture practices do not appear to be an important issue in architectural education in Banda Aceh. It would be necessary to teach vernacular architecture to planners at university in order to prevent knowledge on traditional techniques from fading with an increase of modern houses. This is not about the looks of the traditional houses but about the construction and design principles, as for example a breathable roof combined with permeable walls for a natural cooling effect. In addition, it is equally important to sensitise planners for the unobservable and teach them what can and what cannot be observed directly along with methods to inquire the indistinguishable. “I think we need to do a lot of transformation of traditional architecture into contemporary architecture but we need to study the vernacular rather than the grand architecture.

[...] it's very possible to learn from the simple houses. [...] Acehnese traditional architecture is also very - they have very obvious useful technologies that are often overlooked by people. But I think they learn it the wrong way. That's a problem. That's a challenge for our architectural education.” (Kusumawijaya 2016, 11/§369-371,§477-479;12/§496-502)

In Banda Aceh the symbolical meaning of the traditional architecture weights more than technical aspects culminating in a reduction of traditional architecture as ornament or a picture which gets applied to a façade. Occasionally traditional houses get copied, but primarily the design, not the function. For example, the material of the roof was in the past palm leaves and is now replaced with zinc sheets which transmits the heat into the house and traps it there, leading to thermal discomfort. While brick is seen as modern, traditional building methods and materials are classified as a sign of underdevelopment. Traditional Acehnese houses are more resilient to earthquakes and floods, they are built to withstand these two most common natural hazards and offer a pleasant and comfortable atmosphere for the hot and dry Acehnese climate. Now, along with cultural changes, traditional Acehnese houses tend to be considered unsuitable. It is also regarded as too expensive to build a traditional house due to the price of wood and the burden of constant maintenance. In some cases, old houses get dismantled in villages on the countryside and reassembled at a new location in the city, mainly by members of the upper middle-class and upper class. “[...] socially [...] if you build like, bricks, it means that you have modern life. The modern mindset, if you have the same house all the time, it means that you are not developed. So that's why they want to make like they are really something, so they will build bricks, so they become 'modern!'.” (Hasan 2016, 10/§398-401) “Traditional construction, Acehnese house have the good prevent from the earthquake disaster. Why? [...] Because from the wood, one, second the joint from the wood is not rigid, we have the good flexibility. And when the earthquake happen you can dance in house, the houses dance because of flexibility.” (Indra 2016, 8/§325-328)

9 Discussion

During the reconstruction phase in Banda Aceh, after the Indian Ocean tsunami 2004, there was a strict time schedule which caused subsequent problems due to a lack of preparation. The sheer scale of the disaster, the number of victims and houses lost or destroyed and the resulting pressure rendered the need for immediate action. In addition, the short maturities funds brought in by international organisations were bound to as well as a strong media attention contributed to that predominant pressure to produce and demonstrate rapid results. This left little time for preparations or to draft a comprehensive strategy which led to short- and long-term consequences for housing and urban planning in Banda Aceh, as can be concluded from the findings discussed in Chapter 8. Today, there are early warning systems, escape roads, disaster education programmes in the city, yet there is no worst-case scenario planning for a potential next reconstruction case. Further, while there is a new master plan for the city of Banda Aceh, it has yet to influence future development as the government is lacking instruments to put it into practice. This Chapter proposes an approach for a proactive urban development planning prior to a disaster, firstly to adjust housing to existing natural hazards, secondly to develop a plan for a feasible reconstruction according to the concept of pre-disaster planning in Chapter 2.4.2. and both based on the Sendai framework for Disaster Risk Reduction discussed in Chapter 0.

The suggested planning process to handle the complex project of adjustment and reconstruction of housing is based on the understanding that planning is a circular process with the following sub-sections (the order does not necessarily define the sequence): Comprehension of the situation, elaboration of instructions, communication about behaviour, interventions. The interventions interfere in certain spatial, social, political, ecological and economic circumstances and cause certain results. These results may in turn give rise to an altered comprehension of the situation and the basis for a new problem-solving process (see Chapter 4.2 Theories of planning). In relation to the following subchapters this means, planning should be based on the respective context. It also demonstrates the importance of testing, modifying and learning from gained experiences. The challenge for the planner and other stakeholders involved is to reflect on familiar work practices and to base planning on a sufficient elaboration and analysis of targets and root causes.

9.1 Proactive urban development planning as pre-disaster protection

As stated by Baird et al. (1975, 33f) and discussed in Chapter 5, rushed relief, rehabilitation and reconstruction aid after a disaster, funds spend on immediate intervention such as medical care, food, water or shelter, likely reinforces the former status quo and therefore leads to consistent or increased disaster vulnerability. For example, in Banda Aceh there are more houses in the tsunami risk area along the coast today as there were before the Indian Ocean tsunami 2004, partly in worse quality. Even though large amounts of money were available, which could have offered the possibility to 'build back better' in the sense of adjustment of housing to natural hazards and protection from future disaster, this was widely unaccomplished due to time pressure that came with the enormous funding and due to a lacking plan, regulations and preparation. In prospective, the time of response after a disaster is not the right moment to tackle underlying problems of vulnerability. Therefore, this should be prepared earlier in a systematic risk management approach, before a disaster strikes

as part of the everyday planning process introduced as ‘proactive urban development planning as pre-disaster protection’.

According to Davis and Alexander (2015, 181), the process of planning and housing “is usually more important than the physical outcome” because “planning is an approximate process that deals with developments in the future that cannot be known perfectly”. However, planning also rests on current conditions and experiences. Therefore, planning should be seen as an ongoing rapprochement and learning process incorporating lessons learned and as “a participatory process that is considered to be the common property of all individuals and institutions that have a stake in it”.⁸² Further, inspired by Schönwandt and Jung (2005, 795f), without referring to the overall system that it is a part of, planning cannot be understood or practiced. This applies to, for example, the political, social, ecological, economic or administrative context of planning, each of which needs to be considered. In order to have a process that deals with the causes and not just the symptoms of a disaster, this context is needed for a successful planning. Since every planning situation is different, there cannot be one solution that fits all. Hence, proactive urban development planning as pre-disaster protection needs to be developed from within the city by relevant stakeholders of Banda Aceh, possibly together with experienced national or international planners and stakeholders in the field of housing adjustment.

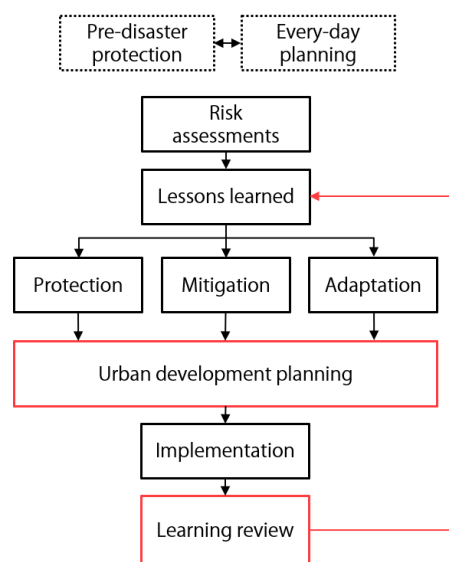


Figure 60. Proactive urban development planning. Source: Smith (2013, 43,98); modified.

Based on a model of Smith (2013, 43,98) Figure 60 illustrates the scheme for proactive urban development planning where pre-disaster protection and everyday planning are equaled without a distinction being made. Urban development planning is based on risk assessments regarding natural hazards as well as lessons learned from previous housing projects. From this, protection, mitigation and adaptation measures for housing are generated defining the urban development planning for the city. This is followed by the implementation and a learning review which again flows into lessons

⁸² See also: Fürst und Ritter (2005, 768f).

learned. Recalling Baird et al. (1975, 43) “planning must be seen as a continuous process”, rather than a linear process proactive development planning describes a circular flow with a constant implementation of lessons learned and current risk assessments. With this, planning attempts to reduce the unknowns and focuses on probability. Lessons learned and the involvement of stakeholders including the community is aimed to induce appropriate actions, instruments and measurements. On top of this, “planning must be based on knowledge” and is “partly an educational activity” (cf. Baird, et al. 1975, 43). Priority 1, ‘Understanding disaster risk’ of the Sendai framework states: “Policies and practices for disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be leveraged for the purpose of pre-disaster risk assessment, for prevention and mitigation and for the development and implementation of appropriate preparedness and effective response to disasters.” (UNISDR 2015c, 14) Hence, learning reviews and knowledge sharing are vital components in proactive urban development planning. One main source for knowledge are lessons learned from former reconstruction either in an own local or regional context or from projects in other areas or countries. In order to understand disaster risk and housing reconstruction in all their dimensions it is imperative to gain and share knowledge between a greatest possible group of stakeholders and experts from different professions, disciplines and sectors by using various methods. Chapter 8 discusses some of these lessons learned in Banda Aceh and their influence on the current planning process gained through the method of stakeholder interviews held by the author, an external observer with an engineering and urban planning background. The following subchapter illustrates the vital role of these lessons learned from reconstruction for the proposed planning process.

9.1.1 Knowledge input from reconstruction process

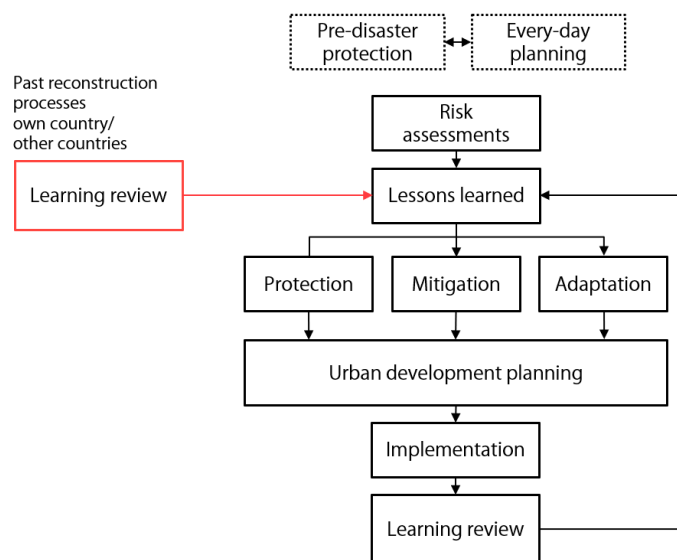


Figure 61. Knowledge input from reconstruction process in proactive urban development planning. Source: Smith (2013, 43,98); modified.

Pre-disaster planning is dependent on knowledge and experience of not only local but also national and international actors. Hence, great importance is attached to learning reviews, lessons learned

and knowledge sharing, representing a key component in the proposed planning process (Figure 61). BRR, the institution put in charge by the Indonesian government to regulate the reconstruction process in Banda Aceh and Nias island after the Indian Ocean tsunami 2004, did not have prior experiences with reconstruction processes. At the same time there was no institution on ground that was able to guide the process. After the reconstruction, BRR was dissolved leading to the loss of major pieces of knowledge gained in the process. Built on the second Priority of the Sendai framework “Strengthening disaster risk governance to manage disaster risk” there should be a permanent institution on-site in Banda Aceh in charge of the proposed proactive urban development planning. Further, a continuous and close community involvement as well as regular exchanges between local, national and global institutions and practitioners are of importance. “Disaster risk governance at the national, regional and global levels is of great importance for an effective and efficient management of disaster risk. Clear vision, plans, competence, guidance and coordination within and across sectors and disciplines, as well as participation of relevant stakeholders, are needed. Strengthening disaster risk governance for prevention, mitigation, preparedness, response, recovery and rehabilitation is therefore necessary and fosters collaboration and partnership across mechanisms and institutions for the implementation of instruments relevant to disaster risk reduction and sustainable development.” (UNISDR 2015c, 17) A strong local government with tried and tested reconstruction policies can take responsibility over foreign or third-party reconstruction agencies in the event of a disaster.⁸³ Based on Fürst and Ritter (2005), proactive urban development planning should be a problem-solving process with prompt and adaptable results flexible towards changes of context and developed as cooperative learning processes. Lessons learned from reconstruction projects are commonly rather similar regardless of location or disaster type. These experiences can teach a number of important lessons for everyday planning and future reconstruction projects. For this they need to be collected, analysed and stored in order to directly become a part of the proactive development planning and a future reconstruction planning process at a later point.

⁸³ See Fengler et al. (2008, 20).

9.1.2 Instruments focusing on housing

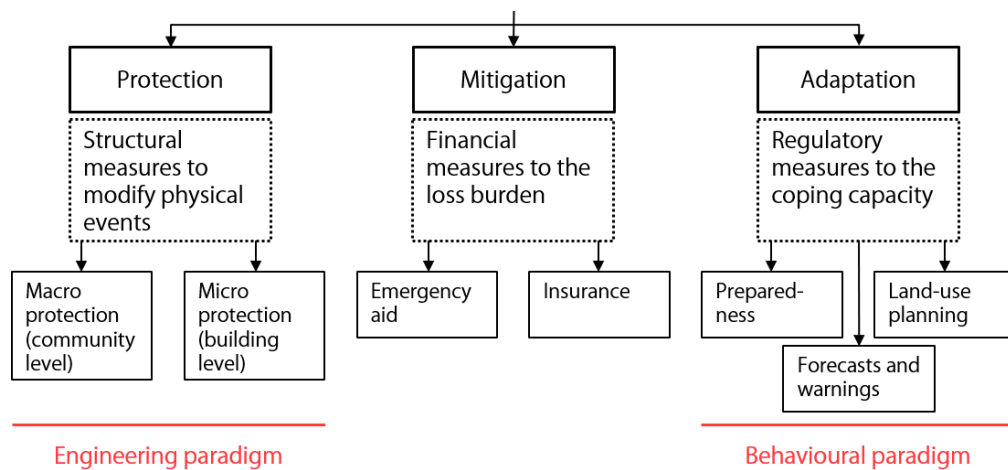


Figure 62. Components of proactive urban development planning. Source: Smith (2013, 43,98); modified.

Based on Smith (2013), there are three components of proactive urban development planning, 'Protection', 'Mitigation' and 'Adaptation' (Figure 62). Protection roots in the engineering paradigm and includes all measures on the community or building level to modify physical events such as a sea-wall to protect against tsunamis (macro protection) or stilts to protect a house from flooding (micro protection). Mitigation represents financial measures such as emergency aid or insurances while adaptation implies regulatory measures to the coping capacity rooted in the behavioural paradigm with measures such as preparedness, land-use planning, forecasts and warnings. Measures for planners are classically land-use planning as well as micro and macro structural measures represented by the classification of Lewis in physical precautions: "[...] precautions related to the adequacy of building construction and consideration of the location for building and development purposes." (Lewis 1975, 35) In this chapter these 'classical planning instruments' are extended by instruments compiled in an exemplary manner from the findings presented in Chapter 8 following the approaches of Heidemann (1996) and Jung (2008) (Chapter 4.4).

Lessons learned from the reconstruction process in Banda Aceh as well as other reconstruction projects indicate repetitive difficulties looking at housing. The principle of including planning instruments focusing on non-structural measures influencing people's regimes and budgets is illustrated in the following. Combined with an early preparation and implementation in the course of the proposed proactive urban development planning, this approach aims for more effective interventions regarding housing adjustment in the long term. Each of the examples presented derive from lessons learned gained through the interviews taken on the reconstruction process and everyday planning in Aceh and Nias discussed in Chapter 8. Protection and adaptation are put into focus in the following discussion, while mitigation forms the basis for all measures.

Protection

This example looks at the micro-scale of protection and housing adjustment to natural hazards on the building level. A first measure is having adequate building codes suiting the local conditions based on risk assessments and previous disaster experience. However, if these building codes are existent but not enforced, there will not be an improvement in housing adjustment. Therefore, a set of interacted measures as suggested in Table 9.1 should be put into place. The table makes no claim to completeness and can be supplemented or expanded as required.

Table 9.1 Protection interventions regarding adjustment of buildings to natural hazards; own table

	Example	Intervention	Regime	Budget
1	Local building codes based on risk assessment and experience	(iii) adjustment of organisations operating in or with these facilities	information	physical integrity, safety of property, planning security, future viability, time
1.1	Update building codes regularly	(iii) adjustment of organisations operating in or with these facilities	information	physical integrity, safety of property, independence, financial means
2	Institution to check plans handed in before handing out building permit	(iv) influencing behaviour	information	time, building permit, right to build, control
2.1	Penalty for building permit violation	(iv) influencing behaviour	Information	financial means, time, control
2.2	On-site monitoring during the building process	(iii) adjustment of organisations operating in or with these facilities	information	time, financial means, control
2.3	Building permit necessary for addition or modification	(iii) adjustment of organisations operating in or with these facilities	Information	time, building permit, right to build, control
3	Studying traditional building methods	(iv) influencing behaviour	information	skill, safety of property
3.1	Translating traditional building concepts into modern methods and materials	(iv) influencing behaviour	information	time, financial means, skill, safety of property, availability of materials
4	Training craftsmen in building safety	(iv) influencing behaviour	information	skill, safety of property, physical integrity, financial means, time
4.1	Construct prototype houses as a learning facility	(ii) construct and maintain facilities	places	skill, financial means, time
5	Teaching planners at university about adjusting houses to natural hazards	(iv) influencing behaviour	information	skill, safety of property, physical integrity, financial means, time
5.1	Involving planners in the building and design process	(iii) adjustment of organisations operating in or with these facilities	information	skill, financial means, safety of property, physical integrity

5.2	Construct prototype houses as a learning facility	(ii) construct and maintain facilities	places	skill, financial means, time
6	Subsidies for building according to safety standard	(iv) influencing behaviour	information	financial means, safety of property, physical integrity
6.1	Fund assessments for homeowners on building performance	(iv) influencing behaviour	information	financial means, safety of property, physical integrity
7	Subsidies for local material	(iv) influencing behaviour	information	financial means, time
8	Close cooperation between institutions handling urban planning and housing	(iii) adjustment of organisations operating in or with these facilities	information	time, coordination, preparedness
9	Education about potential natural hazards	(iv) influencing behaviour	information	skill, time, financial means, physical integrity, preparedness
9.1	Construct prototype houses as a learning facility	(ii) construct and maintain facilities	places	skill, financial means, time
...				

The interventions named in this table must be combined with macro-scale measures as well as adaptation measures to provide sufficient protection for housing from natural hazards. Also, there will be some natural hazards that exceed the possibilities of protection, therefore emergency plans such as evacuation roads (i – provision of locations) or tsunami evacuation buildings (ii – construct and maintain facilities) are in any case indispensable. This scenario requires a whole set of measures according to the table presented.

Adaptation

One prominent example regarding adaptation and land-use is the issue of relocation of settlements to safer ground during post-disaster reconstruction. Lessons learned from Aceh and other reconstruction projects show, if relocation happens unprepared, in the aftermath of a disaster during the reconstruction process the prospects for success are little. Even if new settlements are being built away from the risk areas the chance of people rebuilding their own houses back in the dangerous zone is highly likely. Reasons for this vary between cases, as for example, fishermen often do not want to live far from the shore because they want to be close to their workplace and their boats. The relocation project in Banda Aceh moved fishermen away from the shore, ten kilometres inland up a hill with the intention to have these fishermen working as farmers. Presently, a large number of these houses are rented out while the former owners moved back to the shore. Table 9.2 introduces examples for interventions referring to the relocation settlements from the tsunami-risk area along the shore focusing on fishermen. Re-zoning areas to non-housing and discontinuing to hand out building permits, both highlighted in grey, present commonly used measures. These two measures alone do not tend to be particularly auspicious in the long term. In order to lead to change, a wide combination of measures must be applied and acted upon together.

Table 9.2 Adaptation interventions regarding relocation of fishermen; own table

	Example	Intervention	Regime	Budget
1	Re-zoning area to non-housing	(i) provision of locations	places	property rights
2	Cease handing out building permits (long-term)	(iv) influencing behaviour	information	property, time
2.1	Penalty for building permit violation	(iv) influencing behaviour	information	financial means, time
2.2	Supervisory authority to check building permit violation	(iii) adjustment of organisations operating in or with these facilities	information	time, financial means
3	Discontinue the development of necessary infrastructure (schools, hospitals)	(ii) construct and maintain facilities	places	financial means, education, health, market value, lifetime
4	Offer properties in proximity to the shore	(i) provision of locations	places	property, security, time, financial means
5	Generate new work places	(iii) adjustment of organisations operating in or with these facilities	places	time, financial means
6	Provide public transport to get to shore	(iii) adjustment of organisations operating in or with these facilities	time flow	time, financial means
7	Supply subsidies for fishermen living further away from their work place, e.g. bus tickets	(iv) influencing behaviour	information	time, financial means
8	Build boat houses on the shore that can be used as a storage for fishing boats, nets, etc.	(ii) construct and maintain facilities	places time flow	time, financial means, security of income

8.1	Employ guards to watch the boats and equipment in the boat house and on the shore.	(iii) adjustment of organisations operating in or with these facilities	information	time, financial means, security of property
8.2	Opening hours of the boat house are arranged according to working hours of the fishermen.	(iii) adjustment of organisations operating in or with these facilities	time flow	time
9	Offer an insurance for boats and equipment.	(iii) adjustment of organisations operating in or with these facilities	information	financial means, security of property
10	Retraining, re-education to open up new job possibilities	(iv) influencing behaviour	information	skill,time
11	Education about potential natural hazards	(iv) influencing behaviour	information	skill, time, financial means, physical integrity, preparedness
...				

The selection of measures should be based of an in-depth analysis of underlying problems inclusive of those concerned. These problems are usually multi-layered and in some way interlinked, therefore the measures are as well. For example, measure '4 Offer properties in proximity to the shore' will cause that fishermen need time and financial means to get to their boats and workplaces at the shore. This can be compensated by measure '6 Provide public transport to get to the shore' and measure '7 Supply subsidies for fishermen living further away from their work place, e.g. bus tickets'. For all these measures it is crucial to begin before a disaster as a fixed component of proactive development planning in day-to-day planning in order to prepare all stakeholders and parties concerned in a slow and controlled way, hence a potential future reconstruction can run differently.

9.2 Overview of the challenges and recommended action in the form of a 'Reconstruction template' embedded in proactive urban development planning

As a deduction from the findings it is neither necessary nor advisable to wait and postpone the planning for reconstruction until after a disaster occurs. Although each disaster is different, there are some elements of a reconstruction planning that can be prepared beforehand. The Sendai framework suggests the preparation of a reconstruction plan which will be presented here in the form of a 'reconstruction template'.

9.2.1 'Reconstruction template'

The fourth priority of the Sendai framework states: "The steady growth of disaster risk, including the increase of people and assets exposure, combined with the lessons learned from past disasters, indicates the need to further strengthen disaster preparedness for response, take action in anticipation of events, integrate disaster risk reduction in response preparedness and ensure that capacities are in place for effective response and recovery at all levels. [...] Disasters have demonstrated that the recovery, rehabilitation and reconstruction phase, which needs to be prepared ahead of a disaster, is a critical opportunity to 'build back better', including through integrating disaster risk reduction into development measures, making nations and communities resilient to disasters." (UNISDR 2015c, 21) The reconstruction template proposed is generated from the urban development planning based on lessons learned from previous reconstruction processes. This is composed together with stakeholders and the community and is ready to be executed after a disaster occurs and reconstruction becomes necessary. As displayed in Figure 63, it is directly generated from the urban development planning and guides through relief, rehabilitation and reconstruction. As stated in Chapter 2 and worked out in the findings, time-consuming planning can pose a problem at the time of reconstruction while a plausible pre-thought-out plan is crucial for the process. Therefore, each component that can be anticipated and prepared ahead of time presents a desirable option.

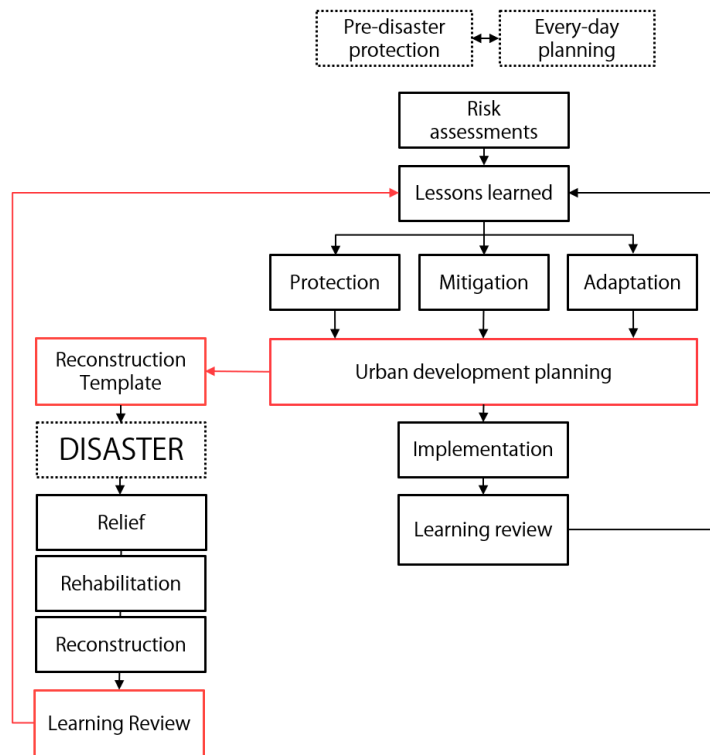


Figure 63. Reconstruction template generated from urban development planning. Source: Smith (2013, 43,98); modified.

Based on Fengler et al. (2008, 6), Figure 64 presents the common course of activities after a disaster takes place, as was the case in Aceh after the Indian Ocean tsunami 2004. All these stages typically proceed in rapid succession: Damage/ loss assessment, needs assessment, donor conference leading to the development of a reconstruction strategy followed by implementation modules coming into force and the integration into the budget cycle. Generally, all this happens within a few weeks or months given the urgency of the situation. The reconstruction template serves as a basis for the reconstruction strategy worked out within this process when mobilizing disaster finance (Figure 65).

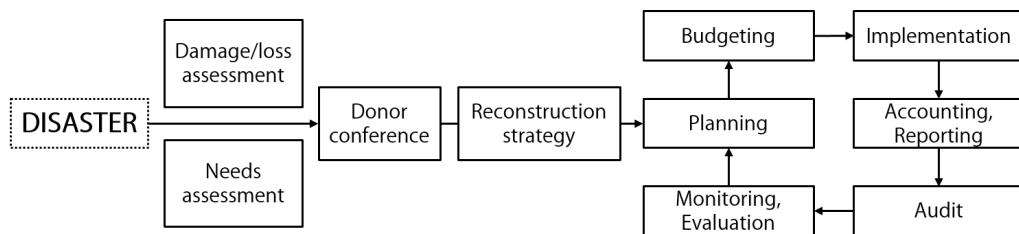


Figure 64. Protocol of events mobilising and executing disaster finance. Source: Fengler et al. (2008, 6).

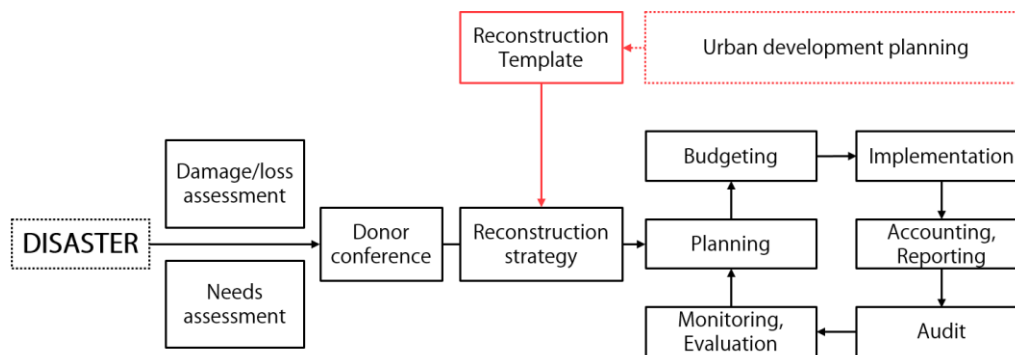


Figure 65. Reconstruction template as basis of reconstruction strategy. Source: Fengler et al. (2008, 6); modified.

According to Kessler (2014, 81) and derived from the findings and case studies in the course of this work as well as done by other researchers⁸⁴, donor money often comes laden with cultural values and the development standards of the lenders. An implementation of the reconstruction template is an attempt for a reconstruction process based on the context of the city or area, available resources, culture and capacity to create and implement housing programmes. The following subchapter discusses a range of components implied in the reconstruction template. In the case of a reconstruction process following a disaster, having a set guideline governing all activities can prevent from the usual chaos that follows. For example, during the reconstruction process in Aceh, several different guidelines on various topics were produced inter alia by the United Nations Humanitarian Information Centre (UNHIC) as well as by the national reconstruction agency BRR in cooperation with UN Habitat. This situation caused confusion on which codes and standards to apply, as emphasised by da Silva (2010, 31f) and also evinced in the findings. Hence, a fixed set of standards and guidelines, possibly with the knowledge and input of for instance these organisations already incorporated, does not only have the potential to lead to more appropriate solutions but also possibly facilitates the reconstruction process.

At this stage it should also be noted that there are always contingencies in every disaster conditional to, for example, the type, location or intensity. However, the reconstruction template is an attempt to prepare at the best possible rate for concerns that rather can be foreseen before a disaster strikes through a number of instruments in excerpts listed in the following.

9.2.2 Instruments of the ‘reconstruction template’

Instruments of the reconstruction template are derived from the urban development planning and therefore presuppose profound preparatory work following the approach described previously in Chapter 4 Planning as well as a regular exchange with relevant stakeholders and recent findings. Only a small extract of the total list of measures will be included in the reconstruction template. The following table exemplarily presents several essential components of a reconstruction template concerning housing taken from the findings.

⁸⁴ See for example Duyne Barenstein and Pittet (2013); Naimi-Gasser (2013); Excursus.

Table 9.3 Components of a reconstruction template concerning housing; own table

Instrument	Components
Masterplan	<ul style="list-style-type: none"> Map of natural hazard risk zones Land-use plan regulating housing area Potential relocation sites Water infrastructure plan Green infrastructure plan Map of evacuation roads Locations determined for public infrastructure Long-term planning goals (best case scenarios) ...
Building code	<ul style="list-style-type: none"> Building methods Material guideline including source of material Construction standards Regulation on refitting versus replacement Regulation on size depending on number of inhabitants Model of standard housing process Model of ideal housing for different settings Regulations for minimum performance (energy, air circulation, ...) Traditional housing aspects (functional), translated into modern use ...
Non-structural	<ul style="list-style-type: none"> Set of measures extracted from defined adaptation, protection and mitigation measures from urban development planning
Institutional issues	<ul style="list-style-type: none"> Regulation on institutions involved in reconstruction process Model procedure (internal flows and stakeholders) Regulation on role of international actors Special regulations (fast-track building permit, ...) ...
Legal issues	<ul style="list-style-type: none"> Record of landownership Detailed building plan including property boundaries ...
Stakeholders	<ul style="list-style-type: none"> Directory of knowledgeable individuals (head of village, advisors) Index of specialised craftsmen Index of qualified planners List of preferred local, national, international organisations Marginalised groups Naming of an advisory and executing committee ...

This list can be continuously extended respectively based on gained experiences and lessons learned as well as altered conditions. Added to this there is the set of measures for adaptation, protection and mitigation extracted from the urban development planning. All of these components are already compiled and prepared in the course of proactive urban development planning in collaboration with relevant stakeholders, people concerned, professionals and authorities. A close exchange with the community as well as local, national and international stakeholders is required to prepare the reconstruction template. It should constantly reflect the current situation while being adjusted and offer solution proposals to long-term goals (e.g. energy supply) and defined problems as for example vulnerabilities.



ARAH EVAKUASI

10 Conclusions

The proposed proactive urban development planning, along with the 'reconstruction template', aim at defining the working area and operating principle of the planner regarding disaster risk reduction (DRR) through housing adjustment. There is often not enough time for planning in the aftermaths of a disaster and therefore as much as possible should be completed beforehand. Here, the planner is needed, as described in Chapter 4.3, in a leading role from within as well as supportive from outside. The question as to what can be done pre-disaster in order to minimise natural disasters and have a positive outcome in reconstruction processes is the key focus of these considerations. This can be achieved by building the foundation for a risk sensitive optimised master plan, coupled with a building code tailored to local conditions and social aspects. While knowledge and lessons learned can be shared locally, nationally and internationally, planning must happen for 'exactly' this location for 'specifically' these people. The definition of the problem and determination of the target is undertaken by the planner and is based on background knowledge, education and lessons learned gained from knowledge sharing across professions and disciplines. This might be supported by integrating the results of assessments conducted by uninvolved, external, independent observers. Following priority 3 of the Sendai Framework for Disaster Risk Reduction 2015-2030 it is necessary to invest in disaster risk reduction to save lives, prevent losses and have a positive influence on recovery and rehabilitation. Every community is obliged to define what positive influence means best adapted to their own circumstances. "Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment. These can be drivers of innovation, growth and job creation. Such measures are cost-effective and instrumental to save lives, prevent and reduce losses and ensure effective recovery and rehabilitation." (UNISDR 2015c, 18) This also raises the question of where the possible support for this comes from such as local, national or global funds. The following subchapters summarise a possible implementation of the proposed method together with potential institutions in charge in the planning environment of Banda Aceh. Further, a transferability, consequences for international institutions, and additional research demand are briefly outlined.

10.1 Implementation and institution in charge

Crucial for a functioning and potential success of the proposed proactive urban development planning is an emphasis on an internal development and implementation of both the planning process and planning instruments. This can be supported by external institutions and planners. Fundamental issues are an early start, before natural hazards turn into a real danger, a close interaction between all actors involved such as planning institutions, educational institutions and the community. Furthermore, planning instruments and measures must be identified and defined as accurately as possible at every level. To illustrate this point, for example, requesting to "reduce the seismic vulnerability to seismic hazards" (da Silva 2010, 63) as it occurred during the reconstruction phase in Banda Aceh, is not enough and does not represent an instruction. The following presents an example of possible external influence on proactive urban development planning.

The principle of this planning process is an interaction between both proposed components, the 'proactive urban development planning' and the 'reconstruction template' derived from the former.

Both are based on a regular revisioning and updating according to current assessments and lessons learned. It consists of measures that can already be implemented as well as measures that can be implemented over time or in the event of an eventual reconstruction. In case of the absence of a disaster, the reconstruction template will not be needed, however, the process of urban development is still justified in the long term for a general adjustment of housing to existing natural hazards. In order to ensure an ongoing process over a long period of time this planning process should be decoupled from local politics depending on election periods, ideally bounded to a local institution which already exists and exchanges information with other relevant local and international institutions as well as the government on a regular basis. In the event of a disaster, this institution is in charge of the guidance of the succeeding reconstruction process. The following summarises a rough organisational structure for Banda Aceh regarding protection interventions for an adjustment of buildings to natural hazards as presented in Chapter 9.1.

Considering the initial situation in Banda Aceh, the existing institutions must be better interconnected and each perform certain tasks, some of which they carry out already. Bappeda, the Regional Body for Planning and Development and TDMRC, the Tsunami and Disaster Mitigation Research Center should establish and provide risk maps, information on natural hazards, devising the foundations for a master plan for Banda Aceh and cover the area of education. For the education and carrying out assessments they should be in direct exchange with the knowledge institutes such as the University of Syiah Kuala or ICAIOS. Education should reach every member of the society to raise awareness for natural hazards and precautionous adjustment of housing among planning students, contractors, companies and firms in the building industry as well as every member of the society. As a part of Bappeda, the Ministry of Public Work is responsible to develop and regularly reassess a building code for Banda Aceh which is exactly adjusted to the latest risk maps as well as additional information, as for example, social aspects. The existing "One-Stop-Office" as part of the Ministry of Public Work still hands out building permits, but the decision must be based on the beforementioned building code as well as the current master plan. This process should be free to encourage people to use the service and get a legal permission before starting to build. After the permit is handed out it is crucial for the Ministry of Public Work to regularly monitor the construction process at any rate it is necessary to visit the construction site at the end of the building process for a final approval. Any violation of the building code implies consequences in any form for the house owner, the contractor and or planner liable. Conversely, this means that every housing project built by either a contractor or a planner means less risk for the private customer. In order to promote the involvement of a planner, the city of Banda Aceh could initiate a reward programme with financial support for private house owners for a proper execution of the building process or penalties in the case of non-observance. In case of a reconstruction after a disaster the Ministry of Public Work must have a leading role throughout the entire process.

An option for Banda Aceh is to introduce a new additional institution which acts as an intermediary between all the existing institutions to correlate and assess the available knowledge, supervise the procedures and flows, as well as oversee the reconstruction template. This institution could also stay in close contact to neighbouring countries and international organisations to exchange lessons learned from former reconstruction processes and current housing adjustment instruments. This would entail costs which must be financed. It also puts a new player to the several fields of interest which demands a smooth coordination so it does not prolong or complicate processes.

10.2 Further research demand and outlook

The methods of proactive urban development planning combined with a 'reconstruction template' for housing adjustment to natural hazards are developed within the framework of recommended actions in this work. These methods are issued to be established as an integral element in both local everyday urban planning as well as reconstruction and rehabilitation programmes in the aftermath of a disaster. In this regard, a set of planning instruments from the field of protection, adaptation and mitigation are introduced. Possible contents are listed exemplarily and considerations on the stakeholders and aspects for an implementation are described. The further in-depth formulation of these instruments for Banda Aceh or other areas of investigation as well as a practical validation pose an interesting challenge for further research in this field.

Institutionalisation of actors

A very significant point is how proactive urban development planning and the 'reconstruction template' can be established within humanitarian aid, reconstruction programmes and international development cooperation. It may have an influence on the form of support through international organisations before and after a disaster. This planning approach requires appropriate funding which communities might not be able to cover. However, focusing on proactive development planning and a 'reconstruction template', funds may be saved in the long run when it comes to a potential disaster and reconstruction focusing on building back better. Further, the approach underlines the need for international organisations to focus on the support of education and training as well as a local, national and international exchange of knowledge on eye level. This raises the question what role international actors and international organisations play in the suggested planning process compared to local actors. Who starts and accompanies the proactive urban development planning and 'reconstruction template' and who supports the implementation of planning instruments?

Exchange of lessons learned

This issue is closely related to the question of knowledge sharing. How can lessons learned concerning housing adjustment and reconstruction from various situations at different places be shared within the international community and between affected communities and countries? How can an exchange be organised and who would be involved? This also establishes whether certain planning instruments could be applied in different communities and sites. International organisations could be in the role of the knowledge carriers with the objective to bring stakeholders together, promoting networking and exchange.

Development of planning instruments

A number of planning instruments for Banda Aceh regarding housing are listed in 9 Discussion. In further studies this list can be complemented and particularised based on more findings and on-site lessons learned.

Standardisation of planning instruments

The question rises whether and to what extent the instruments of the proactive urban development plan and the 'reconstruction template' can be standardised in order to allow a more cost-efficient application. This must be examined carefully based on the knowledge of difficulty with the considerable inefficiency of 'one for all' solutions offering rather vague guidelines when it comes to real-world practice. In any case, adaptation of planning instruments to the particular situation on

site are needed. In regards to the process design, basic standards for the conduct of the process could be outlined, for example, in the area of participation or public outreach.

Education of planners

There is a research demand on the vital education of current and future local and exogenous planners to allow an involvement in everyday housing adjustment to natural hazards and urban development as well as housing reconstruction in the aftermath of a disaster. A lead here can be taken from former reconstruction projects analysed by social scientists, planners or organisations as, for example, Davis and Alexander (2015), Brenner (2017), Tauber (2014) or Duyne Barenstein (2014).

Influence of exogenous international influence on traditional architecture

The adversity of exogenous international influence through donors and agencies on low-income countries is discussed in Chapter 5. The consequences of this influence on housing mainly in relation to building techniques, material and suitability form an interesting field of research when it comes to positive and negative influences of international aid and reconstruction from the outside. Traditional building techniques tend to get ignored, degenerated to decoration and ornament. Is there a pattern in development aid? Should this be prevented? How could building traditions be converted into modern elements without losing their function?

The research demand on the issues listed above is both empirical and theoretical. While a lot can be examined through field research it is crucial to derive the theoretical frameworks. However, it is vital to test theoretical frameworks in practice. The instruments of the proactive urban development plan, as well as the 'reconstruction template' for housing adjustment to natural hazards, need to be tested both in everyday planning and in a disaster situation to determine their practical suitability. Based on these findings from practical experiences, the instruments can be further developed on a theoretical basis.

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The full script of interviews taken in the field study is with the author.

Appendix

Appendix A - Areas of investigation

The areas of investigation are the result of preliminary studies from a comprehensive analysis of the available literature as well as discussions with research partners and actors. The following are the central questions the semi-structured interviews were based on.

1: Adjustment of housing to natural hazards can reduce the extent of a disaster. This link does not receive sufficient attention/consideration in the current planning process in Banda Aceh.

[1] Adjustment of Housing to present and future natural hazards is not an issue/not an important issue in the planning process for housing.

- Are any evaluations/assessments concerning natural hazards as part of the planning process for housing, for example weather conditions or earthquake risk in any planning stage?
- Who is doing them?
- Are there any tables or charts of expected future risk?
- What is the time horizon for these tables or assessments?
- Do you have a building code in Aceh?
- Is this building code getting implemented when houses are getting built in Banda Aceh?
- What do you think are reasons for this?
- What are the most common natural hazards and what will change due to climate change?
- How is the government preparing for this? What is the consequence for housing?
- Who is concerned with these aspects?
- How is the planning of housing connected to urban or spatial planning?

[2] Do-it-yourself construction is not being monitored. Appropriateness of construction, materials, building methods is not checked.

- Who can design and build a private house?
- Who is part of the planning and building process?
- What plans have to be handed in?
- What aspects will be checked before the permission to build?
- Is there any supervision during the building process or once the building is completed?
- If yes, who is supervising?
- If not, what are reasons for this situation?

[12] Planners/architects are not sufficiently sensitized for adjustment.

- How is adjustment to natural hazards taught in architectural education?
- What are the instruments architecture students are working with to analyse climate conditions and natural hazards for their site?
- How is architectural education embedded in urban planning?
- What is the planning scale for housing design in architecture classes?

[15] Within adjustment efforts by the government housing is not an aspect that is considered.

- What is the city doing to adapt to natural hazards?
- What are elements of these plans?

- What is the planning scale?
- What is the governments' role in housing development?

II: Knowledge from the reconstruction process must be included in the current planning process for housing. This is not yet fulfilled.

[18] The planning process for housing reconstruction was partly successful however, had gaps and shortcomings.

- Have you been in any housing reconstruction project? Or are you familiar with the planning process of any housing reconstruction project?
- What was the planning process for this housing project?
- What were the lessons learned?
- What would you suggest improving for a potential next time?
- Are there any steps you think should be implemented in the regular/present planning process for housing?
- Why do you think has this not been done yet?

[3] Lessons learned have not been included in the current urban planning neither is there a preparation for a potential next reconstruction process.

- Have there been assessments of the after-tsunami housing rebuilding projects?
- Who initiated them?
- Who did them?
- What was the result?
- What aspects have been looked at?
- Has the process been analysed?
- What were the most important lessons learned?
- What happened/happens with these findings?
- Will they affect the everyday planning of housing in any way?

[4] There is no exchange of knowledge regarding other reconstruction projects in other countries.

- Are there any similarities between the conditions concerning natural hazards in Banda Aceh and neighbouring country/countries?
- Is there an exchange in techniques or education?
- Are there any good examples in Banda Aceh for housing that is well adapted to climate and natural hazards?

III: The planner must have a clearly defined role throughout the entire planning process, take responsibility for occupiers and ensure adjustment efforts. This has not yet been accomplished.

[13] Housing design is not an important field of work for planners.

- What are common design studios for architecture students?
- What percentage of architects/planners are working in housing development after graduating?

[14] Yet, planners do not play a clear role in the planning process for housing.

- Are planners/architects part of the planning process for housing?
- What is the role of the planner/architect in a planning process for housing?

- What role would you suggest they should have?
- What do you think is missing in the current planning process for housing?
- What are the skills of architect/planners?
- Is it possible to build a house without a planner?
- Do you think this is good?

[6] During reconstruction, affected communities were not sufficiently integrated in all stages which led to a lack of know how.

- What actors were part of the reconstruction planning for housing?
- Who made the decisions?
- What was the role of the future house owners/occupants?
- Where the houses suitable for the occupants?
- What knowledge of the occupants (local knowledge) was needed?

[17] The role of the architect during reconstruction was merely reduced to design issues.

- Where were architects/planners involved in the reconstruction process?
- Local architects/planners? Or foreign ones?
- What was their role?
- What knowledge did the foreign architect/planner bring in to improve the project?
- What knowledge did the local architect/planner bring in to improve the project?

IV: Traditional building methods provide a solid basis for adjustment of housing to natural hazards. Obstacles can be eliminated. However, they do not play a role in current planning.

[10] Traditional architecture (materials, building methods) are not part of planning.

- What role do traditional building methods and structures play in architectural and/or civil engineering education?
- Are traditional building methods taught in class?
- Do people still use traditional building methods and materials?
- What do you think are reasons for this?
- Can you think of possible solutions?
- Do traditional building methods play a role in the provincial building code for housing?
- Is there any instrument that encourages people to use traditional building methods?
- Is the safety of their house an issue that people in Aceh are concerned about?

[11] An attempt to re-interpret traditional building methods and materials and learn from them is not made.

- Have there been any assessments of traditional housing that survived the earthquake (and the Tsunami)?
- Who initiated them?
- Who did them?
- What was the result?
- What aspects have been looked at?
- What happened/happens with these findings?
- Will they affect the everyday planning of housing in any way?
- Are there any older studies about the Acehnese traditional house?

[16] Traditional buildings were considerably less damaged after the earthquake, as well as after the tsunami.

- Have there been any findings about the performance of traditional houses in the earthquake and the Tsunami compared to non-traditional structures?
- Did these houses turn into models for good architecture/construction?
- Did any of these findings get implemented in the building code during or after the rebuilding process?

Appendix B - Evaluation of interviews

The following tables show a selection of quotes from the interviews which have been allocated to assumptions from the interview guideline as well as to categories. The full interview transcripts remain with the author and can be consulted upon request.

The subsequent tables are structured as follows:

Statements concerning the *Reconstruction process* after the tsunami 2004 and earthquake 2005 divided into *Shortcomings (B1)*, *Success (B2)* and *Lessons learned (B3)*.

Statements concerning the *Current state of planning (B4)*.

B1 Reconstruction process – Shortcomings

This chapter presents statements taken from the interviews concerning the below assumptions from the interview guideline:

II: Knowledge from the reconstruction process must be included in the current planning process for housing. This is not yet fulfilled.

III: The planner must have a clearly defined role throughout the entire planning process, take responsibility for occupiers and ensure adjustment efforts. This has not yet been accomplished.

[18] The planning process for housing reconstruction was partly successful however, had gaps and shortcomings.

The statements in the form of direct quotes are allocated to the following categories:

- B1.A: Unclear landownership**
- B1.B: NGOs taking over control**
- B1.C: Missing/unsuitable master plan**
- B1.D: Lack of building code/regulations**
- B1.E: Relocation did not succeed**
- B1.F: No time for planning**
- B1.G: Community was unprepared**
- B1.H: Bad quality housing**
- B1.I: Additions/modifications are made by the people**
- B1.J: Houses were not occupied**
- B1.K: The poor life in the dangerous coastal area**
- B1.L: NGOs are incapable**
- B1.M: More houses got built than houses destroyed**
- B1.N: There were no assessments done afterwards**
- B1.O: No experience of the institution in charge**
- B1.P: Problems that came with the international helpers**
- B1.Q: Lack of institution/no preparation**
- B1.R: Costs went up**

B1.S: All land is owned by the people

B1.T: Expensive temporary shelters

Some of the categories are rather extensive and are therefore further divided into subsets in the form of CODES.

The evaluation tables show the original 'QUOTE' from the interview as well as the 'SOURCE'. Multiple allocations of quotes to more than one category are indicated in the column 'MA' with an abbreviation referring to the other categories. Example: If a quote under category 'B1.A' has a 'B2.C' in the last column this signifies that this exact quote can also be allocated to the category 'B2.C'; square brackets '[B2.C]' indicate it can be allocated to category 'B2.C' in the broadest sense. Quotes are left in the original state and have not been corrected grammatically in order not to influence the content of the statement. For reasons of practicable handling, a short 'SYNOPSIS' was done by the author, in some instances combining several quotes of the same interview. This synopsis does not show the opinion of the author but rather maintains the opinion of the interviewee.

B1.A: Unclear landownership

Quote	Source	Synopsis	MA
"People come to us sometimes like they want to kill us. Why you didn't build the house, this is my land. But not sure yet this is your land or not."	Hasan, 2016,p.1/§3-5	Unclear land ownership for reconstruction of houses and roads.	
"After the tsunami, it was really flat and no clues at all where the guide lands was. Luckily, we had land office, called 'Badan Pertanahan Nasional' or Land Office. So, they got a data and through, what you call that, coordinates data, this means, here, here, here belongs to Mr. A or Mrs. B, that's one of the most important data recorded by the Land Agency Office. But we have to call them from Jakarta, not from Aceh. So, based on their data and, what do you call that, the [pause] When we purchase the land, we have a document. Land ownership."	Irwanyah, 2016,p.2/§67-72	In order to clarify land ownership and land borders, the data had to be sent from the Land Agency Office in Jakarta. There was no instance in Aceh with this information.	
"So, there are many survivor of this village, they took the basic map from google and then they pick their own land and then they recreate the map that's based on their own land."	Irdus, 2016,p.2/§58f	The village map was reconstructed based on google maps.	B1.Cd
"So, for example in one village there is - before the tsunami there is 3000 square metre or something and then after that is become less than that. For example, maybe only left 1000 square metre. We have a discussion with the community."	Kamaruzzaman, 2016,p.1/§33-35	After the tsunami, land was washed away which led to problems later regarding land ownership.	
"And we agreed where the houses were before and something like that. We have a village planning."	Kamaruzzaman, 2016,p.1/§37f		
"They made an agreement with the village about the land border. So, that's one of the process in the housing planning. The status about land."	Kamaruzzaman, 2016,p.1/§40f		

<p>"[...]after tsunami we had to first make some maps for the reconstruction because before tsunami there is a civil servant making maps and he died in the tsunami. So, I - to be a civil servant and the head of the Bappeda asked me to make - to prepare some maps for the reconstruction, especially for the resettlements, for the new roads and that. We worked closely together with the GTZ [...] of Germany. GTZ support us with some equipment like computer, server, equipment for survey, GPS and some training for the civil servants. So, after that we make the GIS centre. Because before the tsunami Bappeda there is no GIS centre, only two or three staff making maps. They not use the GIS they only use the AutoCAD for the maps because they died and I cannot open the computer because I cannot use the AutoCAD so the GTZ trained us to use the GIS. So, after that we can make some map and we give to the UN, we give to the NGO for them for make planning for the housing."</p>	<p>Permakope, 2016,p.1/§5-15</p>	<p>After the tsunami new civil servants had to be trained to create and update maps as the employee who oversaw the maps died in the tsunami. This was done together with GTZ through bringing in equipment, training staff and building up a GIS centre. The new map then was given to the UN and the NGOs to plan the housing.</p>	<p>B1.C</p>
<p>"[...]we collect the data before because there is no data in the database before. So, we go to the field, take some survey, we making the track for the road. No roads. We take the public surveys like where is the school, where is the hospital before? Because tsunami damaged the whole area so there is no sign. So, we surveyed and we take the point, this is the school, this is the housing. After that we give this to NGOs and UN and the agency from the central government also."</p>	<p>Permakope, 2016,p.1/§20-25</p>		
<p>"Absolute chaos and there was really no coordination amongst anybody at all and the local government of course was completely decimated and anyway not functioning because there had been conflict for how many years? Two years, a military operation from the militants but even before the military operation it was still a very heavy military in Aceh and also the previous governor was put in jail for corruption so there wasn't any transparency or any real functioning local authorities in existence here. So, when all the international NGOs came in they were expecting to work with the local government and it was very frustrating for them that there wasn't anybody really with any capacity here. And also, there was no information. Because say for example like Meraksa the sub-district offices that held information about people was gone. And it wasn't stored anywhere. Nothing on computer at that time, it's just files in an office, all gone. And that is what happened at many places, just no information. They were getting very frustrated about the lack of direction and clarity from the local authorities that had survived."</p>	<p>North, 2016,p.3/§121-132</p>	<p>There was an absolute chaos in Aceh since the local government was not functioning. A lot of the data and information was lost in the tsunami. The NGOs that came in were expecting to be able to work together with the government, which was not the case, and therefore there was no coordination at the start.</p>	<p>B1.Q</p>
<p>"There are organisations that built houses on new land, for the panic of the government not to build in the same village, but actually that encourages the government buying land which is not very tactical because it will involve a lot of money. But some organisations didn't care. They just want to build using their money. But in later states and I interviewed their officers they found that the land provided by the government are not suitable for building. And you can imagine the process of the government buying the land and using their money, using NGO money, charity money, buying the land and a lot of it is just corrupted. And it also slow down the process."</p>	<p>Kusumawijaya, 2016,pp.5f/§216-225</p>	<p>Some organisations waited for the government to first handle land certifications. Later this certification process got abandoned after spending ten million dollars of aid money on it.</p>	<p>B1.E, B1.F</p>
<p>"Hernando de Soto is this economist who wrote about the importance of making financial capital accessible by the poor. And in order to do that you need to capitalise on their land. So, if your land is certified it means you can borrow money from the bank, right? By mortgaging your land or whatever. So, that's how the idea of land certification came about in the head quarter of World Bank. Then wow, that is a good occasion, let's also do certification after the tsunami because that will help eventually the people because if they have their land certified they can capitalise on it. So, this idea of popular capitalisation or popular asset land, Hernando de Soto. It's called 'the magic of capital'. So, I think this is where the mistake is. People burden the process of reconstruction with irrelevant agenda."</p>	<p>Kusumawijaya, 2016,p.6/§233-241</p>		

B1.B: NGOs taking over control

The statements concerning NGOs taking over control are further structured using CODES as follows:

- **B1.Ba Mapping as an instrument of planning**
- **B1.Bb Quality of houses**
- **B1.Bc Responsibility for the outcome of planning**
- **B1.Bd Coordination of help through NGOs**
- **B1.Be Choosing the areas for implementation**
- **B1.Bf NGO's programme for implementation**
- **B1.Bg Modification of houses in the aftermath**
- **B1.Bh Standard for houses**

Quote	Source	Synopsis	MA
CODE B1.Ba Mapping as an instrument of planning			
"So, they have to define land ownership first. Before we have to that... it took a long time. But some NGO just built without having that, that's great problem now. Because it's somebody's house, and then somebody built in their house."	Hasan, 2016,p.2/§58-61	Some NGOs started building without the land certificate.	
"Even though the people that we have bring them together to discuss about the map, what they come up is together. But sometimes in some villages what we have planned here not occur in the field."	Mardhatillah, 2016,p.3/§108-110	The village maps that were done together with the communities and given to the NGOs and agencies doing housing, sometimes were ignored. The reality looked different from what the plans were showing.	
"They built something else?"	Interviewer, 2016,p.3/§112		
"Yes, they don't care about this."	Mardhatillah, 2016,p.3/§114		
"Who is they?"	Interviewer 2016,p.3/§116		
"People who live there. Because sometimes they have to lack their land. You know that? To minus their land."	Mardhatillah, 2016,p.3/§118f		
"Maybe they have land for example, 20 metres. So, they have to give two metres or one metres for the road or drainage or something like that. They don't have enough willingness to do that."	Mardhatillah, 2016,p.3/§123-125		
"At the end, the building of the house and anything is like before. For example, if the house – the front of the house there and then there even though here depend of other cause... Because first of all this village is not based on space planning before, so what have been – after at the time before the tsunami it is also – the repeated again this situation."	Mardhatillah, 2016,p.3/§129-132		
"When we design territory the good one. But when we went to the field, trying to implement it, not implemented. Not at all. This we have to learn something why this can be happen. We learned so many thing at that time."	Mardhatillah, 2016,p.13/§540-542		

CODE B1.Bb Quality of houses

"The donor is, I think now he is not a minister anymore but previously he was the minister. He is a very rich man, has a lot of company when he is also quite famous with his mafia stuff. I mean in the perspective of an activist he is totally a bad person."	Adamy, 2016,p.4/§139-142	The donor has a huge influence on the type and quality of houses.	B1.D
"But then I tried to or me and the team tried to go ahead with the process because we said 'ok, as long he will not disturb the process, why not?' Something like that. So, continue. But yeah, of course he involved with the process."	Adamy, 2016,p.4/§143-145		

"So, the thing is he enforced us, the team, to build asbestos house."	Adamy, 2016,p.4/§146		
"And then we realised that asbestos were constructed as a ceiling, and then this became."	Irwasyah, 2016,p.4/§153f	Due to the time pressure there was no time to check materials regarding safety or construction. This led to bad results and failing. Donors got to choose materials and construction methods and the BRR and the Ministry of Public Work failed to supervise their work.	B1.D
"[...]because everything was priority, [...], we didn't have time to check materials by materials, you know what I'm saying?"	Irwasyah, 2016,p.4/§158f		
"And then one more thing, they use zinc as... What you call that? To cover the roof."	Irwasyah, 2016,p.4/§164		
"We thought assessment that wind blows very high on that shore area or... So, everything, to make it cheap we put all zinc as a roof. So, you know what? When the wind blew, everything was thrown away. I think that's... I don't want to blame the donors, not blame to the donors but I think blaming to the us. Us mean Public Works, whoever worked as a supervisor there. Also, BRR, BRR, Rehabilitation and Reconstruction Board of Aceh, were supposed to supervise the housing project, for example, from the donors."	Irwasyah, 2016,p.4/§168-173		
"Because BRR is like the coordination for the donors so they are not the one who are in charge of the reconstruction – this are the donors. They are more coordinators. BRR taking part for the land reconstruction and then the construction is done by the donor, they get a contractor and so on. So, the standard will be followed."	Kamaruzzaman, 2016,p.6/§253-256	BRR did not have their own standards for the reconstruction of buildings. This was given in the hands of the donors. Hence, in the end it was a mixture of different building codes.	B1.D
"So, the standard for the road construction was followed by the rule of US because[...]"	Kamaruzzaman, 2016,p.6/§260		
"In Aceh, we have American standard for the roads."	Kamaruzzaman, 2016,p.6//§262		
"That's the first US road implementation in Indonesia. So, some of the drainage here that you see is from France, built by JICA, Japan."	Kamaruzzaman, 2016,p.6f/§264f		
"So, the whole planning was given to the donors."	Interviewer, 2016,p.7/§267		
"Yes. That's why we have a fast track. We have fast track to push to finish."	Kamaruzzaman, 2016,p.7/§269		
"Because you know we have a case like the roof is from asbestos, it's not good for health. Because I heard that - it's not my own experience - but I heard they had no coordination with the government so they just built the house. That's the result. So, I think in the future - we hope there is no disaster - but if it happens I think our government already has good experience so they just block and say every party that come to help us we welcome but have to coordinate with the coordination with the government to give what they plan to do, what is their specific field they want to go to in this place."	Zulfisni Meutia, 2016,p.3/§89-95		
"The planning, what I understood, it's really determined by the donors who wants to build this housing complex for example. So, there were no supervision of which standard they have to really follow. For example, for the quality of the materials, for the building codes whether it has to be reinforced so it's withstand the earthquake, so different qualities and different standards. What we see during the rehab recon, and they only set this kind of condition according to their own perspective."	Meilianda, 2016,p.2/§65-70	The donors decided themselves how to build the houses. There was no supervision and no common standard they had to follow regarding the quality of materials or building codes. Everyone used different qualities and different standards according to their own perspective.	B1.D, [B1.H]
"BRR already learned themselves that eventually they coordinated better than before. But it's a bit too late because during the process early or already in the early stage after the tsunami, then the housing was started to build and then without following certain regulations. But then later on I understood that the BRR has put some kind of supervision. Yeah, but it's already half way to go to the end."	Meilianda, 2016,p.2/§74-78		

“We would like to have more houses on stilt [for expected flooding events], but we were late in introducing that type. So the difficulty is to have people appreciating all this concept.”	Kusumawijaya, 2016,p.10/§407f	It would have been good to put more houses on stilts, but this type was introduced quite late so people did not appreciate the concept.	B1.D
“We learn a lot actually before designing it. We visited villages, we talked to people. But of course, you can't - there are other conditions to be considered of course. The condition of post-tsunami situations. We learn about the importance of separating the staircase, so even if we have a semi-detached house you cannot have one stair, you have to have one stair per house. That's important for them. And the stair must be made of the strongest timber.”	Kusumawijaya, 2016,p.10/§417-421		
“The houses in tsunami Aceh are destroyed because of this combination of earthquake and tsunami. Tsunami you cannot do anything for that because it floods but we think that having it on stilts reduces the risk. At least you can go up on the second floor. A lot of people survived on the second floor. And when you have the ground floor empty, it's even quicker for water to go down. So that's why the idea of the stilt houses.”	Kusumawijaya, 2016,p.11/§441-445		
“When UN Habitat was bring the process of reconstruction, design building code for Aceh.”	Purwanto, 2016,p.8/§316f	The building code used in Aceh and Nias was brought in by UN Habitat. The communities decided on the building material and wanted it to be brick because this is what they were used to.	B1.D, B1.F
“So they did the building code. And did they take one they already had and changed it a bit or how did this work?”	Interviewer, 2016,p.8/§319f		
“Yes. Took the existing one from Indonesia, change to the new building code.”	Purwanto, 2016,p.8/§322		
“During the process Acehnese people like to build by brick.”	Purwanto, 2016,p.8/§327		
“Why was this, do you know? Why did they want to do this?”	Interviewer, 2016,8/§329		
“Because of they are used to brick instead of the other materials.”	Purwanto, 2016,p.8/§331		

CODE B1.Bc Responsibility for the outcome of planning

“They [NGOs] can come to BRR directly and give some concept note to us and then they can go. We just make sure what is the process that has been done before want to build the project that they want to build in a certain area. What is the process that have been passed away. If it is anything that has been accepted by the villagers then they can go.”	Mardhatillah, 2016,p.14/§610-613	The BRR gave the process for housing away to the NGOs. It was just checked where they would like to build and how many houses and if the villagers agreed they got the OK to start building.	B1.D
“That's what happened at BRR during Aceh. We coordinate I don't know 600 or 900 organisation local NGOs, international NGOs, and we do the coordination the concept note is part of this coordination but the coordination is also facilitation. If they have a problem then we facilitate how - because at the end all of us have a common goal which is to rebuild Aceh. The difference is of course the way we do things. This is based on each of the organisation mandate, culture, environment and so on. But at least we have a common goal and the coordinator will need to make sure that everyone is moving towards that common goal. So, it happened in Aceh, working with NGOs, international organisations, private sectors, everyone is there.”	Faisal, 2016,p.7/§275-282	While the BRR was coordinating all local and international NGOs in Aceh, each organisation was following their own concept of doing things. The common goal was to rebuild Aceh, the way how to do it was mostly exempted.	B1.D
“Maybe first I think we can't do disaster and then responsibility from other, for example international, local NGOs. They give responsibility for example, give the aid for the Aceh people. And then in April we have BRR, BRR organised about this. Then we have some planning. We have BRR and they work from 2005 until 2009. In the BRR process we have more planning. And then in 2007 we have law regulation in national. 2008 we have national agency, BNPB.”	Sunarzy, 2016,p.1/§33-37	At the beginning Aceh or Indonesia was not ready to deal with a disaster. So at the start the responsibility was held by others as for example international or local NGOs. Later, in April 2005 BRR was put in and they took the planning and organisation over.	

<p>"As far as I know since after the tsunami we kind of have limited coordination from the government initially, but then it was organised by what we call the rehabilitation and reconstruction agency, BRR. But even though it was established, but then the disaster was really huge to deal with in a very short time, but on the other hand there are a lot of... How to say... Helps coming from outside with different agencies and NGOs coming over to Banda Aceh and to help rehab and reconstruct the housings and other infrastructures. What I understood early on that stage the coordination was not really good. So, like the NGOs that wants to build housing immediately, they just directly connected to the district, the village leaders, and asked them to collect the data of how many households and how many families needs to have new houses, and because of this mechanism then there're always some... [chuckle] Background stories behind it which is not really... Is not supposed be that way."</p>	<p>Meilianda, 2016,p. 1/§30-39</p>	<p>After the tsunami there was limited coordination from the government until BRR was implemented. Since the disaster was huge there was a lot of international aid coming in through NGOs and agencies. In the beginning, the coordination was not good. The NGOs wanted to start building houses and just directly cooperated with the communities in the villages. This led to a number of unwanted results. The master plan that was made at the same time now does not match up with the result. The housing was already getting rebuilt at the coastal zone and there was no possibility for the government to change the layout. In the end even more houses than before got built in the dangerous areas right on the coast.</p>	<p>B1.M, B1.F, B1.Q, B1.Cd</p>
<p>"And after a while, BRR has established and has been well-structured, in the internal. So, then all this kind of donation of building houses was coordinated through BRR. But still when we think about early on, at the same time in parallel, the government started to... By the help of other foreign agencies trying to re-plan the master plan of the city. Make the master plan of the city. Which seems to be not really connected with the housing construction because the land use that was set on the master plan was not... So, the housing construction was not obeying the master plan that has been newly set. So, then it means that in reality now, we see that the area, the coastal areas which is supposed to be empty for buffer zone, but then more houses were built even more in quantity than before the tsunami. Yeah so, that's what happened."</p>	<p>Meilianda, 2016,p.1f/§40-48</p>		
<p>"[...]I think, from my opinion it's because there's no immediate implementation of the master plan. So, the master plan was already set, a new master plan was... On the early stage until 2007 or so, there was no new master plan, but then, once the new master plan was released with a decree or something. But it's not immediately effective to the rehab recon process. So, it's not going hand-in-hand. So, I think that's one of the reason as to now what we see, the housing was really spread over the coastal areas."</p>	<p>Meilianda, 2016,p.2/§52-57</p>		
<p>"BRR was actually set the standard and also the building code and NGO and also the donor followed the same standard. And the standard of 36 square metre is actually from BRR. So not to create jealousy among refugees because when the 2005 begin a lot of the NGO was promise to the community they are building 42 square metre and also more."</p>	<p>Purwanto, 2016,p.9/§361-364</p>	<p>BRR set a standard for the size of the houses. They all had to be 36 square metres and the NGOs had to follow this. At the beginning some NGOs promised the people bigger houses so the BRR had to step in to prevent jealousy.</p>	<p>B1.P</p>
<p>"We just used very basic building standard. The buildings withstand a 7 Richter scale and the house space is between 36 square meters and 54 square meters. Only two. The 36 and 54 is very strict. But the 7 Richter scale I can say that we did not have a special effort to check. We just trust the NGO or agency that built houses to comply with that. And I understand that not all of them are following the best way they can, but that was my asset. Hopefully there is no earthquake anymore. But luckily no houses were collapsed during the big earthquake in 2011."</p>	<p>Kuntoro, 2016,p.2/§95-100</p>	<p>The BRR "just used very basic building standard". Houses were meant to be built so they can withstand a 7 on the Richter scale. However, this was not being checked. BRR trusted the NGOs or agencies that they will build the houses according to this. Not all of them followed this standard. "But luckily no</p>	<p>B1.D, [B1.H]</p>

<p>"The 7.0 earthquake, actually we don't have a building set of that. Excuse me for not can answer that question. I don't think that we used that standard if there is any. We just leave it to the agencies that built houses for us to use their own standard. So, the Austria Red Cross they used theirs. And I believe they don't follow that as well. Why? Because it was very costly. If you want to build a house with 7 Richter scale strength then it will cost you a lot. So, I don't push too hard on that because for me you build as many houses as needed and you still have the budget to do that. It was very bad that they come back to me Pak Kuntoro I want to build another 30 houses, 3,000 houses but we don't have the budget. Then I will be at a bad position."</p>	<p>Kuntoro, 2016,p.3/§116-123</p>	<p>houses were collapsed during the big earthquake in 2011."</p>	
<p>"There is a housing working group that's actually helping with the building code and we are combining with the government building codes. We allow - normally safe the children come with their own standard, we have the government, we have the Oxfam for example we have whatever. CRS, Catholic Relief Service, World Vision come with their standard. The standards are all a bit different but as long as they comply with our national standard they will go. The government of Indonesia standard cannot be used because this is the first time, Indonesia got this kind of - it's an 8 Richter scale, it's beyond the standard that we have at that time. And I have to try to accommodate, learn from other experience and do these kinds of things."</p>	<p>Sabandar, 2016,p.4/§145-152</p>	<p>Each organisation came with their own building code. The standard of the Indonesian government could not be used because the earthquake in Nias was an 8 on the Richter scale which was not covered.</p>	<p>B1.D</p>

CODE B1.Bd Coordination of help through NGOs

<p>"We only want to the new condition of the land where our friend from NGO come help and build house for people with no good drainage maybe we tried to build them the drainage, we tried to build facility of water, drinking water pipeline. Because in Public Work I'm one of the managers of drinking pipeline project. This is the problem when we were in some meeting in the governor office the manager of drinking water in Banda Aceh city say with angry why the NGOs, who work with drinking water didn't do a combination with them. Because when they give the pipeline in some area and then the people there will angry, why we have no water there because we have no pipeline. But the problem the biggest primary pipeline to go to this area is broken because of tsunami. We have to prepare to manage the primary or secondary pipeline before we prepare for the pipeline for drinking water to houses. That's a problem."</p>	<p>Yubarsi, 2016,pp.6f/§257-266</p>	<p>Some NGOs built pipelines for drinking water for new villages but did not discuss or coordinate this with the manager of drinking water in Banda Aceh city. In some cases, people got angry because they did not have water even though they got a new pipeline but the connecting pipelines from a higher level were broken so the whole system did not work.</p>	
<p>"After tsunami, there were many NGOs here coming to Banda Aceh and maybe the provincial Public Work knows approximately how many house built in Banda Aceh. Because at that time the coordination is rather a bit confusing. Some NGOs come directly to the community talking to people how many unit house and sometime they just build house for the people because the people is very sad at that time. #00:04:57# They lost their home."</p>	<p>Zulfisni Meutia, 2016,p.1/§22-27</p>	<p>After the tsunami a lot of NGOs came to Banda Aceh and the coordination was a bit confusing. Some NGOs talked directly to the people to find out how many houses are needed and some NGOs just started to build houses straight away.</p>	
<p>"And at that time so many NGOs they go directly, no coordination with the government, they go directly. So maybe at that time our government had no experience about dealing with disaster after disaster. But now I think it's better if we do the better coordination after disaster. So, everything can go bad coordination we know but less coordination the result is not so good. So, I think just like the NGOs, sometimes the NGOs not report what they are doing to the government. Especially here in Banda Aceh to the mayor office. If we doing good coordination, the government will know all, this NGO is doing this here and if they build house, how many house and what kind of house, what is the structure of the house. I think if we have good coordination directly after the disaster it will be better in the house."</p>	<p>Zulfisni Meutia, 2016,pp.2f/§80-89</p>	<p>At that time the government had no experience with disaster. So, a lot of NGOs went into the field directly, without coordination. Some NGOs did not report to the government. An insufficient coordination leads to bad results. If there would have been a better coordination between NGOs and the government regarding the number, the kind and the structure of houses, the houses would be better.</p>	<p>B1.D</p>

CODE B1.Be Choosing the areas for implementation

<p>"Before the BRR established, NGOs and donors were already there so they already see which village they want to work. They already did emergency response."</p>	<p>Kamaruzzaman, 2016,p.2/§65f</p>	<p>The NGOs were already in the city working on emergency response before the BRR arrived in Banda Aceh. They picked their own villages that they would like to reconstruct the houses for.</p>	
<p>"[...]after the tsunami hit Banda Aceh many non-government organisations come here to give their support and help. #00:17:41# And then, I don't know what organisation, they come to our people so they ask, "what do you want to live". Our people say that they need a house, of course there will be a house but the problem - our government have the new master plan of city. Because of the big disaster of course something must change in the planning, in the master plan of the city and we have time to make that. But some of the NGO come and do settlements. That's what you can see in the coastal area maybe we have the settlements here. But we try to do the new settlements in the coastal area with a different construction. We have maybe higher, that's why. But of course, I told you it's not easy how to move and make a new settlement for our people. I think that's not only here, maybe in other countries or provinces."</p>	<p>Yubarsi, 2016,p.2/§59-69</p>	<p>After the tsunami hit Banda Aceh several NGOs came to help. The government had a new master plan for the reconstruction of the destroyed villages and areas but instead some NGOs just started to rebuild settlements where they used to be. Now there are still settlements in the coastal area maybe with a different construction, but they are still there. It was too hard to move people out of these areas.</p>	<p>B1.E</p>
<p>"Actually, when BRR established in 2005 we didn't finish to make the new master plan of city. That's why we do that together. As I told you before, especially about the settlements it is too hard to do that, this is the problem. In our master plan, maybe about 500 metre from the coastal area maybe used not for the settlement maybe for other. After that maybe settlement about 1 kilometre far from coastal area. Our new master plan. But the problem after disaster, before we finished the master plan NGO come and build the house in coastal area for people. We can say that now. Break it after that we can't do that."</p>	<p>Yubarsi, 2016,p.6/§251-257</p>		
<p>"The big ones [NGOs] also almost claimed area, this is Care's area, this is Oxfam's area which is terrible actually."</p>	<p>North, 2016,p.6/§228</p>	<p>Some of the big NGOs claimed land to be their land.</p>	
<p>"They [Uplink] came in to various villages met with a few people that were there and [?] that if the village agreed to have assistance from them which could be anything from a tooth brush to a temporary cooker or something they could not have any assistance with any other organization. That was the deal and they made people sign a contract which was ridiculous, absolutely ridiculous. At the same time all the other NGOs, the big ones, were now beginning the cash for work programmes because one thing that everybody needed of course was money. I am not saying that the cash for work programme was particularly good or whatever but it was a means at least of getting some money to people."</p>	<p>North, 2016,p.6/§234-241</p>		

CODE B1.Bf NGO's programme for implementation

<p>"All these agencies were in there and they all were doing different things and they all had different programmes. For example, if you had an Oxfam house you might get some livelihood assistance as well. If you had a - I can't say that this is what they had I just want to demonstrate to you the difficulties there was. If it was a World Vision house it was a very different design of a house. The government had already set a ceiling of the amount of money to be spent per house which I think was - I think it started at 36 Million Rupiah a house but after that it went up."</p>	<p>North, 2016,pp.6f/§263-269</p>	<p>All the NGOs and organisations had their different programmes and did their own thing. For example, Oxfam built houses coupled with livelihood assistance while others did not offer this. All the houses had different designs. The government just set the</p>	
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<p>"I think [Indonesian] 36 square meters per house. But some of those houses included a bathroom and some of them didn't. Two bedrooms. Some included a kitchen area, some didn't. So, there was all sorts of differences between the houses and as I said, as well as the housing came other programmes like livelihood, small business projects. Some got water and sanitation, some didn't. So, all different and even in one village, was Deya Glumpang they had the [?] they had UN they had Oxfam - one village and they had four agencies all building different houses, it was crazy."</p>	<p>North, 2016,p.7/§294-300</p>	<p>maximum amount of money that could be spent per house.</p>	
<p>"At the beginning Oxfam would like to involve community participation. So, Oxfam maybe construct the structure and then the community or the owner, the villagers continue build until complete. But while other country like Turkey come and built completely one. So, people more interested in this compared to Oxfam strategy at that time."</p>	<p>Haiqual, 2016,p.1/§31-34</p>	<p>Each NGO had their own strategy developed from previous experiences. Participation was often not wanted by the community in Aceh. Instead, they preferred options where they got a whole house ready to move in.</p>	<p>B1.D</p>
<p>"Oxfam go here and then try to develop their programme from Sri Lanka. [Indonesian] Just for help the starter for housing, not complete housing. Just structure, in Sri Lanka. He want to replicate in here."</p>	<p>Haiqual, 2016,p.1/§16-18</p>		
<p>"[...]at the beginning Oxfam's plan is good, participatory community involvement to build the housing. But the intention is not to build a permanent house with concrete but semi-permanent - you know semi-permanent - some concrete, some timber woods. So, they start in several village in Banda Aceh and also in Aceh Besar like Lampaja [?] Lambatu [?], mostly in Aceh Besar district. While at the same time another donors for example, Turkey they come and support completely all permanent, I mean concrete based, very good housing. This makes the people jealous. They don't want to receive Oxfam because only semi-permanent, the people need to work but Turkey came and built one hundred percent very much. That is a problem."</p>	<p>Haiqual, 2016,pp.1f/§38-45</p>		
<p>"So, at that time between Oxfam and for example Turkey different strategy. Oxfam would like to conduct the community-based housing construction but the Turkey donor-driven or contractor-based, just hire contractor and build."</p>	<p>Haiqual, 2016,p.2/§50-52</p>		
<p>"One-door coordination among donors because if donor come and build this kind and that it makes so many different style of houses and become people jealous of each other. 'Oh, my friend get better house, me not good'. But if all donor coordinate by one organisation and build all same to avoid that jealous among the people that is what he mentioned about lessons learned from what he was doing."</p>	<p>Haiqual, 2016,p.4/§152-156</p>		

CODE B1.Bg Modification of houses in the aftermath

<p>"Because after ten years later we see so many modification. Maybe only five percent of the houses were not modified. I can say 95 percent are modified because most of them built like, for example they just installed the light plywood at the back, [?] the kitchen or maybe just put a very low zinc sheet to make a barrier to give more function and space for them because the core house normally it consider of two bedrooms and then one living room and then just very small space that maybe the overseas people can use this as a kitchen because when I did my PhD in England the house was very small and then some of them only four times four and then everything is in them like studio room. But in here it is not working. So, people will not be satisfied with that. So that's why around 95 percent of people add some more things to use it as the space."</p>	<p>Sari, 2016,p.1/§14-22</p>	<p>Almost all houses have been modified by now [2016]. The original core houses are too small so people make additions to them. Every NGO had their own template, also the BRR had one. There are usually three or four templates that people can pick from, but it is only 36 square metre for each house.</p>	<p>B1.D, B1.I</p>
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<p>"For the core house as I know that they have their own template. For example, BRR that is the government side who supply the house. They have the template. For example, they have up to three or four templates and then people can choose but most of them the size is 36-meter square, two bedrooms and one living room. So that's why actually this is not enough but people cannot say I have larger because that is the only one that they are providing."</p>	<p>Sari, 2016,p.1/§32-36</p>		
<p>"So mostly 75 percent say we are happy with the houses but after ten years later what we have seen so many modifications so it means maybe the 36 meter square houses doesn't meet their need to accommodate their daily activities so that's why they built some more spaces for them."</p>	<p>Sari, 2016,p.3/§102-104</p>		
<p>"It is also various the one that has small income they just install the very light materials but the one who is rich – and then the plot land is large, so they built larger house. So, the core house is just very small and then the modification is very big."</p>	<p>Sari, 2016,p.3/§104-107</p>		

CODE B1.Bh Standard for houses

<p>"So, in the housing planning for example ADB or Safe the Children wants to build a house I ask them to discuss themselves and some the government house we have to fix at the working group meeting first and then discuss. Because you cannot get the house which is 60 million here and 30 million here so I apply one standard. You have to maintain the fairness in the community because if you want to bring your flag and you build this actually you ruin the community so I solved this issue before they were going down. When it starts initially, there are NGOs that start to build like this but then when I came and tell this is the fault development issue, very much. It's a poverty. You cannot give and then house is individual entity. You bring to the family 60 million the other will get 30 million. It creates social unfairness, social jealousy. So, you have to see so don't follow this. Then it's becoming standardised even going down from the standard of Aceh, getting fund."</p>	<p>Sabandar, 2016,p.5/§191-201</p>	<p>In the beginning, each organisation did their own approach with their own standard so some houses got built for 30 million Rupiah while others cost 60 million. Therefore, there had to be one standard to maintain the fairness within the community and avoid jealousy. The standard in the end was lower than the standard in Aceh.</p>	<p>B1.D</p>
<p>"It is development perspective. If you are taken from the reconstruction prospective for example what China doing is now they are taking the community out and they build very good house that is not the case with Nias case. I think Nias case you are given four years you have to also do the construction but you have to improve the social fabrics not destroy it so a combination of development approach and reconstruction approach happening in that situation."</p>	<p>Sabandar, 2016,p.5/§206-210</p>		

B1.C: Missing/unsuitable master plan

The statements concerning missing/unsuitable master plan are further structured using CODES as follows:

- B1.Ca Infrastructure
- B1.Cb Absence of master plan
- B1.Cc Village planning
- B1.Cd General

Quote	Source	Synopsis	MA
CODE B1.Ca Infrastructure			

“Maybe now you cannot see that we raised, because they already built the road, and before we built there is no road, so we can see, like, it’s very high above the ground. But now you cannot see any more, because all the people are, what do you call it? Putting the soil, so now it’s filled.”	Hasan, 2016,p.4/§161-164	In some places the roads were planned and put in after the houses were already built. Mainly as a consequence of time pressure.	
“Actually, some of the housing, they do the road first, but not when we did that, because they need the house, actually, right? So, the house is the priority.”	Hasan, 2016,p.4/§174f		
“So after the design of the house the community start to thinking to build the infrastructure, like road access and drainage and everything to make the village complete because the ADB funding is including for the whole infrastructure.”	Irdus, 2016,p.4/§140-142	The infrastructure was planned on the spot after the design of the houses was decided on.	

CODE B1.Cb Absence master plan

“The difficulties is the NGO has a limit of time let’s say 2005 to 2006. But at that time Banda Aceh for spatial case we don’t have a spatial plan at that time. We have to review our spatial plan that have to input the disaster and mitigation plan. Takes three years, 2006, 7, 8 and 2009 we have a spatial plan.”	Bahagia, 2016,p.4/§145-148	After the tsunami Banda Aceh did not have a spatial plan and the time of the NGOs was too short to work on a master plan first. Now, since 2009 there is a spatial plan for Banda Aceh.	B1.F
“I think we have to think it because we every five years we have to evaluate that our spatial plan. For example, last year is the fifth year of our spatial plan so we have to revise it someday, of course.”	Bahagia, 2016,p.5/§200-202		
“At that time the evaluation even on the what we call on the project on the case by case basis depending on which area they are working on of course everything is done in the concept of what we call the build back better. So that is basically the whole theme of reconstruction. Now in some of the project the DRR, disaster risk reduction also being implemented. In one of the place for example in Banda Aceh the escape hill being built so in the case that the tsunami come again then there is a place that people can go and then utilize this to save lives. And also, some of the project related for example mangrove, which is also and then then I believe there is some as well related to the drainage system for managing flood. But most of the project, I mean the project is not only about infrastructure various kind including the training and so on.”	Faisal, 2016,p.2/§63-71	Disaster risk reduction was done on a case by case base. Escape hills, mangrove planting, a drainage system for flood control and training were some of these projects that got implemented.	
“[...]when BRR make a blueprint but not here, in Jakarta the blueprint is not too comfortable in the field in Aceh. So maybe they are not too make assessment or something like survey like research, I don’t know. But when combine the blueprint and the field is a lot of not comfort when we offer in the field. So, the mitigation that they planned, whether they plan help to change when we make offerly[?] In the field so BRR make the new plan but not more just one maybe so about the mitigation just in Banda Aceh, I speak just in Banda Aceh because I responsible in Banda Aceh. In the generally Banda Aceh city have the escape building as the primary escape solution. The escape building is just access in the escape. I don’t know in the others, they are generally like that.”	Indra, 2016,p.1/§29-36	The BRR made a blue print or master plan in Jakarta. There were maybe no assessments or surveys or any research in the field for this. Hence, this blue print was not being accepted in Aceh. Thus, BRR changed the plan and let go of the original blue print. The mitigation options that got included now were only escape buildings, the aim was to make it possible for people to escape in the case of a future disaster.	

CODE B1.Cc Village planning

“At that time BRR start with the bottom-up. They go to the village and invite the people and then make village planning what we call a village planning because we don’t have at that time a spatial planning. So, they sit together and asking about where is the road here, how about the land, how about the social building and other things? Takes same time takes six months because a lot of people with a lot of idea, takes a lot of time.”	Bahagia, 2016,p.4/§148-152	Since there was no spatial plan for the city, BRR used the instrument of village planning, where they planed each separate village individually together with the community.	
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<p>"This is the planning for the village. So, this is from the community give a proposal. This is the process of verification for who will get the house. First the villagers give kind of a proposal or something like that to KP4D, Committee for reconstruction in the village. And then they sit together with the head of the village, they will verify the data."</p>	<p>Kamaruzzaman, 2016,p.2f/§86-89</p>	<p>The village planning was done in a bottom-up process. The villagers gave a proposal about how they would like to have their village to be rebuilt and about who should get a house and then this was discussed.</p>	<p>B2.A</p>
<p>"And in Banda Aceh there is an example of good planning of housing, resettlement of housing. It's in Lambung, Lambung village in Meraksa sub-regency. It is near Ulee Lheue, near the beach. There is - the community of the village they really need to rebuild their home and so they plan. They do the land acquisition, so the road is arranged good and the house. But in the other village when the community "oh I need a house immediately" they not patient to wait. So, the resettlement of the house is not so good. Just follow the old land. The road is not straight, not block and block. But in Lambung, maybe you can visit Lambung village, you can see where the people have patience to wait they do the acquisition, the village planning and the house is very good arrangement there."</p>	<p>Zulfisni Meutia, 2016,p.1/§27-35</p>	<p>In villages where the community was not patient and wanted to have houses as fast as possible, the resettlement of the houses turned out not as good. The construction follows the old land, the roads are not straight. Where the people where patient the village now has a much better arrangement.</p>	<p>B1.F, B1.H</p>
<p>"At that time actually the government asked the people to do the village planning. But sometime the planning that they made sometime they can follow it but sometime they are not patient. Maybe the fund is not go directly, so they feel it is taking a long time to do the village planning first, to wait for the government. So sometimes the ideal is not happen. But I know that they have doing the village planning. Especially the village near the shore, the beach they doing the good village planning."</p>	<p>Zulfisni Meutia, 2016,p.2/§50-55</p>		
<p>"I think the procedure is already good, first the government ask them to do the village planning so they know what they need because they are doing the planning, the community after the disaster. They are doing the planning by their own so they know what they need and they learn how to make a planning. Of course, the government accompany them to do the planning. Actually, after the village planning, they know what they need and they finish the planning, after that the government will know what to have to do with the planning. So, I think the people learn a lot by doing their own planning. I think before they are not doing that. We doing the meeting in the beginning of the year for the activity the next year so we invite the people to make some proposal what they need to do for their village. But they just do the title of the project something like that, they are not doing the planning."</p>	<p>Zulfisni Meutia, . 2016,p.2/§62-71</p>		
<p>"The way to rebuild a village depends on people. Do they want to get a village, just look like before or they want to consolidate their village? #00:04:34# We have two things. For example, we asked the people do you still want the village to look like before or do you want to have something different? For example, a wider village road or you want to have a market or you want to have a mosque or you want to have a village planning or whatever. And if they say yes, yes, yes, yes, yes then we need the land. So that means that they have to suffer. They lose their land or part of their land to have this facilities in the village. And we ask some donor countries to support this approach meaning a donor country like the United States with their USAID, we ask them to provide some fund to pay consultant to help us in helping these village people. To come up with the village map. So that's the approach. And I told the village people, before they have a village map then I will not rebuild your home, let another donor agency rebuild houses for you. Whether you want your village look like before or have a different layout or whatever, you need a village map. This village map should be signed by all the village people because that's the only document that will be used as a reference to rebuild the village."</p>	<p>Mangkusubroto, 2016,p.1/§21-34</p>	<p>The people in the villages decided how they want their village to be rebuilt. If necessary, it got rebuilt in the exact same way as before the tsunami. The villagers did the village map and later the reconstruction was done according to this map.</p>	

<p>“So, USAID hired for us, not going through us, they hired for us a number of consultants and with my directive signature this consultant is responsible for these five villages in that area, another consultant responsible another village in some other area. So, the approach is they build the previously existing village.”</p>	<p>Mangkusubroto, 2016,p.1/§38-41</p>		
<p>“But I can say that 99 percent, I mean 95 percent is basically rebuilding of villages or - well in general I use the term villages, ok? For those in the city I use the term villages. Because they are the smallest unit of houses. 95 percent that used to be there before in which area we built the village.”</p>	<p>Mangkusubroto, 2016,p.2/§49-52</p>		
<p>“If this is a village, the boundary was actually not seen anymore. So, people have to meet and have their own plot for example something like this. But maybe some the tree and then maybe toilet located like this. We make temporary village plan. We call it village planning. This is very key. We ask the community where to put the school and the clinic, the clinic consist not only one village but maybe some other village. And then we put something repeat and also, we plan the road according to the community. And this is the whole village planning.”</p>	<p>Purwanto, 2016,p.2/§59-65</p>	<p>The communities of each village did the village planning themselves. There was no general master plan for the city. The communities decided were to have a road, were to have a school, a clinic and so on. Everything got rebuilt as it was before.</p>	
<p>“Before we start the reconstruction, there was already a blueprint. This blueprint outlined what need to be done during the period of reconstruction. The BRR is the organisation which is assigned by the government of Indonesia, a government agency who do the overall coordination as well as the implementation and validation of construction. Actually, we used the blueprint as the planning [?] however, as like in any disaster the planning is being developed during the emergency period some data will need to be adjusted, some of the information will need to be gathered more. So, then I think in the middle of the reconstruction after two years, if I am not mistaken we do the adjustment of the blueprint to really capture the need of the people during the period of reconstruction.”</p>	<p>Faisal, 2016,p.1/§18-26</p>	<p>Before the reconstruction began there was a blue print that outlined what needed to be done. At the start this blue print was used, however, as the emergency phase went on the planning had to be adjusted according to the data and the information on the site. Two years into the reconstruction these adjustments were made.</p>	
<p>“First thing doing reconstruction was actually Bappenas, national planning board was actually make the blueprint. But when we are coming to Aceh, all our men was actually refuse to build the housing because of land dispute. Because land actually was away and there is no boundary or exact map of... for example, tsunami was actually affect one to three kilometre, 800 kilometre long. And there is no boundary and also trace of land.”</p>	<p>Purwanto, 2016,p.1/§27-31</p>	<p>At the start, the national government [Bappenas] did a blueprint for Banda Aceh. When they came to Aceh they could not implement this plan since all the boundaries were gone and there were no detailed maps of the area.</p>	
<p>“[...]the government that panicked, that want to free two kilometres of the coastal areas not to be built and our approach is really to get people to go back to their original villages. But it is not that we don't agree that you need to limit construction but that for the future.”</p>	<p>Kusumawijaya, 2016,p.1/§16-19</p>	<p>The government wanted to implement a two kilometres no-building zone. This cannot be done all at once and in a situation like this. When the government realised that they would have to move 20,000 families they eventually did not go ahead with this idea.</p>	<p>[B1.E]</p>
<p>“But you cannot impose that now. And actually, as the government itself eventually realised if they what to impose that just immediately after the tsunami they will have to remove 20,000 families. So that's why eventually the government did not go ahead with that idea, free the two kilometres' zone from the coast.”</p>	<p>Kusumawijaya, 2016,p.1/§20-23</p>		
<p>“But in Aceh at that time, we insist that people go back to their initial villages, which is in our case 23 villages. We knew it was unrealistic to free two kilometres' free zone, so that's why we move very quickly. We ignored the government guideline because we know that the guideline will be somehow be abandoned. Because we didn't panic.”</p>	<p>Kusumawijaya, 2016,p.1f/§41-45</p>		

<p>"Officially at the national level conducted by our national planning agency the Bappenas [?] they made a master plan for the reconstruction of Aceh and Nias. Aceh first of all, because Nias was hit by an earthquake in the month of March. So, the master plan at the beginning just covered Aceh. But later on, when I moved to Aceh, I was assigned as the head of the reconstruction agency in the end of April, they put Nias as well. But Nias is very rough. This becomes the master plan of the Aceh and Nias reconstruction. But once I was there in Aceh and try to study the master plan, I don't see that the master plan was well prepared. That's understandable because how do you prepare a master plan of a coastal area that span more than 800 kilometres of the Sumatra Island, Simuelue Island, another two islands smaller than that. And then later on with Nias Island. So basically, I did not use that master plan as my reference. So, I make my own master plan and basically my master plan is a very - my term is quick and dirty. Because I had to move very fast."</p>	<p>Kusumawijaya, 2016,p.1/§4-14</p>	<p>The national Bappenas made a master plan for the reconstruction of Aceh and Nias. Nias was added later, since the earthquake only happened in March 2005, so it was very rough. Since this master plan was done from Jakarta and not in the field it was not being used later. As a consequence, a new master plan was being made which was a quick solution because everything had to happen fast.</p>	
<p>"The maximum of length of people to live in a tent is not more than a month. If you ask them to stay for more than six months you can imagine what kind of, what opposition they will give you. Whatever you do will be wrong."</p>	<p>Kusumawijaya, 2016,p.1/§15-17</p>		
<p>"So there are many survivor of this village, they took the basic map from google and then they pick their own land and then they recreate the map that's based on their own land."</p>	<p>Irdus, 2016,p.2/§58f</p>	<p>The village map was reconstructed based on a google map.</p>	<p>B1.A</p>

CODE B1.Cd General

<p>"Our plan to - I tried to remind that the first three months after the tsunami we have a blueprint from Bappenas [Indonesian Ministry of National Development Planning], Bappenas is the planning agency in central government. And I join with them before I work in Public Work in provincial. We have a plan that at two-kilometre zone there is no building. It's good because we also learn from our sister city in Japan they also move all community to the hill. I think that's a good idea and also all the public facilities like hospital, power plants and other things let's say governor's office move to more the inland. But it's not happen at that time, I don't know why because at that time I am not first person that can make decision. But I know we have a good idea, we have a good plan that time but they not follow that plan. I mean the BRR. In my mind at that time it's good that our people in more safe living in inland area. Even in Aceh Besar it's ok. We can work together with Aceh Besar that's our neighbour and we can share the facilities, water supply, also solid waste and other things that we can share, it's ok. But decision is not good enough I think."</p>	<p>Bahagia, 2016,p.6/§230-241</p>	<p>The people that got houses close to the coast also became the owners of the land. BRR decided to not go with the master plan for Banda Aceh that already existed.</p>	<p>B1.K</p>
<p>"If you saw the spatial plan it's always, not always, you can see that in the north side of our city is green, so we start to start."</p>	<p>Bahagia, 2016,p.5/§215f</p>		
<p>"And again, takes time and takes money to buy the land from the private, from the community. Every year we have to buy about two or three hectare that's quite a lot of money. But we have to buy. Otherwise we lose a chance to plant mangrove or something like this. So, it's still, ya."</p>	<p>Bahagia, 2016,p.5f/§220-223</p>		

<p>"[...]after tsunami we had to first make some maps for the reconstruction because before tsunami there is a civil servant making maps and he died in the tsunami. So, I - to be a civil servant and the head of the Bappeda asked me to make - to prepare some maps for the reconstruction, especially for the resettlements, for the new roads and that. We worked closely together with the GTZ [...] of Germany. GTZ support us with some equipment like computer, server, equipment for survey, GPS and some training for the civil servants. So, after that we make the GIS centre. Because before the tsunami Bappeda there is no GIS centre, only two or three staff making maps. They not use the GIS they only use the autoCAD for the maps because they died and I cannot open the computer because I cannot use the autoCAD so the GTZ trained us to use the GIS. So, after that we can make some map and we give to the UN, we give to the NGO for them for make planning for the housing."</p>	<p>Permakope, 2016,p.1/§5-15</p>	<p>After the tsunami there were no maps existing since the civil servant who was in charge of the maps died in the tsunami. So as a first step maps had to be made. This was done together with GTZ in training staff and building up a GIS centre. This map was given to the UN and the NGOs to plan the housing.</p>	<p>B1.A</p>
<p>"[...]we collect the data before because there is no data in the database before. So, we go to the field, take some survey, we making the track for the road. No roads. We take the public surveys like where is the school, where is the hospital before? Because tsunami damaged the whole area so there is no sign. So, we surveyed and we take the point, this is the school, this is the housing. After that we give this to NGOs and UN and the agency from the central government also."</p>	<p>Permakope, 2016,p.1/§20-25</p>		
<p>"But I think the rehab recon in Higashimatsushima better from Banda Aceh city because in Higashimatsushima city before they make the housing, the building they make the infrastructure. They make the roads, the drainage, the line for the gas, line for the electricity. They make the good maps before implementing the planning. Why, because Japan has good data. After tsunami, they in they only took data from the central government and they use the central data to make the planning again after tsunami."</p>	<p>Permakope, 2016,p.8/§317-322</p>	<p>During the reconstruction in Banda Aceh the houses were built first and then after this the infrastructure was put in, including roads, drainage, gas lines and electricity. In Japan this was done better because they made good maps before they implemented the planning. Banda Aceh did not have good data.</p>	<p>B1.F</p>
<p>"And it was east wind season. It is the rainy season, really strong winds. The NGOs had no idea about tides, cause these were coastal villages – high tide, low tide. We had Oxfam building houses in the sea because they researched it when it was low tide. And then we came past when it was high tide."</p>	<p>North, 2016,p.4/§153-156</p>	<p>Some NGOs built houses during low tide and then during high tide the houses were flooded or washed out to sea. The NGOs were not used to working in coastal areas like this and yet, they did not do examinations or listen to locals.</p>	<p>B1.L</p>
<p>"Oxfam built house in Meraksa, you know, Deyah Glumpang. They build and then after a month high tide, half house flooding."</p>	<p>Istens, 2016,p.4/§158f</p>		
<p>The works, materials, everything gone out to sea... That was the beginning of the most ridiculous things, there were many others. And because also they wouldn't believe us. I'm like, you know I know, I've lived here for a long time, I know the situation. They weren't even looking because it never occurred to them that there are tides even. You know, these people aren't used to work I guess on coastal areas like this and a lot of the areas like Ulee Lheue there was a lot of land lost as well.</p>	<p>North, 2016,p.4/§161-166</p>		

<p>"As far as I know since after the tsunami we kind of have limited coordination from the government initially, but then it was organised by what we call the rehabilitation and reconstruction agency, BRR. But even though it was established, but then the disaster was really huge to deal with in a very short time, but on the other hand there are a lot of... How to say... Helps coming from outside with different agencies and NGOs coming over to Banda Aceh and to help rehab and reconstruct the housings and other infrastructures. What I understood early on that stage the coordination was not really good. So, like the NGOs that wants to build housing immediately, they just directly connected to the district, the village leaders, and asked them to collect the data of how many households and how many families needs to have new houses, and because of this mechanism then there're always some... [chuckle] Background stories behind it which is not really... Is not supposed be that way."</p>	<p>Meilianda, 2016,p.1/§30-39</p>	<p>After the tsunami there was limited coordination from the government until BRR was implemented. Since the disaster was huge there was a lot of international aid coming in through NGOs and agencies. At the start the coordination was not good. The NGOs wanted to start building houses and just directly cooperated with the communities in the villages. This led to several unwanted results. The master plan that was made at the same time now does not match up with the result. The housing was already getting rebuilt at the coastal zone and there was no possibility for the government to change the layout. In the end even more houses than before got built in the dangerous areas right on the coast.</p>	<p>B1.Bc, B1.F, B1.Q, B1.M</p>
<p>"And after a while, BRR has established and has been well-structured, in the internal. So, then all this kind of donation of building houses was coordinated through BRR. But still when we think about early on, at the same time in parallel, the government started to... By the help of other foreign agencies trying to re-plan the master plan of the city. Make the master plan of the city. Which seems to be not really connected with the housing construction because the land use that was set on the master plan was not... So, the housing construction was not obeying the master plan that has been newly set. So, then it means that in reality now, we see that the area, the coastal areas which is supposed to be empty for buffer zone, but then more houses were built even more in quantity than before the tsunami. Yeah so, that's what happened."</p>	<p>Meilianda, 2016,p.1f/§40-48</p>		
<p>"[...]I think, from my opinion it's because there's no immediate implementation of the master plan. So, the master plan was already set, a new master plan was... On the early stage until 2007 or so, there was no new master plan, but then, once the new master plan was released with a decree or something. But it's not immediately effective to the rehab recon process. So, it's not going hand-in-hand. So, I think that's one of the reason as to now what we see, the housing was really spread over the coastal areas."</p>	<p>Meilianda, 2016,p.2/§52-57</p>		
<p>"Actually, they [Oxfam, UN Habitat] make an adaptation consider for the future disaster like earthquake. So, they design the house for earthquake proof until certain Richter scale. But not for tsunami because some built again near the coast. [Indonesian] They tried to adapt with the future disaster, especially the earthquake. But not for tsunami because they know that a tsunami very strong, the houses cannot stand for this. But earthquake yes, evacuation yes."</p>	<p>Haiqual, 2016,p.3/§107-111</p>	<p>A future tsunami was not an issue in reconstruction for some NGOs. Settlements got rebuilt near the coast in the hazard prone area. Also flooding was not anticipated in the design. There was no time to plan or design options for this. The priority was to get people into a house as fast as possible.</p>	<p>[B1.D], B1.H</p>
<p>"Not anticipate for flooding for Oxfam design. So, I think mister Haiqual pointed about the - you know at that time the people need a housing quickly as possible, that is their intention. While other donor waiting, design. But Oxfam tried to support as quickly as possible so that the people can live in normal stage. This is the intention. So that's why they cannot discuss about the design for flooding. But how to make people can life in the permanent house. Because they want to bring people from the shelter to the permanent house. That is the intention. Maybe not much for anticipating another disaster like flooding. But other donors yes."</p>	<p>Haiqual, 2016,p.3/§119-125</p>		
<p>"[...] there are a lot of NGOs came so there is no really good coordination about it. NGO worked alone and with the government there is not so good coordination as well."</p>	<p>Mardalena, 2016,p.3/§106-108</p>	<p>A big number of NGOs came into Banda Aceh which made it difficult to coordinate them. Some NGOs worked for themselves and did not coordinate with the government.</p>	

<p>"I came there and then I start to do my planning because there is no planning. I have the Bappenas planning but because Nias earthquake just came on the 28th of March, that was 18 days before the agency was inaugurated. That was two days before the master plan - if you have seen the master plan of Bappenas. So actually, they are not in the master plan of Bappenas. So, I came there and see no plan, no document at all, I saw the master plan given by the Bappenas, no point of using it because there is no Nias there yet. They only put in the last days Nias and they put because the president wants to launch the initiative on 16th of February. So that's the start. I said, "any direction?", Pak Kuntoro said "I cannot give you any direction, I don't know either". So, ok I start to do my planning myself. But I cannot do a lot of planning[...]"</p>	<p>Sabandar, 2016,p.1f/§36-45</p>	<p>For Nias there was no planning to start with. The master plan from Bappenas did not include the Island because it was done so late, so the plan could not be used. At the same time there was no time to do a planning first in the field.</p>	
<p>"90 percent of the buildings collapsed. The schools, everything collapsed. Wherever I go it's a ruin. How can I start. No planning."</p>	<p>Sabandar, 2016,p.2/§50f</p>		
<p>"And people start to get high expectation because now the BRR is there and they bring money and they can start to work but how can you start? There is no planning, right? Then I start to have people come with their high expectations, the first months, second month, third month, they don't see progress. They start to do the demonstration."</p>	<p>Sabandar, 2016,p.2/§51-55</p>		
<p>"My planning time is very - I don't have time to plan. And then I have to plan on every day basis because if you don't spend the money people will come and ask why don't you spend the money."</p>	<p>Sabandar, 2016,p.2/§57-59</p>		
<p>"I won't repeat the Bappenas planning - you know Bappenas. When that happens you actually do the planning on the ground for this reconstruction. Don't do the planning from Jakarta. You are losing many months. On Nias Island we were losing quite a lot of months at the beginning because I don't have planning materials. This is important."</p>	<p>Sabandar, 2016,p.7/§258-262</p>		

B1.D: Lack of building code/regulations

Quote	Source	Synopsis	MA
<p>"But not after the tsunami, you don't have that draft really..."</p>	<p>Hasan, 2016,p.8/§337</p>	<p>There was no building code for Band Aceh when the reconstruction was done.</p>	
<p>"So that's how you know when you see the houses, many models, many many kind of materials. It's all different."</p>	<p>Hasan, 2016,p.8/§339f</p>		
<p>"The donor is, I think now he is not a minister anymore but previously he was the minister. He is a very rich man, has a lot a lot of company when he is also quite famous with his mafia stuff. I mean in the perspective of an activist he is totally a bad person."</p>	<p>Adamy, 2016,p.4/§139-142</p>	<p>The donor has a huge influence on the type and quality of houses.</p>	<p>B1.Bb</p>
<p>"But then I tried to or me and the team tried to go ahead with the process because we said 'ok, as long he will not disturb the process, why not?' Something like that. So, continue. But yeah, of course he involved with the process."</p>	<p>Adamy, 2016,p.4/§143-145</p>		
<p>"So, the thing is he enforced us, the team, to build asbestos house."</p>	<p>Adamy, 2016,p.4/§146</p>		
<p>"And then we realised that asbestos were constructed as a ceiling, and then this became..."</p>	<p>Irwanyah, 2016,p.4/§153f</p>	<p>Due to the time pressure there was no time to check materials regarding safety or construction. This led to bad results and failing. Donors got to choose materials and construction methods and the BRR and the</p>	<p>B1.Bb</p>
<p>"[...]because everything was priority, [...], we didn't have time to check materials by materials, you know what I'm saying?"</p>	<p>Irwanyah, 2016,p.4/§158f</p>		
<p>"And then one more thing, they use Zinc as... What you call that? To cover the roof."</p>	<p>Irwanyah, 2016,p.4/§164</p>		

<p>"We thought assessment that wind blows very high on that shore area or... So, everything, to make it cheap we put all zinc as a roof. So, you know what? When the wind blew, everything was thrown away. I think that's... I don't want to blame the donors, not blame to the donors but I think blaming to the us. Us mean Public Works, whoever worked as a supervisor there. Also, BRR, BRR, Rehabilitation and Reconstruction Board of Aceh, were supposed to supervise the housing project, for example, from the donors."</p>	<p>Irwansyah, 2016,p.4/§168-173</p>	<p>Ministry of Public Work failed to supervise their work.</p>	
<p>"So it's already constructed, 153 houses without a kitchen. And then there is a complaining from the females say that when you take a decision to choose the design there is no opinion from female side. So, no kitchen."</p>	<p>Irdus, 2016,p.3/101-103</p>	<p>Houses came without kitchens. The design was discussed with the community but there were no female community members involved. The area was too devastated after the tsunami so most women were staying outside the area and were not involved in any decisions.</p>	
<p>"So after the building of the houses here started, the process started and the there was an issue that came up, something about feminism since the house doesn't have a kitchen."</p>	<p>Irdus, 2016,p.3/§98f</p>		
<p>"After tsunami this area is empty, almost all the houses are destroyed, it's clear. No building. So, there is no people or anything here. So, the people from Kampung Pande they maybe move to the relatives or somebody, so when they made a meeting here they were like a base camp so ADB and some of the males. Most of the community who join the meeting is male. There is no woman. It's difficult to invite the women at that time."</p>	<p>Irdus, 2016,p.3/§109-113</p>		
<p>"The area was so devastated that it was hard for women to come here. So, in the process of decision making they were not involved."</p>	<p>Irdus, 2016,p.3/§115f</p>		
<p>"He personally took the final decision. The final decision is from Irdus because he is the community leader of that time, because there is not a woman participate in the meeting. So, it is based on his personal opinion."</p>	<p>Irdus, 2016,p.3/§120-122</p>		
<p>"Because after ten years later we see so many modification. Maybe only five percent of the houses were not modified. I can say 95 percent are modified because most of them built like, for example they just installed the light plywood at the back, [?] the kitchen or maybe just put a very low zinc sheet to make a barrier to give more function and space for them because the core house normally it consider of two bedrooms and then one living room and then just very small space that maybe the overseas people can use this as a kitchen because when I did my PhD in England the house was very small and then some of them only four times four and then everything is in them like studio room. But in here it is not working. So, people will not be satisfied with that. So that's why around 95 percent of people add some more things to use it as the space."</p>	<p>Sari, 2016,p.1/§14-22</p>	<p>Almost all houses have been modified by now [2016]. The original core houses are too small so people make additions to them. Every NGO had their own template, also the BRR had one. There are usually three or four templates that people can pick from but it is only 36 square metre for each house.</p>	<p>B1.Bg. B1.I</p>
<p>"For the core house as I know that they have their own template. For example, BRR that is the government side who supply the house. They have the template. For example, they have up to three or four templates and then people can choose but most of them the size is 36-meter square, two bedrooms and one living room. So that's why actually this is not enough but people cannot say I have larger because that is the only one that they are providing."</p>	<p>Sari, 2016,p.1/§32-36</p>		
<p>"So mostly 75 percent say we are happy with the houses but after ten years later what we have seen so many modifications, so it means maybe the 36-meter square houses doesn't meet their need to accommodate their daily activities so that's why they built some more spaces for them."</p>	<p>Sari, 2016,p.3/§102-104</p>		
<p>"It is also various the one that has small income they just install the very light materials but the one who is rich – and then the plot land is large, so they built larger house. So, the core house is just very small and then the modification is very big."</p>	<p>Sari, 2016,p.3/§104-107</p>		

<p>"But if you go to Aceh Besar it's still there. There is a lot of traditional building there. So, if there an earthquake is very safe to live inside, it's ok. It just move, let's say ten centimetres, it's ok it's no problem. But here in the city with the concrete building is – even after tsunami there is an idea there to make a steel the main structure of the building but again still it's not a good promise. If they use a bad labour and they didn't follow the procedure, the guideline they also have a problem to crack also."</p>	<p>Bahagia, 2016,p.7/§299-304</p>	<p>Using stronger materials in order to make buildings more earthquake resistant is not enough. There must be a guideline that is followed in order to reach this aim.</p>	
<p>"So when all these organisations came I assume some of them had their own standards with them?"</p>	<p>Dirhamsyah, 2016,p.7/§296</p>	<p>Some of the organisations did not have any standards to build the houses during the reconstruction time.</p>	
<p>"Without standard. [laugh] They think how we can help the people quickly."</p>	<p>Dirhamsyah, 2016,p.7/§299</p>		
<p>"There are some reason I guess because during the reconstruction we had to build 100,000 housing in very short time. And then from donor side they need to [?] all of the money so they can get more fresh money to came to Aceh. A lot of problem during the reconstruction including the policy. Like our local government is not good - because during the reconstruction we came to the piece period. So, in some area we need to accept some opinion that maybe is not [?] through the reality. That's sometimes when we do the reconstruction some partner said, 'we need to push' so no standard for that. That make the condition like that. Until right now ideally the reconstruction is in local government side. But the concentration of our government is not there right now. They move to [?] a lot of - not connected to our reconstruction period."</p>	<p>Dirhamsyah, 2016,p.7f/§301-309</p>		
<p>"We are talking about the structure and the building code and my engineering perspective also the NGO side, previously we are also working for NGOs. Actually, the civil engineer they are use the standard [?]. So, there is a standard following the building code but this is developed by the Dutch a long time ago. So, it is updated but still they use for the build of [?] they are following this standard."</p>	<p>Dirhamsyah, 2016,p.8/§311315</p>		
<p>"Oh yes, of course. We give some standards housing..."</p>	<p>Kamaruzzaman, 2016,p.2/§76</p>	<p>There were no standards or building codes regarding the safety of housing that was given by the BRR. They had a regulation about the size of each house which was meant to be 36 square metres.</p>	
<p>"36 square metre."</p>	<p>Kamaruzzaman, 2016,p.2/§78</p>		
<p>"Because BRR is like the coordination for the donors so there are not the one who are in charge of the reconstruction – this are the donors. They are more coordinators. BRR taking part for the land reconstruction and then the construction is done by the donor, they get a contractor and so on. So, the standard will be followed."</p>	<p>Kamaruzzaman, 2016,p.6/§253-256</p>	<p>BRR did not have their own standards for the reconstruction of buildings. This was given in the hands of the donors. So in the end it was a mixture of different building codes.</p>	<p>B1.Bb</p>
<p>"So, the standard for the road construction was followed by the rule of US because..."</p>	<p>Kamaruzzaman, 2016,p.6/§260</p>		
<p>"In Aceh, we have American standard for the roads. [Indonesian]"</p>	<p>Kamaruzzaman, 2016,p.6//§262</p>		
<p>"That's the first US road implementation in Indonesia. So, some of the drainage here that you see is from France, built by JICA, Japan."</p>	<p>Kamaruzzaman, 2016,p.6f/§264f</p>		
<p>"So, the whole planning was given to the donors?"</p>	<p>Interviewer, 2016,p.7/§267</p>		
<p>"Yes. That's why we have a fast track. We have fast track to push to finish."</p>	<p>Kamaruzzaman, 2016,p.7/§269</p>		

<p>“They [NGOs] can come to BRR directly and give some concept note to us and then they can go. We just make sure what is the process that has been done before want to build the project that they want to build in a certain area. What is the process that have been passed away. If it is anything that has been accepted by the villagers then they can go.”</p>	<p>Mardhatillah, 2016,p.14/§610-613</p>	<p>The BRR gave the process for housing away to the NGOs. It was just checked where they would like to build and how many houses and if the villagers agreed they got the OK to start building.</p>	<p>B1.Bc</p>
<p>“That’s what happened at BRR during Aceh. We coordinate I don’t know 600 or 900 organisation local NGOs, international NGOs, and we do the coordination the concept note is part of this coordination, but the coordination is also facilitation. If they have a problem then we facilitate how – because at the end all of us have a common goal which is to rebuild Aceh. The difference is of course the way we do things. This is based on each of the organisation mandate, culture, environment and so on. But at least we have a common goal and the coordinator will need to make sure that everyone is moving towards that common goal. So, it happened in Aceh, working with NGOs, international organisations, private sectors, everyone is there.”</p>	<p>Faisal, 2016,p.7/§275-282</p>	<p>While the BRR was coordinating all local and international NGOs in Aceh, each organisation was following their own concept of doing things. The common goal was to rebuild Aceh, the way how to do it was mostly exempted.</p>	<p>B1.Bc</p>
<p>“And at that time so many NGOs they go directly, no coordination with the government, they go directly. So maybe at that time our government had no experience about dealing with disaster after disaster. But now I think it’s better if we do the better coordination after disaster. So, everything can go bad coordination we know but less coordination the result is not so good. So, I think just like the NGOs, sometimes the NGOs not report what they are doing to the government. Especially here in Banda Aceh to the mayor office. If we do good coordination, the government will know all, this NGO is doing this here and if they build house, how many house and what kind of house, what is the structure of the house. I think if we have good coordination directly after the disaster it will be better in the house.”</p>	<p>Zulfisni Meutia, 2016,p.2f/§80-89</p>	<p>At that time the government had no experience with disaster. So a lot of NGOs went into the field directly, without coordination. Some NGOs did not report to the government. An insufficient coordination leads to bad results. If there would have been a better coordination between NGOs and the government regarding the number, the kind and the structure of houses, the houses would be better.</p>	<p>B1.Bd</p>
<p>“Because you know we have a case like the roof is from asbestos, it’s not good for health. Because I heard that - it’s not my own experience - but I heard they had no coordination with the government, so they just build the house. That’s the result. So, I think in the future - we hope there is no disaster - but if it happens I think our government already has good experience so they just block and say every party that come to help us we welcome but have to coordinate with the coordination with the government to give what they plan to do, what is their specific field they want to go to in this place.”</p>	<p>Zulfisni Meutia, 2016,p.3/§89-95</p>	<p>There is a project where the roofs were made with asbestos which is bad for the health. This happened because there was no coordination with the government and the houses just got built. For future reconstruction processes the government should block every party and have coordination compulsory.</p>	<p>B1.Bb, B1.H</p>
<p>“The planning, what I understood, it’s really determined by the donors who wants to build this housing complex for example. So, there were no supervision of which standard they have to really follow. For example, for the quality of the materials, for the building codes whether it has to be reinforced. So, it’s, withstand the earthquake, so different qualities and different standards. What we see during the rehab recon, and they only set this kind of condition according to their own perspective.”</p>	<p>Meilianda, 2016,p.2/§65-70</p>	<p>The donors decided themselves how to build the houses. There was no supervision, no standard they had to follow regarding the quality of materials or building codes. Everyone used different qualities and different standards according to their own perspective.</p>	<p>B1.Bb, [B1.H]</p>
<p>“BRR already learned themselves that eventually they coordinated better than before. But it’s a bit too late because during the process early or already in the early stage after the tsunami, then the housing was started to build and then without following certain regulations. But then later on I understood that the BRR has put some kind of supervision. Yeah, but it’s already half way to go to the end.”</p>	<p>Meilianda, 2016,p.2/§74-78</p>		

<p>"So, they [NGOs] came all the way here introducing this kind of ideas of design of that's really hazard friendly. So, for example, the houses around here, that you see, you notice that's elevated houses, which kind of revitalize the cultural heritage that we have because in the past we had our traditional houses elevated houses, and they want to reintroduce this idea again to the community. But always this kind of project's not really sustainable, they're just project based and then they stopped."</p>	<p>Meilianda, 2016,p.6/§221-226</p>	<p>Some NGOs introduced hazard friendly designs for housing as for example elevated houses in the coastal areas. In the past the traditional houses were elevated, and this NGO wanted to reintroduce the idea in the community. But these projects are never sustainable, they are project based and then stop.</p>	
<p>"I think they only... What I mean is that they only introduced this idea and they built the design and then they built it, but it's not as if that it would inspire to get... How to say? To give inspiration to the community through disseminating this idea not to build the housing itself, but only to spread the idea. This is what's the ideal design of the housing is supposed to be in this coastal areas, for example, just like the campaign of this idea is not really, the socialization is not done properly. So, then this idea is not spread throughout other communities, so it's not sustained."</p>	<p>Meilianda, 2016,p.6/§230-235</p>		
<p>"There are many reasons, I guess. Yeah, because then it's also about the practicality of people likes to be, to have this ground houses. And also, maybe also the materials to build these elevated houses, they introduced most of these houses with woods but then, you know, timber, kind of like... Yeah, it's not really suggested any more that we build houses with timber, which is expensive and we are concerned about the environment as well, deforestation, things like that."</p>	<p>Meilianda, 2016,p.6/§239-243</p>		
<p>"At the beginning Oxfam would like to involve community participation. So, Oxfam maybe construct the structure and then the community or the owner, the villagers continue build until complete. But while other country like Turkey come and built completely one. So, people more interested in this compared to Oxfam strategy at that time."</p>	<p>Haiqual, 2016,p.1/§31-34</p>	<p>Each NGO had their own strategy developed from previous experiences. Participation was often not wanted by the community in Aceh. Instead, they preferred options where they got a whole house ready to move in.</p>	<p>B1.Bf</p>
<p>"Oxfam go here and then try to develop their programme from Sri Lanka. [Indonesian] Just for help the starter for housing, not complete housing. Just structure, in Sri Lanka. He want to replicate in here."</p>	<p>Haiqual, 2016,p.1/§16-18</p>		
<p>"[...]at the beginning Oxfam's plan is good, participatory community involvement to build the housing. But the intention is not to build a permanent house with concrete but semi-permanent - you know semi-permanent - some concrete, some timber woods. So, they start in several village in Banda Aceh and also in Aceh Besar like Lampaja [?] Lambatu [?], mostly in Aceh Besar district. While at the same time another donor for example, Turkey they come and support completely all permanent, I mean concrete based, very good housing. This makes the people jealous. They don't want to receive Oxfam because only semi-permanent, the people need to work but Turkey came and built one hundred percent very much. That is a problem."</p>	<p>Haiqual, 2016,p.1f/§38-45</p>		
<p>"So, at that time between Oxfam and for example Turkey different strategy. Oxfam would like to conduct the community-based housing construction but the Turkey donor-driven or contractor-based, just hire contractor and build."</p>	<p>Haiqual, 2016,p.2/§50-52</p>		
<p>"One-door coordination among donors because if donor come and built this kind and that it makes so many different style of houses and become people jealous of each other. 'Oh, my friend get better house, me not good'. But if all donor coordinate by one organisation and build all same to avoid that jealous among the people that is what he mentioned about lessons learned from what he was doing."</p>	<p>Haiqual, 2016,p.4/§152-156</p>		

<p>"Actually, they [Oxfam, UN Habitat] make an adaptation consider for the future disaster like earthquake. So, they design the house for earthquake proof until certain Richter scale. But not for tsunami because some built again near the coast. [Indonesian] They tried to adapt with the future disaster, especially the earthquake. But not for tsunami because they know that a tsunami very strong, the houses cannot stand for this. But earthquake yes, evacuation yes."</p>	<p>Haiqual, 2016,p.3/§107-111</p>	<p>A future tsunami was not an issue in reconstruction for some NGOs. Settlements got rebuilt near the coast in the hazard prone area. Also flooding was not anticipated in the design. There was no time to plan or design options for this. The priority was to get people into a house as fast as possible.</p>	<p>B1.H, [B1.Cd]</p>
<p>"Not anticipate for flooding for Oxfam design. So, I think mister Haiqual pointed about the - you know at that time the people need a housing quickly as possible, that is their intention. While other donor waiting, design. But Oxfam tried to support as quickly as possible so that the people can live in normal stage. This is the intention. So that's why they cannot discuss about the design for flooding. But how to make people can life in the permanent house. Because they want to bring people from the shelter to the permanent house. That is the intention. Maybe not much for anticipating another disaster like flooding. But other donors yes."</p>	<p>Haiqual, 2016,p.3/§119-125</p>		
<p>"So Derahaya is one of the first place who got the first aid of housing. So, at that time - I think there was a name like Bakri who built the housing there and they built it with asbestos and so on which is not the best material. So those people where in the camp after tsunami. And then when they built the house - they make agreement before of course, before they start building the house, like with this material and so on at the beginning. But then all of the NGOs came and in every area some NGOs working, different NGOs working and they all have different material. So, the first people got really kind of like disappointed with the things why they got this. So, they make demonstration here, they protest about it."</p>	<p>Mardalena, 2016,p.2f/§87-94</p>	<p>In one of the first projects the material of the houses contains asbestos. All the NGOs came in and each NGO was working with different materials. The people that got these first asbestos houses were protesting.</p>	<p>B1.H</p>
<p>"And sometime when the house was built since early 2005 and when BRR have wrong building code and we revised with some string turning column like this. Like in Nias we are eager to build fast and later on we are strengthening the column like this."</p>	<p>Purwanto, 2016,p.4/§141-143</p>	<p>At the start BRR had had insufficient building codes and therefore houses which were originally built got revised and retrofitted. This was especially the case in Nias where the aim was to build fast.</p>	<p>B1.H</p>
<p>"Climate adaptation, was this a topic?"</p>	<p>Interviewer, 2016,p.4/§164</p>		
<p>"No. At that time, it was actually not."</p>	<p>Purwanto, 2016,p.4/§166</p>		
<p>"When UN Habitat was bring the process of reconstruction, design building code for Aceh."</p>	<p>Purwanto, 2016,p.8/§316f</p>	<p>The building code used in Aceh and Nias was brought in by UN Habitat. The communities decided on the building material and wanted it to be brick because this is what they were used to.</p>	<p>B1.F, [B1.Bb]</p>
<p>"So they did the building code. And did they take one they already had and change it a bit or how did this work?"</p>	<p>Interviewer, 2016,p.8/§319f</p>		
<p>"Yes. Took the existing one from Indonesia, change to the new building code."</p>	<p>Purwanto, 2016,p.8/§322</p>		
<p>"During the process Acehnese people like to build by brick."</p>	<p>Purwanto, 2016,p.8/§327</p>		
<p>"Why was this, do you know? Why did they want to do this?"</p>	<p>Interviewer, 2016,p.8/§329</p>		
<p>"Because of they are used to brick instead of the other materials."</p>	<p>Purwanto, 2016,p.8/§331</p>		
<p>"It's like giving the right medicine to any illness. I am thinking for example the GTZ, after we did our design for the houses on stilts they did the same principle, design also a house on stilts but they design it much better. But because of that it took a long time and I think this is not appropriate. It's like giving a Mercedes Benz to someone who just need a simple truck. #00:43:16# So it's not being bad or good it's being appropriate for the condition of that time."</p>	<p>Kusumawijaya, 2016,p.4/§196-201</p>	<p>Some organisations came up with very good solutions, but this also took a very long time which was bad in this situation and condition. The solutions should be appropriate.</p>	<p>B1.F, B1.H</p>
<p>"We would like to have more houses on stilt [for expected flooding events], but we were late in introducing that type. So the difficulty is to have people appreciating all this concept."</p>	<p>Kusumawijaya, 2016,p.10/§407f</p>	<p>It would have been good to put more houses on stilts, but this type was introduced quite late</p>	<p>[B1.Bb]</p>

<p>"We learn a lot actually before designing it. We visited villages, we talked to people. But of course, you can't - there are other conditions to be considered of course. The condition of post-tsunami situations. We learn about the importance of separating the staircase, so even if we have a semi-detached house you cannot have one stair, you have to have one stair per house. That's important for them. And the stair must be made of the strongest timber."</p>	<p>Kusumawijaya, 2016,p.10/§417-421</p>	<p>so people did not appreciate the concept.</p>	
<p>"The houses in tsunami Aceh are destroyed because of this combination of earthquake and tsunami. Tsunami you cannot do anything for that because it floods but we think that having it on stilts reduces the risk. At least you can go up on the second floor. A lot of people survived on the second floor. And when you have the ground floor empty, it's even quicker for water to go down. So that's why the idea of the stilt houses."</p>	<p>Kusumawijaya, 2016,p.11/§441-445</p>		
<p>"Well, we don't have that at first. So, in Nias we develop our own building code at the time using pictures. So, it's a very simple thing. It's called 'more earthquake resistant building code'. So that you know the principles of... And this book because it is, very simple, I'll send it to you, but don't forget to ask me. So that book contains pictures from Nias, on how to select sands, gravel, the size of the rod, where you need to put reinforcement, those kinds of things. It's all there, simple thing, the book. And that is being used as one of the tools during the process of facilitation of the community-based housing delivery, with the hope that it's becoming a new knowledge."</p>	<p>Samadhi, 2016,p.8/§330-337</p>	<p>At the beginning there was no building code for Nias so a new one was developed. A very simple book using pictures was made in order to make it easy for everyone to understand and also to spread the knowledge.</p>	
<p>"And we involve young people, kids in the consultation. So, the facilitator is asked to also involve young people, because they're the one who understand. They're the ones who can read, right? Their parents might not necessarily be able to read."</p>	<p>Samadhi, 2016,p.8/§344-347</p>		
<p>"Of course, the traditional building is good. But it will be too expensive for them to come up with that one. It needs a lot of woods and they don't have that. So, this new knowledge on constructions we try to instil as new local knowledge system."</p>	<p>Samadhi, 2016,p.8/§340-343</p>		
<p>"My building code is then adapted by Aceh and then adapted by ISDR."</p>	<p>Samadhi, 2016,p.8f/§352f</p>		
<p>"It's the simple civil engineer, because this is only for a simple house. [...] The span, the place where you need to reinforce, the size of the rod, and so on and so forth. It's coming... It starts from the simple housing, and then you can develop."</p>	<p>Samadhi, 2016,p.9/§366-370</p>		
<p>"We just used very basic building standard. The buildings withstand a 7 Richter scale and the house space is between 36 square meters and 54 square meters. Only two. The 36 and 54 is very strict. But the 7 Richter scale I can say that we did not have a special effort to check. We just trust the NGO or agency that built houses to comply with that. And I understand that not all of them are following the best way they can, but that was my asset. Hopefully there is no earthquake anymore. But luckily no houses were collapsed during the big earthquake in 2011."</p>	<p>Samadhi, 2016,p.2/§95-100</p>	<p>The BRR "just used very basic building standard". Houses were meant to be built so they could withstand a 7 on the Richter scale. However, this was not being checked. BRR trusted the NGOs or agencies that they will build the houses according to this. Not all of them followed this standard. "But luckily no houses were collapsed during the big earthquake in 2011."</p>	<p>B1.Bc, [B1.H]</p>
<p>"The 7.0 earthquake, actually we don't have a building set of that. Excuse me for not can answer that question. I don't think that we used that standard if there is any. We just leave it to the agencies that built houses for us to use their own standard. So, the Austria Red Cross they used theirs. And I believe they don't follow that as well. Why? Because it was very costly. If you want to build a house with 7 Richter scale strength, then it will cost you a lot. So, I don't push too hard on that because for me you build as many houses as needed and you still have the budget to do that. It was very bad that they come back to me Pak Kuntoro I want to build another 30 houses, 3,000 houses but we don't have the budget. Then I will be at a bad position."</p>	<p>Samadhi, 2016,p.3/§116-123</p>		

<p>"There is a housing working group that's actually helping with the building code and we are combining with the government building codes. We allow - normally safe the children come with their own standard, we have the government, we have the Oxfam for example we have whatever. CRS, Catholic Relief Service, World Vision come with their standard. The standards are all a bit different but as long as they comply with our national standard they will go. The government of Indonesia standard cannot be used because this is the first time, Indonesia got this kind of - it's an 8 Richter scale, it's beyond the standard that we have at that time. And I have to try to accommodate, learn from other experience and do these kinds of things."</p>	<p>Sabandar, 2016,p.4/§145-152</p>	<p>Each organisation came with their own building code. The standard of the Indonesian government could not be used because the earthquake in Nias was an 8 on the Richter scale which was not covered.</p>	<p>B1.Bc</p>
<p>"So, in the housing planning for example ADB or Safe the Children wants to build a house I ask them to discuss themselves and some the government house we have to fix at the working group meeting first and then discuss. Because you cannot get the house which is 60 million here and 30 million here, so I apply one standard. You have to maintain the fairness in the community because if you want to bring your flag and you build this actually you ruin the community, so I solved this issue before they were going down. When it starts initially, there are NGOs that start to build like this but then when I came and tell this is the fault development issue, very much. It's a poverty. You cannot give and then house is individual entity. You bring to the family 60 million the other will get 30 million. It creates social unfairness, social jealousy. So, you have to see so don't follow this. Then it's becoming standardised even going down from the standard of Aceh, getting fund."</p>	<p>Sabandar, 2016,p.5/§191-201</p>	<p>In the beginning each organisation did their own approach with their own standard so some houses got built for 30 million Rupiah while others cost 60 million. Therefore, there had to be one standard to maintain the fairness within the community and avoid jealousy. The standard in the end was lower than the standard in Aceh.</p>	<p>B1.Bh</p>
<p>"It is development perspective. If you are taken from the reconstruction prospective for example what China doing is now they are taking the community out and they build very good house that is not the case with Nias case. I think Nias case you are given four years you have to also do the construction, but you have to improve the social fabrics not destroy it so a combination of development approach and reconstruction approach happening in that situation."</p>	<p>Sabandar, 2016,p.5/§206-210</p>		

B1.E: Relocation did not succeed

Quote	Source	Synopsis	MA
<p>"[...]we actually also have blue print like we have to build two kilometres from the sea. But, in reality, they still built near the sea. Our government control is not really strong."</p>	<p>Hasan, 2016,p.14/§602f</p>	<p>There was the plan to leave a two-kilometre no-build zone by the government. Some people were relocated to safer areas. The government could not implement the blue print and people also did not want to be relocated to the areas offered. The relocation was not well planned and did not consider people's livelihood. Therefore, it did not succeed.</p>	
<p>"The problem, actually, they really want to relocate, we are involved in that when we relocate them. If we relocate the government bought the land, but it's far away from their work, that's why there's a problem. If they can do near their work, it's really OK for them to relocate. But the problem, the government always look for the land with the very cheap price, at it's far away. For example, they are fishermen and then they put in the mountain. In the mountains or the hill area. We have this. The one that was funded by the Chinese government."</p>	<p>Hasan, 2016,p.14/§608-613</p>		
<p>"Sometimes the fishermen, most of the washed away were fishermen. We have to relocate them inland. They got no skill at all as a farmer, so they wanted to come back to the shore, to the beach, to do their own, their natural instinct job as a fisherman. So, at that time, we lack knowledge, regarding, transfer knowledge from fisherman to became farmer for example. We couldn't blame the fishermen because they didn't have anything skill about farming. Then they came back to the shore and then they started build barracks and then temporary housing from the cardboard."</p>	<p>Irwansyah, 2016,p..4/§142-148</p>	<p>Some fishermen had to be relocated. They were expected to work as farmers in their new settlements, but they did not have any skills. Also, the skill to train them to be farmers was lacking.</p>	

<p>“Because some of the houses have been built very far away from the market and of course it makes the people – because some of the houses who were left by the occupants, they don't want to live there because it is far away from their works, from the market.”</p>	<p>Sari, 2016,p.1/§9-12</p>	<p>Some houses were built far from the markets and people's work places. These houses were likely to be left by their occupants.</p>	
<p>“And then at that time we assessed four houses, so the original house built by the NGO. So, from the foundation, the wall, the roof, the material and then also the location whether it is near to the market. And then what kind of public buildings have been built by the NGO for them.”</p>	<p>Sari, 2016,p.1/§7-9</p>		
<p>“So, it's difficult situation and of course the building is also slightly different, the architecture I mean but the square metre is same, 36 square metre. So, I think for the building of course there is no problem with the buildings the problem is only that at that time we need in the coastal area let's say two kilometres or three kilometres there is no building. #00:19:08# It's only fishermen village maybe or a fish pond but right now there is a lot of building because there is decision that have to make at that time maybe the land is quite limited, and they don't want move to another district, they want to close to the city. Let's say our neighbour Aceh Besar, there is a lot of space there, but they don't want to go there, they want to live in this specific area so that's also the problem at that time. So, then we allow them, but we also built escape building for emergency.”</p>	<p>Bahagia, 2016,p.4/§153-161</p>	<p>Houses got built very close to the coast even though the plan was to have a three kilometre "no-building-zone". People living in these areas did not want to move to a place outside the city. Consequently, escape buildings got built in these dangerous coastal areas.</p>	
<p>“But we have a space at that time for 700 houses, so we also built 700 houses and we move and who wants to move there is ok. We try our best to do that but again we have a lack of budget at the time, we have no budget to buy a land. But if we can buy a land there is no space because the city is only 61.3 square metres. In our regulation 30 percent is green. So, for let's say 2029 starting from 2009, so 20 years we have to reach 30 percent of our space in the city is green. Right now, it's about 24, 10 percent is from the private, it's ok now but from publics we still have a, we have a progress at 14 percent, 10 plus 14 is 24, so another six percent to reach so it's quite difficult to move all the people. That's at that time the decision have to make from the head of BRR, so they allow the NGOs to build close to the sea. I think it's not good but again we have to make road wider now, to escape road and then we have to make another escape building maybe for the next couple of years. Right now, we have four escape building and there is I think we have to make some simulation every year [chuckles] tsunami drill sometimes and then also [Indonesian] working what the people that they have to know what the problem living in a hot spot.”</p>	<p>Bahagia, 2016,p.4f/§165-177</p>		
<p>“This is one concept of management, disaster management. Non-structural and structural way. Structural way they build houses and policy about that. And non-structural divided by two, cultural and spiritual. It means how we can put the same things together, to joining. Sometimes the infrastructure put - the housings is not near by the livelihood activity, so far from the economic activity. This is one how the houses are still empty and some houses they rented to other people. If we look directly to the empty houses or maybe you can interview some local communities. They ask similar, 'how we can survive?' 'how we can get the some of our life?' and this is what they say.”</p>	<p>Dirhamsyah, 2016,p.5/§183-190</p>	<p>In some places, houses were built as a structural answer, but the non-structural aspects did not receive consideration. As a result, the houses stayed empty or people rented them out since they did not have any livelihood options in this area.</p>	<p>B1.J</p>
<p>“It means our duty now - also we need your help - how we can create the concept of the small or medium industry to help the people. And how to create competency of the people. If we help to create the competency it means that they have their own competence and they can sell it. This is what we need some idea how we can create competency programme and how we can create the livelihood for example. How to put the [?] inside this area and how we can create some concept of the housing but nearby the economic activity. Also, nearby for their children for school.”</p>	<p>Dirhamsyah, 2016,p.5/§192-198</p>		

<p>"They don't have the idea how they can move from their land, you can say that cultural [?]. This is also the same in Japan. They make the great wall very high. In some area, they don't facing about the view of the ocean they are looking only the wall. And that's also something structural without the cultures. But we are different in Aceh. We have the non-structural too - cultural and spiritual."</p>	<p>Dirhamsyah, 2016,p.5f/\$219-223</p>		
<p>"For instance, in Aceh they depend on there no more risk. They live in a place since they are still child. There are many many memories about their relatives, their family their place and also [?] people. For example, in Ulee Lheue, before they live in the coastal after tsunami testing [?] the [?] them to move to another place because it's very dangerous near the coast. But they said they don't want to move to the other place at the place in the hill area. They didn't want to because Aceh is far from there, their people. So, it's also difficult for the government to relocate their home village to another place outside."</p>	<p>Dirhamsyah, 2016,p.5/\$211-217</p>	<p>Some people in the coastal area did not want to move to another place even though this would have been safer. They did not want to be far from everything they knew and the place where they grew up. Therefore, it was very difficult for the government to relocate the village to another place.</p>	
<p>"In our case in Aceh, we have difficulties to bring the people who has in the coastal area to move inland. In Aceh, this is impossible. Two kilometre from the coastal... [Indonesian]"</p>	<p>Kamaruzzaman, 2016,p.5/\$201f</p>	<p>In Aceh it was impossible to relocate people from the coast to a place further inland. The two kilometre no-build-zone could not be implemented.</p>	
<p>"In the planning, in the blue print there is a two-kilometre zone from the coastal area where there is no construction but the villagers they don't want to move even until six months they are waiting for that. There is nothing happening, but the people still want to stay. 'Whatever it is that will happen, I will die here. This is my land.'"</p>	<p>Kamaruzzaman, 2016,p.5/\$204-207</p>		
<p>"In Aceh you have this reality and this culture."</p>	<p>Kamaruzzaman, 2016,p.5/\$209</p>		
<p>"I think that was the initial plan [to have a two-kilometre no-building zone in the disaster-prone area] but at the same time the reconstruction is also about the bottom-up approach. So, the people that are affected they must have a say about their future. So, and then we see the social issues as well, where it would be very difficult to move fishermen and then becoming a farmer in the mountain. So, it is like for them it is difficult. And then some cultural aspect as well. In Aceh land is very very important element and then link with the dignity. So, there is a social aspect and not to mention that we are at that time also Aceh was in the conflict areas and we cannot afford to have a social conflict as well. So, after a lot of discussion and then we need to find a solution because there are some people who are moving out, we have the areas, the relocation much higher in the mountains, some people willing but some would said no and then said I lost my wife, I lost everything and this piece of land is the only thing I have. So, there is an emotional attachment as well. The way we deal with this then in any disaster and particularly we are talking about tsunami, that what is important is to safe life, therefore in a lot of area in the coastal, particularly in Banda Aceh we have several escape buildings so if something happened then people can go to this. This is designed to stand the earthquake and high enough – they used the previous tsunami as scale – but then if something happened then people can go immediately to the escape building. This is always a dilemma in many many countries where we talk about the evacuation or resettlement from people that living close to the coastal zone then moving out of that area. And again, we need to see this by the context of each of that country when they handle this. What is the social situation, what is the economic situation and so on before we decide on this one."</p>	<p>Faisal, 2016,p.9f/\$383-401</p>	<p>The initial plan of a two-kilometre no-building zone could not be implemented in Aceh. People did not want to leave their land and move to a different area. Houses were built back in the disaster-prone areas. To deal with the situation, and to save lives in a potential next disaster, escape buildings were built. They were earthquake resistant and the height was defined according to the scale of the tsunami in 2004. Moving people out of the coastal zone is always a dilemma in many countries when it comes to resettlement. The context of the country needs to be seen.</p>	
<p>"Actually, after tsunami the central government wants to move the villagers to inland, two kilometres. But the people in especially the ones near the sea they said, "we are fishermen, we have to stay near the sea"."</p>	<p>Permakope, 2016,p.5/\$255-258</p>	<p>The central government wanted to move the villages out of the tsunami risk zone along the coast, but the fishermen wanted to stay.</p>	

<p>"[...]after the tsunami hit Banda Aceh many non-government organisations come here to give their support and help. #00:17:41# And then, I don't know what organisation, they come to our people so they ask, "what do you want to live". Our people say that they need a house, of course there will be a house but the problem - our government have the new master plan of city. Because of the big disaster of course something must change in the planning, in the master plan of the city and we have time to make that. But some of the NGO come and do settlements. That's what you can see in the coastal area maybe we have the settlements here. But we try to do the new settlements in the coastal area with a different construction. We have maybe higher, that's why. But of course, I told you it's not easy how to move and make a new settlement for our people. I think that's not only here, maybe in other countries or provinces."</p>	<p>Yubarsi, 2016,p.2/§59-69</p>	<p>After the tsunami hit Banda Aceh several NGOs came to help. The government had a new master plan for the reconstruction of the destroyed villages but instead some NGOs just started to rebuild settlements where they used to be. Now there are still settlements in the coastal area maybe with a different construction, but they are still there. It was too hard to move people out of these areas.</p>	<p>B1.Be</p>
<p>"Actually, when BRR established in 2005 we didn't finish to make the new master plan of city. That's why we do that together. As I told you before, especially about the settlements it is too hard to do that, this is the problem. In our master plan, maybe about 500 metre from the coastal area maybe used not for the settlement maybe for other. After that maybe settlement about 1 kilometre far from coastal area. Our new master plan. But the problem after disaster, before we finished the master plan NGO come and build the house in coastal area for people. We can say that now. Break it after that we can't do that."</p>	<p>Yubarsi, 2016,p./§251-257</p>		
<p>"[...]actually the government already had a blueprint about they only can build two kilometres from the beach. But at that time people were not patient so they just go back to their home, build their own."</p>	<p>Zulfisni Meutia, 2016,p.2/§78-80</p>	<p>The government had a blueprint to keep a two kilometre no-build zone at the coast. People were not patient at that time though, so they went back to the shore and built their own houses.</p>	
<p>"Maybe sometime we must understand about the people of Aceh. The people of Aceh are very, we say strong, because they think the life [Indonesian] - they have the religious concern. For example, we have the Allah, we have the god. They are not afraid if they must stay in the near of the coast or the beach. Sometime when the people formally they stay in the near of the beach and then they must move on the mountain I think about the problem of livelihood. Because the people in the near of the coast they only go to the beach and then fishing but if they move to the mountain they don't understand about farming. Sometimes they only in the night they only sleep in the house and then come back to the livelihood."</p>	<p>Sunarty, 2016,p.9/§357-364</p>	<p>The people in Aceh are very strong because of their religion. They are not afraid to stay close to the coast or the beach because they have Allah.</p>	
<p>"Sometime when the people formally they stay in the near of the beach and then they must move on the mountain I think about the problem of livelihood. Because the people in the near of the coast they only go to the beach and then fishing but if they move to the mountain they don't understand about farming. Sometime they only in the night they only sleep in the house and then come back to the livelihood."</p>	<p>Sunarty, 2016,p.9/§360-364</p>	<p>In some cases when people had to move from the coast to the mountain they had problems to maintain their livelihood. The people on the coast used to be fishermen and they do not know how to farm. So sometimes they only spend the night in their new house on the mountain and spend all day on the beach to work.</p>	
<p>"Majority of the people now are back to their village near the coast."</p>	<p>Sunarty, 2016,p.9/§369</p>		
<p>"So the house on the mountain is just a ware house or something they put in. Not stay for long time but just sometime they come back to see the house."</p>	<p>Sunarty, 2016,p.9/§371f</p>		
<p>"Sometime rent for other people."</p>	<p>Sunarty, 2016,p.9/§374</p>		

<p>"But also then the government had already abandoned the first blueprint of people not living within three kilometres by the sea. They tried to, for example people in coastal towns like Ulee Lheue, they were going to move them up to Janto which is the capital if you like of this sub-district here which is a farming area, it's forest and farming. So, you gonna move all the fishermen to the forest and of course most of them didn't want to go. They wanted their livelihoods, the only thing they know is from the sea. So that didn't go down very well. There were a few people who were relocated [...] So a few people from Ulee Lheue were rehoused in another area, those who's land had all gone there was no chance of them ever having a house there."</p>	<p>North, 2016,p.5/§186-194</p>	<p>The government tried to move people from the coast to the mountain, out of the danger zone. Since the people were fishermen and not farmers most of them did not want to move. As a consequence, the government abandoned their first blueprint with a three kilometre no building zone. There is no promising future for the fishermen anyway. The corals are bleaching and they are overfishing but they are still the poorest members of the community. But there are no alternatives and nothing is being done.</p>	<p>B1.K</p>
<p>"So, all we can do really is trying to set up areas where they protect the corals at least in any way they can. Whatever happens with bleaching there is nothing we can do about that. The fishermen have no idea about what they gonna face in the future. No idea. And they are overfishing. But their view is how can they be overfishing - if they were overfishing they would be rich and they are not. They are still the poorest of the community. I mean they are and they've got no alternatives and nothing is being done."</p>	<p>North, 2016,p.14/§608-613</p>		
<p>"People was actually traumatised because of central government take the land for being shore to the investor. BRR fund finding in interview the whole community and while - during the meeting they express the concern."</p>	<p>Purwanto, 2016,p.1/§32-34</p>	<p>People in Aceh were afraid that the government would take the coastal area, take over the land that they own and give it to investors.</p>	
<p><i>["[...]the government that panicked, that want to free two kilometres of the coastal areas not to be built and our approach is really to get people to go back to their original villages. But it is not that we don't agree that you need to limit construction but that for the future."]</i></p>	<p>Kusumawijaya, 2016,p./§16-19</p>	<p><i>[The government wanted to implement a two kilometres no-building zone. This cannot be done all at once and in a situation like this. When the government realised that they would have to move 20,000 families they eventually did not go ahead with this idea.]</i></p>	<p>B1.Cc</p>
<p><i>["But you cannot impose that now. And actually, as the government itself eventually realised if they what to impose that just immediately after the tsunami they will have to remove 20,000 families. So that's why eventually the government did not go ahead with that idea, free the two kilometres' zone from the coast."]</i></p>	<p>Kusumawijaya, 2016,p.1/§20-23</p>		
<p><i>["But in Aceh at that time, we insist that people go back to their initial villages, which is in our case 23 villages. We knew it was unrealistic to free two kilometres' free zone, so that's why we move very quickly. We ignored the government guideline because we know that the guideline will be somehow be abandoned. Because we didn't panic."]</i></p>	<p>Kusumawijaya, 2016,p.1f/§41-45</p>		
<p>"There are organisations that built houses on new land, for the panic of the government not to build in the same village, but actually that encourages the government buying land which is not very tactical because it will involve a lot of money. But some organisations didn't care. They just want to build using their money. But in later states and I interviewed their officers they found that the land provided by the government are not suitable for building. And you can imagine the process of the government buying the land and using their money, using NGO money, charity money, buying the land and a lot of it is just corrupted. And it also slows down the process."</p>	<p>Kusumawijaya, 2016,p.5/§206-212</p>	<p>Some organisations built houses on new land which encouraged the government to buy land with aid money. Later they found out that this land provided was not suitable for building.</p>	<p>B1.A, B1.F</p>

<p>“But those villages that are destroyed totally and cannot be rebuild because they are too close to the water or the sea then they have to relocate obviously. And we have to build new village at a different location. So, if you go to the area Labui [?], the new town, we built in that location around 10,000 new houses. So actually, one thing that I am proud of, we built for that city of Banda Aceh a satellite city. 10,000 people there. We have to decide everything, we have to buy the land because they cannot provide land there, so we have to buy. That is the only place in Aceh where we have to buy land and build houses for them. And those who live in that area is basically those who used to live close to the sea. There are some social problems as well, let me talk about that later on.”</p>	<p>Mangkusubroto, 2016,p.1f/§41-49</p>	<p>Some villages that were totally destroyed had to be relocated. So a new satellite city with 10,000 houses was built. Now those people are away from the sea which is good but there are some social problems as well.</p>	
<p>“Five percent relocation, we have to provide the land. The new location we have to buy land and built houses.”</p>	<p>Mangkusubroto, 2016,p.2/§52f</p>		
<p>“The earthquake is about 200 kilometres from the shoreline. But it also effected the coastal area because it collapsed. In the centre of Banda Aceh, it collapsed 13 centimetres, but you go to Jalang [?] it's around one meters. So that means that the water is now inland. So basically, some area cannot be rebuilt because it's covered with water. And those are the villages that we have to relocate.”</p>	<p>Mangkusubroto, 2016,p.2/§73-77</p>		

B1.F: No time for planning

Quote	Source	Synopsis	MA
<p>“World Vision is already having money to build houses which of course would be faster and there is this villager in the middle of all of that politics who need a house. Right, so which you are? The architect with this idealistic project, World Vision with this mass product process and the villagers who just need a house for god sake.”</p>	<p>Adamy, 2016,p.3/§122-126</p>	<p>There was no time to work out what is really needed, to come up with a concept together with the people and to design according to people's needs.</p>	
<p>“I think still the debate is about we need to build fast and meanwhile theoretically the best way to build is not a very fast way. It's always the dilemma during reconstruction. We need to build fast in the perspective of the donors, in the perspective of the contractors, the consultants and of course the villagers the beneficiaries. But as we are an architect or a planner we always believe we need to do this participation, they need to be part of the process so they have this ownership...”</p>	<p>Adamy, 2016,p.7/§291-295</p>	<p>There is always a time pressure in reconstruction. It needs to happen fast. But good results need time. Concepts as participation, community involvement need time. That's a main dilemma.</p>	
<p>“And then what I can see most of the problem here, they don't even have the planning, they don't have the planning drawing and then secondly when they build they don't build correctly. Like how to build it correctly in a construction way or standard. We can see this a lot. Even during the reconstruction process when they hire a very famous expensive architect, contractor whatsoever.”</p>	<p>Adamy, 2016,p.8f/§351-355</p>	<p>During the reconstruction process a lot of houses were built without a plan. The houses were not built correctly which means with a hazard resistant construction and according to people's needs, even when architects or contractors were involved.</p>	
<p>“What is the standard of correct. First of all, we need a plan. Sometimes we know all, sometimes they build house without plan. That is one thing. And then how is the planning. Like what you mentioned before, we are living in a tsunami prone area - did they put this hazard resistant in the plan? And in housing, we read this a lot, because of not participation they don't build what the people want. So maybe correctly means also to make sure what do they need.”</p>	<p>Adamy, 2016,p.8/§341-346</p>		
<p>“Can you imagine in housing? Where there is no one that is controlling that, except the owner.”</p>	<p>Adamy, 2016,p.9/§356f</p>		

<p>"They wanted to build a new village, a new housing, a new school. But at that time, when I was as... What do you call that... Advisory architect, I said to the Turkish Red Crescent, "No, it's impossible to build with the same situation, with the same condition as it was before." So that means no progress, no development. So, I talked to my boss, and then we talked to the head of the villages and we discussed till midnight. So finally, we got conclusion that land consolidation must be in action. It was really hard, because can you imagine at that time you had a price sale on the land 200 metres. But you expect after the redevelopment and funded by the Turkish Red Crescent. At least you expect your land more than 200 metres. But what happened, during land consolidation, could be to 200 metres reduced to become 180 metres or when your land was just 150, due to the consolidation, or land consolidation, it will increase to become 180 metres, for example. Otherwise no plan, unplanned."</p>	<p>Irwansyah, 2016,p.1f/§39-49</p>	<p>They tried to change the setting of the village for the reconstruction. Therefore, land consolidation was needed, a very complicated process since people loose parts of their land. Other than that, there was no plan.</p>	
<p>"The difficulties is the NGO has a limit of time let's say 2005 to 2006. But at that time Banda Aceh for spatial case we don't have a spatial plan at that time. We have to review our spatial plan that have to input the disaster and mitigation plan. Takes three years, 2006, 7, 8 and 2009 we have a spatial plan."</p>	<p>Bahagia, 2016,p.4/§145-148</p>	<p>After the tsunami Banda Aceh did not have a spatial plan and the time of the NGOs was too short to work on a master plan first. Now, since 2009 there is a spatial plan for Banda Aceh.</p>	<p>B1.Cb</p>
<p>"I think we have to think it because we every five years we have to evaluate that our spatial plan. For example, last year is the fifth year of our spatial plan so we have to revise it someday, of course."</p>	<p>Bahagia, 2016,p.5/§200-202</p>		
<p>"Because Aceh learned from the long conflict and a lot of NGOs also here in Aceh so maybe from the central government we felt insecure with a lot of international will be in Aceh so there is only for – kind of a politic issue – so it's only four years emergency to construct."</p>	<p>Kamaruzzaman, 2016,p.7/§229-231</p>	<p>The national government implemented the BRR for the reconstruction in Aceh and Nias. BRR was put in charge for four years. This time limitation was due to the conflict history between Aceh and the Indonesian government. The government did not want to have international workers to be in Aceh for long.</p>	<p>B1.N</p>
<p>"You know in Aceh there was a conflict before, it was a conflict area. In the conflict, we wanted to be independent from Indonesia, that's why a lot of international communities in Aceh makes..."</p>	<p>Kamaruzzaman, 2016,p.6/§225-227</p>		
<p>"[Indonesian] They [BRR] have a short time because BRR is only for four years so there is only for reconstruction and rehabilitation so there is not enough time to do the monitoring."</p>	<p>Kamaruzzaman, 2016,p.5/§215f</p>		
<p>"We don't have to be in hurry. Before, people want anything in hurry. So, they use us in the institution BRR to do what they want. We don't have enough time and capacity to change their mind. Many people provoke us, just bring it."</p>	<p>Mardhatillah, 2016,p.4/§152-154</p>	<p>People were putting the BRR under time pressure. There was no time to educate them or change the current situations.</p>	<p>B1.G</p>
<p>"We need time to raise awareness of people."</p>	<p>Mardhatillah, 2016,p.4/§137f</p>		
<p>"But people they have no capacity to be patient. And then the politician also trying to go for people."</p>	<p>Mardhatillah, 2016,p.4/§169f</p>		
<p>"So, there is been assessment but at the same time they will need to as well as we said ability to adapt to the current situation. The planning, the assessment and all of this will need to reflect the situation at that time. Because what is important at that time is 'how do we get this done?'. And so that is something that is the main focus, how can we move quickly, how do we do this reconstruction. And then if something needed to be improved and along the way we continue to improve."</p>	<p>Faisal, 2016,p.5/§205-210</p>	<p>Due to the time pressure during the reconstruction period, the focus was not on the planning or assessments. Because "what is important at that time is 'how do we get this done?'".</p>	

<p>“But I think the rehab recon in Higashimatsushima better from Banda Aceh city because in Higashimatsushima city before they make the housing, the building they make the infrastructure. They make the roads, the drainage, the line for the gas, line for the electricity. They make the good maps before implementing the planning. Why, because Japan has good data. After tsunami, they in they only took data from the central government and they use the central data to make the planning again after tsunami.”</p>	<p>Permakope, 2016,p.8/§317-322</p>	<p>During the reconstruction in Banda Aceh the houses were built first and then after this the infrastructure was put in, including roads, drainage, gas lines and electricity. In Japan this was done better because they made good maps before they implemented the planning. Banda Aceh did not have good data.</p>	<p>B1.Cd</p>
<p>“And in Banda Aceh there is an example of good planning of housing, resettlement of housing. It's in Lambung, Lambung village in Meraksa sub-regency. It is near Ulee Lheue, near the beach. There is - the community of the village they really need to rebuild their home and so they plan. They do the land acquisition, so the road is arranged good and the house. But in the other village when the community "oh I need a house immediately" they not patient to wait. So, the resettlement of the house is not so good. Just follow the old land. The road is not straight, not block and block. But in Lambung, maybe you can visit Lambung village, you can see where the people have patience to wait they do the acquisition, the village planning and the house is very good arrangement there.”</p>	<p>Zulfisni Meutia, 2016,p.1/§27-35</p>	<p>In villages where the community was not patient and wanted to have houses as fast as possible, the resettlement of the houses turned out not as good. The construction follows the old land, the roads are not straight. Where the people were patient the villages now have a much better arrangement.</p>	<p>B1.Cb, B1.H</p>
<p>“At that time actually the government asked the people to do the village planning. But sometime the planning that they made sometime they can follow it but sometime they are not patient. Maybe the fund is not go directly, so they feel it is taking a long time to do the village planning first, to wait for the government. So sometimes the ideal is not happen. But I know that they have doing the village planning. Especially the village near the shore, the beach they doing the good village planning.”</p>	<p>Zulfisni Meutia, 2016,p.2/§50-55</p>		
<p>“I think the procedure is already good, first the government ask them to do the village planning so they know what they need because they are doing the planning, the community after the disaster. They are doing the planning by their own so they know what they need and they learn how to make a planning. Of course, the government accompany them to do the planning. Actually, after the village planning, they know what they need and they finish the planning, after that the government will know what to have to do with the planning. So, I think the people learn a lot by doing their own planning. I think before they are not doing that. We doing the meeting in the beginning of the year for the activity the next year so we invite the people to make some proposal what they need to do for their village. But they just do the title of the project something like that, they are not doing the planning.”</p>	<p>Zulfisni Meutia, 2016,p.2/§62-71</p>		
<p>“I mean in some cases we had like for example the UN. We were funding a lot of our projects, the funding came through the UN, UNDP but then it came through different international NGOs so a lot of the international NGOs made quite a lot of money from it. And the amount that was actually there for us wasn't much. We had a terrible time, honestly. With all agencies.”</p>	<p>North, 2016,p.17/§727-730</p>	<p>A lot of the aid money is short term and must be spent within a year so that the donor commits.</p>	
<p>“I mean I know. I was country director and I've been finance director for a number of different organisations, so I know how it works. The headquarters of each of these offices survive or don't based on the number of projects they have out in the field and with the donors.”</p>	<p>North, 2016,p.17/§711-713</p>		
<p>“[...]and then by the time it gets down to the actual community what's left really? Not a lot.”</p>	<p>North, 2016,p.17/§725f</p>		

<p>"So you have Save the Children, you have Care, you have Constone??, you have Oxfam, you have all these different agencies. And for example, Save the Children you got Save the Children UK, you got Save the Children Australia, Save the Children this, Save the Children that and they never work together. And now they are all here. So, they must have spent, I don't know how much time and money and energy on trying to figure out a structure how they could all work together. In the meantime, children are being trafficked out of the area."</p>	<p>North, 2016,p.17/§732-738</p>		
<p>"As far as I know since after the tsunami we kind of have limited coordination from the government initially, but then it was organised by what we call the rehabilitation and reconstruction agency, BRR. But even though it was established, but then the disaster was really huge to deal with in a very short time, but on the other hand there are a lot of... How to say... Helps coming from outside with different agencies and NGOs coming over to Banda Aceh and to help rehab and reconstruct the housings and other infrastructures. What I understood early on that stage the coordination was not really good. So, like the NGOs that wants to build housing immediately, they just directly connected to the district, the village leaders, and asked them to collect the data of how many households and how many families need to have new houses, and because of this mechanism then there're always some... [chuckle] Background stories behind it which is not really... Is not supposed be that way."</p>	<p>Meilianda, 2016,p.1/§30-39</p>	<p>After the tsunami there was limited coordination from the government until BRR was implemented. Since the disaster was huge there was a lot of international aid coming in through NGOs and agencies. At the start the coordination was not good. The NGOs wanted to start building houses and just directly cooperated with the communities in the villages. This led to a number of unwanted results. The master plan that was made at the same time now does not match up with the result. The housing was already getting rebuilt at the coastal zone and there was no possibility for the government to change the layout. In the end even more houses than before got built in the dangerous areas right on the coast.</p>	<p>B1.Bc, B1.M, B1.Q, B1.Cd</p>
<p>"And after a while, BRR has established and has been well-structured, in the internal. So, then all this kind of donation of building houses was coordinated through BRR. But still when we think about early on, at the same time in parallel, the government started to... By the help of other foreign agencies trying to re-plan the master plan of the city. Make the master plan of the city. Which seems to be not really connected with the housing construction because the land use that was set on the master plan was not... So, the housing construction was not obeying the master plan that has been newly set. So, then it means that in reality now, we see that the area, the coastal areas which is supposed to be empty for buffer zone, but then more houses were built even more in quantity than before the tsunami. Yeah so, that's what happened."</p>	<p>Meilianda, 2016,p.1f/§40-48</p>		
<p>"[...]I think, from my opinion it's because there's no immediate implementation of the master plan. So, the master plan was already set, a new master plan was... On the early stage until 2007 or so, there was no new master plan, but then, once the new master plan was released with a decree or something. But it's not immediately effective to the rehab recon process. So, it's not going hand-in-hand. So, I think that's one of the reasons as to now what we see, the housing was really spread over the coastal areas."</p>	<p>Meilianda, 2016,p.2/§52-57</p>		
<p>"You know the survivors, some families remain three person or even one or two but some families still are very big, very big number of survivor in the family like six for example. But this house is very small, 36 square meters. It is not enough for the big family to stay in. So, he mentioned that to solve this problem they should get two houses, something like that. Not prepare well before and then at the time of the construction they realise 'oh, this family should have more than one house because of big family' something like that. Some problem arose with that."</p>	<p>Haiqual, 2016,p.3/§90-95</p>	<p>Every family was meant to get a 36 square metres house. Since some families were very big this house was too small, so they should get more than one house. This aspect was not realised at the beginning and led to problems later.</p>	
<p>"Because the people in tent was not patient. When you are entering the community, people were waiting for long time. And during the time it was wet."</p>	<p>Purwanto, 2016,p.4/§184f</p>	<p>The people had to stay in tents at the start and it was the rainy season. They were not patient and everything had to happen really fast.</p>	
<p>"When UN Habitat was bring the process of reconstruction, design building code for Aceh."</p>	<p>Purwanto, 2016,p.8/§316f</p>	<p>The building code used in Aceh and Nias was brought in by UN</p>	

<p>"So they did the building code. And did they take one they already had and changed it a bit or how did this work?"</p>	<p>Interviewer, 2016,p.8/§319f</p>	<p>Habitat. The communities decided on the building material and wanted it to be brick because this is what they were used to.</p>	
<p>"Yes. Took the existing one from Indonesia, change to the new building code."</p>	<p>Purwanto, 2016,p.8/§322</p>		
<p>"During the process Acehnese people like to build by brick."</p>	<p>Purwanto, 2016,p.8/§327</p>		
<p>"Why was this, do you know? Why did they want to do this?"</p>	<p>Interviewer, 2016,p.8/§329</p>		
<p>"Because of they are used to brick instead of the other materials."</p>	<p>Purwanto, 2016,p.8/§331</p>		
<p>"It's like giving the right medicine to any illness. I am thinking for example the GTZ, after we did our design for the houses on stilts they did the same principle, design also a house on stilts but they design it much better. But because of that it took a long time and I think this is not appropriate. It's like giving a Mercedes Benz to someone who just need a simple truck. #00:43:16# So it's not being bad or good it's being appropriate for the condition of that time."</p>	<p>Kusumawijaya, 2016,p.4/§196-201</p>	<p>Some organisations came up with very good solutions, but this also took a very long time which was bad in this situation and condition. The solutions should be appropriate.</p>	<p>B1.D, B1.H</p>
<p>"There are organisations that built houses on new land, for the panic of the government not to build in the same village, but actually that encourages the government buying land which is not very tactical because it will involve a lot of money. But some organisations didn't care. They just want to build using their money. But in later states and I interviewed their officers they found that the land provided by the government are not suitable for building. And you can imagine the process of the government buying the land and using their money, using NGO money, charity money, buying the land and a lot of it is just corrupted. And it also slows down the process."</p>	<p>Kusumawijaya, 2016,p.5/§206-212</p>	<p>Some organisations built houses on new land which encouraged the government to buy land with aid money. Later they found out that this land provided was not suitable for building.</p>	<p>B1.A, B1.E</p>
<p>"What temporary shelter that we have is not that adequate if you like. So, it's really really a temporary shelter. Meaning that we need to work faster in regard to planning, yeah. Even we plan as we go, right? So, what we have is a quick, rapid, if you like but with compromised quality if you like. Quality not in the building quality, but quality in terms of planning. You will not have an ideal situation where you put housing for this type of family here, and this is the consumer centre if you like, this is the shopping centre, you don't have the luxury to plan that ideally. But you move people quickly from temporary housing to the final housing, meaning that you try to establish normalcy to achieve normalcy in a short period of time. This is also the reflection of our social, cultural and economic setting, different than Japan. #00:02:44# They have funds, they have resources to allow people to stay in temporary housing longer. But they would have a better or ideal spatial plan, urban design or whatever. So, which one is the correct approach?"</p>	<p>Samadhi, 2016,p.1/§9-19</p>	<p>The temporary shelters in Aceh and Nias were really temporary. Therefore, everything had to happen fast with compromised quality in terms of planning. In this situation there is no time to plan ideally. The aim is to move people quickly from temporary to final housing to achieve normality.</p>	
<p>"[...]post disaster reconstruction and rehabilitation, it's very much human-oriented. Even building schools, health facilities, roads, housing, especially housing, it's all human-oriented kind of activity. So, you need to get it right from the start. And the lesson that I captured during my service in Nias is, if you go there for the first time, don't... Or you better have a social specialist and anthropological specialist as the main component of your first or advanced team. Yeah. Then they would be able to map out things that has to be done, and things that cannot be done. Like for example, contractor versus community-based, is something that is learned after the fact. Which actually can be prevented should we deploy social scientists or anthropological scientists instead of engineer."</p>	<p>Samadhi, 2016,p.3/§116-124</p>	<p>Post disaster reconstruction, especially housing is very much human-oriented. Hence, it is essential to have a social specialist or anthropological specialist in the team from the very beginning. They would have to map out things that have to be done as well as things that cannot be done. This would prevent a number of mistakes.</p>	

<p>"[...]we employed more social or community facilitator, community engagement facilitators or specialists, than engineer. Then we get more input and feedbacks, in regard to how best we deliver the reconstruction, even the housing. And that is why we know then that, it's not just housing, they need more on road and bridges and school, then."</p>	<p>Samadhi, 2016,p.3f/§131-135</p>		
<p>"Should we take that into account, the design would be different, but we don't have the time. What we need to do is a universal design. That's also a lesson learned that we have. That's why it's not just engineer that needs to go there in the first or within the advanced team, but you have to have social specialist and anthropological specialist. That is why, and then, you can capture that. We don't have the luxury of having time to have a participatory kind of a planning or inclusive planning because we need to move people from temporary housing to the final housing and create a sense of normalcy back. Because that is the thing that is deemed important for Indonesia, for Aceh and Nias case. We don't know about other cases but going back to normalcy stage is important as soon as possible."</p>	<p>Samadhi, 2016,p.6/§225-233</p>	<p>During the reconstruction in Nias there was no time to work on an earthquake resistant design option following the traditional techniques. A universal design was needed so people could move from temporary shelters to permanent houses as soon as possible. There is no luxury of planning there and engineers are less needed than social scientists.</p>	
<p>"ICRC and IFRC they have emergency shelter which is made of pine wood and steel frame. It's so beautiful, you love it when you see it. I mean, I'm from Indonesian background, I like to see that. So, the first thing that they do, ICRC and IFRC when they came to Aceh and Nias, they built that emergency shelter. And then us and other agencies later on built the final house. And what would you do with this? Sphere said it has to be disbanded because you already have the final one. But people in Aceh and Nias doesn't want to dismantle that, because they can use this for other purposes, which is permanent activities, like kitchen, extra bedroom and this and that. So, one of my first decision is to not allow the Red Cross to have that kind of approach because it makes the survivor, a family, has two houses. Because this temporary, sorry, emergency shelter is considered as a house, because it is better than their original house already, because they are poor. So, we don't want to give them two houses, we will give them only one houses. So, when I took office, one of my first decisions is not to use that Sphere approach in regard to the housing."</p>	<p>Samadhi, 2016,p.5f/§262-273</p>	<p>Some emergency shelters were made from wood and steel and looked better than the normal houses of the people because they are poor. After the permanent houses were built these shelters were meant to get taken down. But the people in Aceh and Nias did not want to do this and instead kept the shelters as an additional room or a kitchen or something alike. This led to a situation where some families had two houses in the end which was not fair. So building emergency shelters was not an option in Nias which added to the time pressure for reconstruction.</p>	<p>[B1.T]</p>
<p>"You just do - for me my mantra is that let the people see that you are really doing something on the ground. Whether the serious one or not so serious one but at least they see you do something on the ground because that will calm them down. If you just tell them that we are still in meeting, we are still doing the planning process and they don't see anything except your office, although there is light in the evening, late in the evening they don't consider that as work but as doing nothing. So, I cannot wait. So, I am not suggesting to use the normal process or let them know and also take part of the whole thing - no. Then I make a disaster. In a major disaster, you just do as fast as possible whatever you can do although the consequence of that is mistakes and costs - and additional costs."</p>	<p>Mangkusubroto, 2016,p.5/§200-208</p>	<p>Everything has to happen fast. There is no time for a planning process, instead people need to see something happening. As a consequence, this might lead to mistakes and additional costs.</p>	
<p>"But to tell you the truth, I don't put the theme on cultural things in the planning process otherwise it takes such a long time to plan. I opened room for, for me unnecessary thing. For me the most important thing is get the house ready as fast as possible."</p>	<p>Mangkusubroto, 2016,p.9/§390-393</p>	<p>Cultural aspects were not part of the planning process. There was no time for something like that.</p>	
<p>"It's too luxury. And that is actually part of the ICAIOS. The ICAIOS conference to put the protect of culture into the planning and that kind of things. So that's why I was supported by historians, I forgot his name - a professor from the National University of Singapore. I was supported by a historian from Harvard and NUS Singapore, the London library because I put the cultural perspective as the, basically the main theme of ICAIOS conference one."</p>	<p>Mangkusubroto, 2016,p.9/§380-384</p>		

"I think it was at the end of year two or the beginning of year three. There is an exhibition and I got a number of pictures, photographs from 150 years ago from the London library. So, we have the nice exhibition during that time."	Mangkusubroto, 2016,p.9/§388-390		
"It's a conduit to lessen the pressure, aha the BRR is now considering about culture. Aha ok ok, but they don't see the real implementation."	Mangkusubroto, 2016,p.10/§397f		
"Another thing on planning I think in my situation you cannot have a brilliant planning. There is no way of having this. So, what you have to do is actually planning as you go, planning as you go, planning as you go. You will make mistake but that will enrich your planning. There is not such a planning that is comprehensive planning in that kind of situation. You do, you try, you talk to the community and then you do the planning."	Sabandar, 2016,p.6/§234-238	There cannot be a brilliant or comprehensive planning for a reconstruction process. It would always be necessary to plan as you go. Mistakes will be made but they will enrich the planning.	
"And then they come and they see, like traditional houses. If you do the normal standards like treat Aceh and Nias the same you won't be able to build these traditional houses. It's a different ethnics between Aceh and Nias. And they come with this. The Australian government for example, they come with this. It's an example on when you do the local planning you do the regional planning, exactly you really address the needs of the region."	Sabandar, 2016,p.8/§327-331		
"At the beginning, I will let them do. At the beginning, they come and after the first six months they just come and they try to do it and then we tried to learn this process and then during the consultation process and then we learn ok, this approach is good. And then for example the German Red Cross come with a good example, the Italian NGO come with a good example, something like that. Even the traditional house that we see. For example, this is actually a good thing at the traditional houses, why don't we use this from the traditional house, this kind of things. So, everybody is contributing into shaping the approach and then I learned from this Island because I like to move from different part. For sure you make mistake, and some will ah this is not the right thing for example when we build the first houses constructor approach, some were broken. The NGO approach with bringing their big houses that was not the right things but we fix it, very quickly. The first year is actually trial and error. But after the second year I start to see 'ok, this is good thing'. More knowledge come into the systems."	Sabandar, 2016,p.9/§370-381		

B1.G: Community was unprepared

Quote	Source	Synopsis	MA
"[...]I think the awareness of the community in terms of reconstruction. They were thinking reconstruction means we get the money and then we can construct by ourselves, because lot of rumours at that time. When you were thinking, you will get money to build or totally build or totally reconstruct your house. But in fact, not always like that. So, you have to do plan."	Irwansyah, 2016,p.3/§90-93	The community did not know what to expect from reconstruction. Some thought they will get money to rebuild their house themselves just as it was.	
"We don't have to be in hurry. Before, people want anything in hurry. So, they use us in the institution BRR to do what they want. We don't have enough time and capacity to change their mind. Many people provoke us, just bring it."	Mardhatillah, 2016,p.4/§152-154	People were putting the BRR under time pressure. There was no time to educate them or change the current situations.	B1.F
"We need time to raise awareness of people."	Mardhatillah, 2016,p.4/§137f		
"But people they have no capacity to be patient. And then the politician also trying to go for people."	Mardhatillah, 2016,p.4/§169f		

B1.H: Bad quality housing

Quote	Source	Synopsis	MA
"So when there was an earthquake in 2012 in some of the houses they found a crack between the wall of the bathroom and the main living room. It was an error from the contractor but not all of the house had it. Just some of them. The hole is not too big but you can see it."	Irdus, 2016,p.5/§195-198	Some of the houses built by ADB got damaged in the 2012 earthquake. The walls between the bathrooms and the main living rooms had a crack. This is probably the shortcoming of a contractor.	
"[...]because this house was supervised by himself that's why it's really good but maybe different in other house. Depending on how the community looked at the project."	Irdus, 2016,p.8/§333-335		
"And then another thing is, once they build the house, for example BRR, so they built up to one hundred or two hundred houses in one area for example. So, the first ten house have been built very good but the last most of them not because sometimes in the middle of the process they change the contractor, or any conditions can happen in the middle and then the rest are most of them not as good as the first one because too many houses."	Sari, 2016,p.2/§68-73	Houses in big projects tend to get worse in quality. The first ones built are made well while the last ones built can be of real bad quality.	
"It is also various the one that has small income they just install the very light materials but the one who is rich – and then the plot land is large, so they built larger house. So, the core house is just very small and then the modification is very big."	Sari, 2016,p.3/§104-107		
"I did the assessment on thermal comfort in post-tsunami housing for my PhD thesis. We assess only in Banda Aceh case that is around 120 houses. So, at that time I want like to see – because for example Turkey the house built by Turkey looked very beautiful and most people just say how lucky they get the house from Turkey and also from Saudi-Arabia. So, the houses are very good from the outer performance. And then I would like to assess the internal comfort whether it is just as good as the people see from outside. Most of them were built from brick, from the heavy weight material. This is just as the one that we are studying in building physic, so for the heavy material during the morning it is cool but during the night – the heat that was absorbed by the heavy material will be transmitted into the internal during the night. So, it happens. So, the people say during the night it is warm so that's why some of them installed an air conditioner and a fan. So, it is just like the one we can predict. So, the result can be predicted before."	Sari, 2016,p.4/§141-151	Houses were not adapted to climate conditions. For example, the houses built by the Turkish Red Crescent were rated well by the people however, since they used stone and lacked insulation, they were too warm at night and the occupants had to install air conditioners. Thermal comfort did not seem to be an aspect that was looked at during the reconstruction. This is due to time pressure.	
"[...]actually the traditional Acehnese house is built from the wood. So, once I assess there the Acehnese traditional house right now it is still comfortable. Why, because maybe the proportional size. The size of the column, the wall and then the number of the openings and then the full of [?] so that's why the traditional Acehnese house can be maintained to be comfortable up to now. But the one that was built by the NGO just look like the Acehnese house, but the comfort is not as the same as the traditional house. Maybe the number of the openings and then the size and then the ceiling is just very close to the occupants and this is from zinc, but the traditional house is from leave. So that's why."	Sari, 2016,p.4/§162-169		
"Because they are running with times and then so many victims are waiting for the houses so that's why maybe just take six months the house should be finished. I think this is the reason why they don't think about the thermal comfort. At least the space is enough."	Sari, 2016,p.5/§112-114		
"So up to now most of the people will choose this one [brick] because they are thinking it is very solid and then it will be very strong but actually it is not as strong as we are thinking if the enforce is not well attached. Because for example this house look like very light and people will think that it will not sustainable for many years so people will choose this one."	Sari, 2016,p.5/§186-189	The choice of construction material and methods used during the reconstruction phase influences people's decisions when they build a house today. They think a brick construction is better in any case, even	

		though this does not meet other requirements, as for example climate conditions.	
“Because in Aceh it is quite often to have flooding so that is the better [?] for making such grounded house. For example, my house in Kabapang, three times a year we get flooding up to 30 centimetres so we have to stay on the bed so this is why if I build my house I will raise up my floor. I don't know maybe the drainage is not good so that's why the flooding is very a problem right now in Aceh.”	Sari, 2016,p.5/§197-201	Flooding is still a common problem. If the house is not on stilts and the drainage is not good enough, this leads to constant problems.	
“And then about the implementations because like Pak Heros say it's a huge implementation, 100,000 houses build in a short period. So, it's also difficult for the NGOs to implement all [?]. The big issue in the implementation is not the building code but the [?]. The corruption is the big issue if you are talking professionally about what is the worst what is the best. So, the worst is the corruption. The corruption so it is not following the aspects that has been [?] or tension in the bill of quantities. So, it's also the big issues. So, until you know that some of the agencies they were inviting the finding teams to Aceh for checking the iron, checking the cement, checking the composition of the buildings. Something like that.”	Dirhamsyah, 2016,p.8/§315-322	A big issue in reconstruction is corruption. This means whether the materials used are of a good quality or the houses are getting built as the builders were asked to. Some agencies were invited to check the quality for example of the cement and the construction in general.	
“We are talking about the structure and the building code and my engineering perspective also the NGO side, previously we are also working for NGOs. Actually, the civil engineer they are use the standard [?]. So, there is a standard following the building code but this is developed by the Dutch a long time ago. So, it is updated but still they use for the build of [?] they are following this standard.”	Dirhamsyah, 2016,p.8/§311-315		
“We checked this kind of thing and the mix of cement and sand. That was a special thing that we established in there to make sure that this kind of term occurred in the field. There were so many problems.”	Mardhatillah, 2016,p.6/§245-247	The BRR checked the quality of the houses for example the mix of cement and sand for the concrete and a number of houses got built in a very bad quality.	
“And so many material in the house is not compatible to the planning. The quality I think. The quality of concrete, the quality of anything – they reduced the quality. Most of the houses.”	Mardhatillah, 2016,p.6/§253-255		
“Not function at all, at all. Even we have spent too much money on building this one. You know, after BRR there is 2 billion, 200 million from the French government to Banda Aceh city to build the drainage but not function at all.”	Mardhatillah, 2016,p.10/§417-419	The drainage system in Banda Aceh was built with 2 billion Rupiah from the French government but it does not work.	
“I am trying to explain you about the drainage planning. Because when the rain is too heavy, the water cannot go anywhere. This is not function.”	Mardhatillah, 2016,p.10/§412f		
“When the French [?] come almost all of our housing is water damage.”	Mardhatillah, 2016,p.10/§423		
“Yes, the community build their house. And in the process more big problem then because one of the problem like the community is not in the field they are in the barrack and the other in I don't know where. And second not understanding technically and last, they are lazy for do that because I don't know I don't understand about this. We understand what they feel because we learn this process five years in colleague but we pressure them to know in one month. I think it's not possible. This is the problem and the third problem is some of them is busy like civil government, like other job that they have. They have no time to include in this process.”	Indra, 2016,p.3/§127-132	Approaches where the community builds their houses lead to problems since first, they don't live in the field but in barracks outside, second, they do not have the capability to build a house, third, some members of the community do not have the time to participate in the process.	
“The finally based of the three problems, the community can't make the own decision they want to build by themselves, they will bring the contractor or they want to involve the neighbourhood to help them. They do decision depend on the community or beneficiaries. That is the solving from the uncomfortable concept to adapt this problem. That is one of the lessons learned that we have.”	Indra, 2016,p.4/§240-144		

<p>"BRR have two concept, concept community contract like community based development and the second company contract, we use the contractor".</p>	<p>Indra, 2016,p.4/§151f</p>		
<p>"Before the tsunami victim happened, they don't know what the concept community we just know the contract by the company by the contractor. [...] How do we manage the concept and the timeline and schedule and community finish as we want. Finish as soon as possible because community contract is more weak from look. But after that, after house is finish, the beneficiaries is entry to the house we have good feeling. We build our own house by our hands. We discuss together what will planning in our neighbourhood. They know what they need. We don't know what they need. We just know what technically what we know, we know what we know and do what we know but they know what they need. So, we combine that. [...]The victim tsunami has different psychological condition to handle. If there is someone to rebuild there and go to Aceh when the tsunami happened this concept is not too easy to implement it. So that is the difference we have to change and adapt."</p>	<p>Indra, 2016,p.4/§158-174</p>		
<p>"And in Banda Aceh there is an example of good planning of housing, resettlement of housing. It's in Lambung, Lambung village in Meraksa sub-regency. It is near Ulee Lheue, near the beach. There is - the community of the village they really need to rebuild their home and so they plan. They do the land acquisition, so the road is arranged good and the house. But in the other village when the community "oh I need a house immediately" they not patient to wait. So, the resettlement of the house is not so good. Just follow the old land. The road is not straight, not block and block. But in Lambung, maybe you can visit Lambung village, you can see where the people have patience to wait they do the acquisition, the village planning, and the house is very good arrangement there."</p>	<p>Zulfisni Meutia, 2016,p.1/§27-35</p>	<p>In villages where the community was not patient and wanted to have houses as fast as possible, the resettlement of the houses turned out not as good. The construction follows the old land, the roads are not straight. Where the people were patient the village now has a much better arrangement.</p>	<p>B1.Cb, B1.F</p>
<p>"At that time actually, the government asked the people to do the village planning. But sometime the planning that they made sometimes they can follow it but sometimes they are not patient. Maybe the fund is not go directly, so they feel it is taking a long time to do the village planning first, to wait for the government. So sometimes the ideal is not happen. But I know that they have doing the village planning. Especially the village near the shore, the beach they doing the good village planning."</p>	<p>Zulfisni Meutia, 2016,p.2/§50-55</p>		
<p>"I think the procedure is already good, first the government ask them to do the village planning so they know what they need because they are doing the planning, the community after the disaster. They are doing the planning by their own so they know what they need and they learn how to make a planning. Of course, the government accompany them to do the planning. Actually, after the village planning, they know what they need and they finish the planning, after that the government will know what to have to do with the planning. So, I think the people learn a lot by doing their own planning. I think before they are not doing that. We doing the meeting in the beginning of the year for the activity the next year so we invite the people to make some proposal what they need to do for their village. But they just do the title of the project something like that, they are not doing the planning."</p>	<p>Zulfisni Meutia, 2016,p.2/§62-71</p>		
<p>"Because you know we have a case like the roof is from asbestos, it's not good for health. Because I heard that - it's not my own experience - but I heard they had no coordination with the government, so they just build the house. That's the result. So, I think in the future - we hope there is no disaster - but if it happens I think our government already has good experience so they just block and say every party that come to help us we welcome but have to coordinate with the coordination with the government to give what they plan to do, what is their specific field they want to go to in this place."</p>	<p>Zulfisni Meutia, 2016,p.3/§89-95</p>	<p>There is a project where the roofs were made with asbestos which is bad for the health. This happened because there was no coordination with the government and the houses just got built. For future reconstruction processes the government should block every party and have coordination compulsory.</p>	<p>B1Bb, B1.D</p>

<p>"But in some place, when we do the meeting with the community in Kuta raja sub-district the house that we help, I mean the fund is from some NGOs I don't know, the structure from wood is already weak. So, we had to maybe give some fund to rehabilitation. I think its time now. It's already 11 years after tsunami so it's already damage some, just like that. The floor, the wall so they ask for some fund to rehab their house."</p>	<p>Zulfisni Meutia, 2016,p.3/§116-120</p>	<p>The houses of a community in Kuta Raja were made by an NGO with a wood structure. Now, 11 years later, these houses are already weak and damaged, so these people asked for some funding to renovate their houses.</p>	
<p>"One of the issues was that some of the NGOs – I am not sure whether the World Bank was one of them – their thinking is that they want participation from the communities and from the families that were getting the houses. #00:55:24# But in some cases a twelve-year-old child is all that's left and in others it might just be a couple of women and nobody else or it might be one man and that's all. But they wanted the villages to be involved in the building of their own houses. But they don't have any skills about how to build a house and they were pushed into ordering materials and things like that which didn't exist in Aceh so they had to bring things from Medan and what Adi was saying, cause they had no experience to check the quality of the materials or how to take care of them or even how to secure them cause a lot of things went missing during that time as well. You've got a few thousand bricks on the side of the road that might be halved by the morning. Somebody went off with that, it was a lot of that going on. So, a lot of people didn't get a quality house as a result."</p>	<p>North, 2016,p.9f/§389-400</p>	<p>In some cases, the NGOs wanted the participation of the communities in building their own houses but this was not always a good option. Because "[...] in some cases a twelve-year-old child is all that's left and in others it might just be a couple of women and nobody else or it might be one man and that's all." Some people did not have any skills about building houses or checking the quality of material so in the end this often led to bad results.</p>	
<p>"[...]this idea of participation. I mean there is one thing about participation yes of course, it's a good thing to do but you got to look at the capacity of people who are left behind that you are expecting to participate."</p>	<p>North, 2016,p.11/§465-467</p>		
<p>"We had problems with Oxfam as I mentioned in our area where they promised to build this one particular village who had nobody committed to building for them. They promised to do it and then they couldn't do it because they didn't have the money but then they promised to organise for another organisation to come in and build it, that was a really long process. And I think even the organisation they got in to do it couldn't do it either."</p>	<p>North, 2016,p.10/§403-408</p>	<p>While some NGOs ran out of money and could not finish the houses they promised, a lot of houses got built that were not needed. Also, several houses had such bad quality that nobody wanted to live in them. Houses were built for children that lost their parents, but they would not live in these houses by themselves. In a number of cases people who lost their partner in the tsunami got remarried and therefore did not need their house anymore. So as a result, there were a lot of empty houses.</p>	<p>B1.J, B1.M</p>
<p>"So, what you end up with is houses that have been half built and then abandoned because of the quality and they couldn't do it. Or those that belonged to children because they were the only survivor and there was no way they were gonna live there on their own. They were obviously taken care of by somebody else and they may or may not need that house. In many areas, too many houses were built by the end of the day and so there is also a lot of empty houses but also one of the reasons is because after the tsunami during the reconstruction, if you are a female by yourself and you have a child or you are a female by yourself and you've lost all your children then probably the first thing you are thinking about is you need a husband and the same for the man. They've lost their wife they've lost their children they want a wife. So, then people began to get married and the usual situation is that the man would come and live in the village of the wife here anyway. So, if both of them had a house then one of them would be empty. In Meraksa at least quite a lot the houses are being out to rent now."</p>	<p>North, 2016,p.10/§410-421</p>		
<p>"[...]all they were talking about was how they could get the proper number of people that they had to help. I mean it was impossible for them to have a number because they had to report to their donors, everybody was obsessed with the number of people and what you gonna do with that number of people and the numbers changed. As I said people got married, more people came back from outside of Aceh when the piece deal was done. The NGOs and their donors were not flexible enough to cope with the changing situation in Aceh, the areas hit by the tsunami[...]"</p>	<p>North, 2016,p.11/§459-465</p>		

<p>"Well, I can see it sometimes like that, at least during the rehab recon. For example, so there are these houses which was already built with a different agency, and then there came another one from foreign country, to have a look to evaluate themselves, and it was kind of permitted by [chuckle] the one who constructed, that I wonder, [chuckle] yeah. So, what they did, the second agency that came to evaluate, and so, they introduced the method of reinforcement of the house. So, the house was built. So, they introduced the idea of reinforcing more the housing, with the frame for example, additional frame, additional whatever. So, this for me is a bit strange because then it should have been in the beginning when they started to build the house, they think about it. [chuckle] Not like complementary action afterwards. So, there are things happening like that during this rehab recon which is very interesting."</p>	<p>Meilianda, 2016,p.13/§544-553</p>	<p>During the reconstruction phase some houses got checked after they were already built and then got reinforced afterwards. One agency built houses and then later on another agency came along and added some reinforcements.</p>	
<p>"So, it was like there's this, maybe there was built these houses, the housing complex in 2007, and people later on in 2009, this agency came from different country, different agency, and have a look around at these houses and then, "Oh, this house has to be reinforced with our frame." So, they introduced it."</p>	<p>Meilianda, 2016,p.13/§557-560</p>		
<p>["The planning, what I understood, it's really determined by the donors who wants to build this housing complex for example. So, there were no supervision of which standard they have to really follow. For example, for the quality of the materials, for the building codes whether it has to be reinforced. So, it's, withstand the earthquake, so different qualities and different standards. What we see during the rehab recon, and they only set this kind of condition according to their own perspective."]</p>	<p>Meilianda, 2016,p.2/§65-70</p>	<p>[The donors decided themselves how to build the houses. There was no supervision, no standard they had to follow regarding the quality of materials or building codes. Everyone used different qualities and different standards according to their own perspective.]</p>	<p>B1.Bb, B1.D</p>
<p>["BRR already learned themselves that eventually they coordinated better than before. But it's a bit too late because during the process early or already in the early stage after the tsunami, then the housing was started to build and then without following certain regulations. But then later on I understood that the BRR has put some kind of supervision. Yeah, but it's already half way to go to the end."]</p>	<p>Meilianda, 2016,p.2/§74-78</p>		
<p>"Actually, they [Oxfam, UN Habitat] make an adaptation consider for the future disaster like earthquake. So, they design the house for earthquake proof until certain Richter scale. But not for tsunami because some built again near the coast. [Indonesian] They tried to adapt with the future disaster, especially the earthquake. But not for tsunami because they know that a tsunami very strong, the houses cannot stand for this. But earthquake yes, evacuation yes."</p>	<p>Haiqual, 2016,p.3/§107-111</p>	<p>A future tsunami was not an issue in reconstruction for some NGOs. Settlements got rebuilt near the coast in the hazard prone area. Also, flooding was not anticipated in the design. There was no time to plan or design options for this. The priority was to get people into a house as fast as possible.</p>	<p>[B1.D], [B1.Cd]</p>
<p>"Not anticipate for flooding for Oxfam design. So, I think mister Haiqual pointed about the - you know at that time the people need a housing quickly as possible, that is their intention. While other donor waiting, design. But Oxfam tried to support as quickly as possible so that the people can live in normal stage. This is the intention. So that's why they cannot discuss about the design for flooding. But how to make people can life in the permanent house. Because they want to bring people from the shelter to the permanent house. That is the intention. Maybe not much for anticipating another disaster like flooding. But other donors yes."</p>	<p>Haiqual, 2016,p.3/§119-125</p>		
<p>"So Derahaya is one of the first place who got the first aid of housing. So, at that time - I think there was a name like Bakri who built the housing there and they built it with asbestos and so on which is not the best material. So those people where in the camp after tsunami. And then when they built the house - they make agreement before of course, before they start building the house, like with this material and so on at the beginning. But then all of the NGOs came and in every area some NGOs working, different NGOs working and they all have different material. So, the first people got really kind of</p>	<p>Mardalena, 2016,p.2f/§87-94</p>	<p>In one of the first projects the material of the houses contained asbestos. All the NGOs came in and each NGO was working with different materials. The people that got these first asbestos houses were protesting.</p>	<p>B1.D</p>

like disappointed with the things why they got this. So, they make demonstration here, they protest about it.”			
“And sometime when the house was built since early 2005 and when BRR have wrong building code and we revised with some string turning column like this. Like in Nias we are eager to build fast and later on we are strengthening the column like this.”	Purwanto, 2016,p.4/§141-143	At the start BRR had insufficient building codes and so later on the houses built in this time got revised and retrofitted. This was especially the case in Nias where the aim was to build fast.	B1.D
“Climate adaptation, was this a topic?”	Interviewer, 2016,p.4/§164		
“No. At that time, it was actually not.”	Purwanto, 2016,p.4/§166		
“It's like giving the right medicine to any illness. I am thinking for example the GTZ, after we did our design for the houses on stilts they did the same principle, design also a house on stilts but they design it much better. But because of that it took a long time and I think this is not appropriate. It's like giving a Mercedes Benz to someone who just need a simple truck. #00:43:16# So it's not being bad or good it's being appropriate for the condition of that time.”	Kusumawijaya, 2016,p.6/§252-257	Some organisations did mistakes even though they should have had experience from other countries and other disasters. "But apparently, the experiences, the knowledge which is gained from the experiences are not stored in their organisation."	B1.D, B1.F, B1.L
“That's why we really, really shift from contractor-based to community-based housing delivery system. With contractor-based, you provide funds to contractor to build a house. And you know that Indonesia, is a very corrupt country, even in this construction, post-disaster kind of setting. Yeah? #00:08:36# So, what the contractor, did at that time is maximize profit by sacrificing quality or standard. I was there for the first time as building inspector. So, I go around the island and inspect the house. Most of the time, you find bad quality, even house without foundation or a column without proper, what you call it, steel rod. Not just numbers but also the size. Immediately, the concept that I propose was shifting from contract to community-based housing, because then the survivor would have a new economic kind of activities.”	Samadhi, 2016,p.2/§55-63	In Nias the BRR shifted from contractor-based to community based since the contractor tried to "maximize profit by sacrificing quality or standard". This results in houses with bad quality for example, without a foundation or with missing columns.	
“We just used very basic building standard. The buildings withstand a 7 Richter scale and the house space is between 36 square meters and 54 square meters. Only two. The 36 and 54 is very strict. But the 7 Richter scale I can say that we did not have a special effort to check. We just trust the NGO or agency that built houses to comply with that. And I understand that not all of them are following the best way they can, but that was my asset. Hopefully there is no earthquake anymore. But luckily no houses were collapsed during the big earthquake in 2011.”	Mangkusubroto, 2016,p.2/§95-100	The BRR "just used very basic building standard". Houses were meant to be built to withstand a 7 on the Richter scale. However, this was not being checked. BRR trusted the NGOs or agencies that they will build the houses according to this. Not all of them followed this standard. "But luckily no houses were collapsed during the big earthquake in 2011."	B1.Bc, B1.D
“The 7.0 earthquake, actually we don't have a building set of that. Excuse me for not can answer that question. I don't think that we used that standard if there is any. We just leave it to the agencies that built houses for us to use their own standard. So, the Austria Red Cross they used theirs. And I believe they don't follow that as well. Why? Because it was very costly. If you want to build a house with 7 Richter scale strength, then it will cost you a lot. So, I don't push too hard on that because for me you build as many houses as needed and you still have the budget to do that. It was very bad that they come back to me Pak Kuntoro I want to build another 30 houses, 3,000 houses but we don't have the budget. Then I will be at a bad position.”	Mangkusubroto, 2016,p.3/§116-123		
“[...]not all donor agencies or donor countries build houses with the quality that we require. For example, there are maybe still some article. We found out that in a certain area the building agency used asbestos. And there was a big criticism from the international NGO and from Australian Red Cross and that kind of things. That kind of things. And it was Bakri houses, so you step in and do something very fast. Another house on stilts that are not strong enough.”	Mangkusubroto, 2016,p.5f/§220-225	Some agencies built houses that did not meet the requirements. For example, there was a case where asbestos was used or another one where the stilts were not strong enough.	
“[...]our system with contractors is so bad. In Nias you see it's not because the houses are not strong for the earthquake but	Sabandar, 2016,p.2/§68-75	There were problems with the contractor based approach in	

the houses were built in the very poor standard. You see the reinforcement for example, the steel reinforcement. It should be reinforced. But because there is no supervision, corruption everywhere sometimes you see the buildings collapsed because there is only one steel in the column, that's not right. #00:10:49# All the schools were like this because there is no supervision, they normally send the money, 100 percent from Jakarta and then cut maybe corrupt in Jakarta 20 or 30 percent, bring to Medan, another corrupt, into Nias, so it's only 20 percent arriving there."		Nias. The houses were built to a very bad standard because there was no supervision and a lot of the money got lost on the way from Jakarta to Nias. Usually only 20 percent of the money arrived on the island.	
["Sometimes the brick houses were destroyed because of the earthquake. The wooden houses who are actually poor didn't destroy because of it's wooden. Now you have to give the money to the brick house. Now they build with 30 million rupiahs at that time but the poor houses because of they are not destroyed they are still poor they are still wooden. And then you see the discrepancy with these poor houses right. So, it's creating jealousy in the community. You have to solve these issues."]	Sabandar, 2016,p.3/§94-99	[While the brick houses got destroyed in the earthquake the wooden houses of the poor did not. The owners of the brick houses got money to rebuild their houses, again in brick while the poor still kept their poor houses. This created a discrepancy and jealousy in the community.]	
"Besides the earthquake issue, did you also look at other natural hazards that they are facing or also climate adaptation for example, climate issues?"	Interviewer, 2016,p.4/§167f	Natural hazards (besides earthquakes) as well as climate adaptation were not considered during the reconstruction process in Nias. The only consideration was development, poverty and reconstruction.	
"That time I haven't put that into considerations. My only consideration is development, poverty and reconstruction because the community is very poor."	Sabandar, 2016,p.4/§169f		
"The master plan didn't take climate change into the consideration at that time. If I do it now I would take it. But at that time, I think this is another thing that I didn't take."	Sabandar, 2016,p.8/§336f		
"And the current approach is we incorporate this but ten years ago when I did this it's very much with the environment, maintain your forest. Today I think if we do it again I think its more serious considerations on the climate adaptation, climate mitigation as well."	Sabandar, 2016,p.9/§341-343		
"[...]when I came there, schools were broken, not because of the earthquake it's because they are constructed wrongly. And that requiring you going down, telling them this is how you do this is how to do, not because they don't want. They don't know what to do so that's the role of NGOs, my people, facilitators to educate the community, this is how you do the houses. You have the guideline but you don't educate them. You don't go down and then tell them, they don't follow the guideline. They will just leave and then the contractors or the labours will do the same because they've been doing wrong things for long time so you have to train again and this is the way."	Sabandar, 2016,p.5/§181-187	Schools were destroyed, not because of the earthquake but because of bad construction. If a guideline is not combined with the education of the people then they will not be followed.	

B1.I: Additions/modifications are made by the people

Quote	Source	Synopsis	WA
"So at the beginning, when they introduced the design the house design is like an expanded house, so from the basic design in the future the beneficiaries can change and develop. So almost 90 percent of all the houses here changed."	Irdus, 2016,p.7/§295-297	Most of the occupiers, 90 percent, changed their house after the reconstruction process was finished.	
"They also make another room because the design of the house is only two room."	Irdus, 2016,p.7/§300		
"For new houses or if you do an addition to your house, is it still a rule to follow the earthquake safety?"	Interviewer, 2016,p.5/§184f		
"So for new house there is no following for the rule."	Irdus, 2016,p.5/§189		
"Because after ten years later we see so many modification. Maybe only five percent of the houses were not modified. I	Sari, 2016,p.1/§14-22	Almost all houses have been modified by now [2016]. The	B1.Bg, B1.D,

can say 95 percent are modified because most of them built like, for example they just installed the light plywood at the back, [?] the kitchen or maybe just put a very low zinc sheet to make a barrier to give more function and space for them because the core house normally it consider of two bedrooms and then one living room and then just very small space that maybe the overseas people can use this as a kitchen because when I did my PhD in England the house was very small and then some of them only four times four and then everything is in them like studio room. But in here it is not working. So, people will not be satisfied with that. So that's why around 95 percent of people add some more things to use it as the space."		original core houses are too small so people make additions to them. Every NGO had their own template, also the BRR had one. There are usually three or four templates that people can pick from but it is only 36 square metre for each house.	
"For the core house as I know that they have their own template. For example, BRR that is the government side who supply the house. They have the template. For example, they have up to three or four templates and then people can choose but most of them the size is 36-meter square, two bedrooms and one living room. So that's why actually this is not enough but people cannot say I have larger because that is the only one that they are providing."	Sari, 2016,p.1/§32-36		
"So mostly 75 percent say we are happy with the houses but after ten years later what we have seen so many modifications so it means maybe the 36 meter square houses doesn't meet their need to accommodate their daily activities so that's why they built some more spaces for them."	Sari, 2016,p.3/§102-104		
"It is also various the one that has small income they just install the very light materials but the one who is rich – and then the plot land is large, so they built larger house. So, the core house is just very small and then the modification is very big."	Sari, 2016,p.3/§104-107		
"But most of the core house – because I am living also in the post-tsunami houses, so the one that I have recognized is the core one is very good up to now there is no cracks. But one that has been modified full of cracks. So, what I am thinking, NGO has been working very well, they followed the guidance because UN Habitat provide the guidance that they revise that all the NGOs should follow this guidance. But then maybe not all of the occupants observe how the labour work on their houses so they cannot take any knowledge. #00:08:15# So once they modify their house they just do with their own knowledge, the old one. So that's I think why the modified one is full of cracks but the core one is still good."	Sari, 2016,p.2/§54-61	Often the core house has a good quality, but the additions that the people did themselves are in bad quality and have cracks already. The occupiers modify their houses with their own [old] knowledge and therefore the houses are unsafe again.	
"Also, we were interested in the morphological change of the houses because the government and the donors actually agreed that they will be building, what we call the core house which is 36 metre square minimum but some donors did 40 or 36 plus they say. And that's very small but many people of course changed the layout, add room, add a second floor, add different things. We tried to look at that. Initially we wanted to see the quality, also to see the quality of the building, I think there is some data on that but mostly our data is on the morphological change of the houses, which is very interesting in terms of many things including cultural issues, demography issues, but also the DRR issues how actually adding new rooms affect the risk reduction.[...]But many [?] basically most houses have changed usually by adding new rooms and most addition happened to the kitchen because culturally Acehnese women want big kitchen. Well, the Acehnese want big kitchen because kitchen is not necessarily only to cook things but also a social space in our culture where women usually accept guest, female guests or male guests."	Mahdi, 2016,p.1/§31-42	Almost all the houses got changed now, ten years after the reconstruction. Most people added new rooms to their house. This affects the disaster risk reduction. Mainly kitchens got expanded or added, since the kitchen is a very important room in the Acehnese culture.	

B1.J: Houses were not occupied

Quote	Source	Synopsis	MA
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<p>"Four years after the tsunami maybe only 50 percent were occupied but the rest were empty. Maybe the reason they were not ready yet to stay there because it is just close to the beach, some of them because they were still afraid maybe because they still remember but right now most of the houses have been fully occupied either the renter or maybe they bought from the post-tsunami victims."</p>	<p>Sari, 2016,p.3/§107-111</p>	<p>Half the houses close to the beach, in the dangerous area, were not occupied four years after the tsunami because people were scared to go back. Now the houses are occupied, either from renters or from people that bought it off the victims.</p>	
<p>"This is one concept of management, disaster management. Non-structural and structural way. Structural way they build houses and policy about that. And non-structural divided by two, cultural and spiritual. It means how we can put the same things together, to joining. Sometimes the infrastructure put - the housings is not near by the livelihood activity, so far from the economic activity. This is one how the houses is still empty and some houses they rented to other people. If we look directly to the empty houses or maybe you can interview some local communities. They ask similar, 'how we can survive?' 'how we can get the some of our life?' and this is what they say."</p>	<p>Dirhamsyah, 2016,p.5/§183-190</p>	<p>In some places, houses were built as a structural answer, but the non-structural aspects did not receive consideration. As a result, the houses stayed empty or people rented them out since they did not have any livelihood options in this area.</p>	<p>B1.E</p>
<p>"It means our duty now - also we need your help - how we can create the concept of the small or medium industry to help the people. And how to create competency of the people. If we help to create the competency it means that they have their own competence and they can sell it. This is what we need some idea how we can create competency programme and how we can create the livelihood for example. How to put the [?] inside this area and how we can create some concept of the housing but nearby the economic activity. Also, nearby for their children for school."</p>	<p>Dirhamsyah, 2016,p.5/§192-198</p>		
<p>"They don't have the idea how they can move from their land, you can say that cultural [?]. This is also the same in Japan. They make the great wall very high. In some area, they don't face about the view of the ocean they are looking only the wall. And that's also something structural without the cultures. But we are different in Aceh. We have the non-structural too - cultural and spiritual."</p>	<p>Dirhamsyah, 2016,p.5f/§219-223</p>		
<p>"The point at that time, because they have so much money, the point is just wasting money. Building something that sometimes this is the building of the people but actually no, because not enough participation. So just building, we have so much money."</p>	<p>Mardhatillah, 2016,p.5/§216-218</p>	<p>A number of buildings were built during the reconstruction process but then were never used. The people or future owners were not involved in the planning, so the houses were not of use and were a waste of money.</p>	<p>B1.M</p>
<p>"Was there a timeframe for the money to be spent?"</p>	<p>Interviewer, 2016,p.5/§220</p>		
<p>"In the range of four years from the beginning after tsunami until the BRR finished up - four years. But for NGO can be extend, if they have some kind of spending they have to talk to you. So, we don't have a stiff frame time. We have some kind of flexibility in time."</p>	<p>Mardhatillah, 2016,p.6/§222-224</p>		
<p>"We had problems with Oxfam as I mentioned in our area where they promised to build this one particular village who had nobody committed to building for them. They promised to do it and then they couldn't do it because they didn't have the money but then they promised to organise for another organisation to come in and build it, that was a really long process. And I think even the organisation they got in to do it couldn't do it either."</p>	<p>North, 2016,p.10/§403-408</p>	<p>While some NGOs ran out of money and could not finish the houses they promised, a lot of houses got built that were not needed. Also, several houses had such bad quality that nobody wanted to live in them. Houses were built for children that lost their parents, but they would not live in these houses by themselves. In a number of cases people who lost their partner in the tsunami got remarried and therefore did not need their house anymore. So as a result, there were a lot of empty houses.</p>	<p>B1.H, B1.M</p>
<p>"So, what you end up with is houses that have been half built and then abandoned because of the quality and they couldn't do it. Or those that belonged to children because they were the only survivor and there was no way they were gonna live there on their own. They were obviously taken care of by somebody else and they may or may not need that house. In many areas, too many houses were built by the end of the day and so there is also a lot of empty houses but also one of the reasons is because after the tsunami during the</p>	<p>North, 2016,p.10/§410-421</p>		

reconstruction, if you are a female by yourself and you have a child or you are a female by yourself and you've lost all your children then probably the first thing you are thinking about is you need a husband and the same for the man. They've lost their wife they've lost their children they want a wife. So, then people began to get married and the usual situation is that the man would come and live in the village of the wife here anyway. So, if both of them had a house then one of them would be empty. In Meraksa at least quite a lot the houses are being out to rent now."			
"[...]all they were talking about was how they could get the proper number of people that they had to help. I mean it was impossible for them to have a number because they had to report to their donors, everybody was obsessed with the number of people and what you gonna do with that number of people and the numbers changed. As I said people got married, more people came back from outside of Aceh when the piece deal was done. The NGOs and their donors were not flexible enough to cope with the changing situation in Aceh, the areas hit by the tsunami[...]"	North, 2016,p.11/§459-465		
"So, there are also housing already built but no people inside. No one lives there. So, there are two cases. The first one is there is the house but no one lives, this is the case where the parents were live there and the kids will be like somewhere else like Medan or somewhere and the tsunami happened and the parents are passed away so no one was there. But the kids they have the certification that the land belongs to them so they send a letter to the government to get a house. So, got a house but no one lives there. And the second one those are people who rent the house. They are not from Banda Aceh they don't own a house here. Tsunami happened and they got no place to live. They don't have the land of their own so there's a problem."	Mardalena, 2016,p.3/§98-106	Several houses were built but stayed empty. This was the case, when parents passed away and their kids were outside the city. If the kids sent the land certification they got a house built for them even if they did not need it. Also, people who were renters and lost their rental house got their own new house in the reconstruction process.	B1.M

B1.K: The poor life in the dangerous coastal area

Quote	Source	Synopsis	MA
"Our plan to - I tried to remind that the first three months after the tsunami we have a blueprint from Bappenas [Indonesian Ministry of National Development Planning], Bappenas is the planning agency in central government. And I join with them before I work in Public Work in provincial. We have a plan that at two-kilometre zone there is no building. It's good because we also learn from our sister city in Japan they also move all community to the hill. I think that's a good idea and also all the public facilities like hospital, power plants and other things let's say governor's office move to more the inland. But it's not happen at that time I don't know why because at that time I am not first person that can make decision. But I know we have a good idea, we have a good plan that time but they not follow that plan. I mean the BRR. In my mind at that time it's good that our people in more safe living in inland area. Even in Aceh Besar it's ok. We can work together with Aceh Besar that's our neighbour and we can share the facilities, water supply, also solid waste and other things that we can share, it's ok. But decision is not good enough I think."	Bahagia, 2016,p.6/§230-241	The people that got houses close to the coast also became the owners of the land. BRR decided to not go with the master plan for Banda Aceh that already existed.	B1.Cd
"If you saw the spatial plan it's always, not always, you can see that in the north side of our city is green so we start to start."	Bahagia, 2016,p.5/§215f		
"And again, takes time and takes money to buy the land from the private, from the community. Every year we have to buy about two or three hectare that's quite a lot of money. But we have to buy. Otherwise we lose a chance to plant mangrove or something like this. So, it's still, ya."	Bahagia, 2016,p.5f/§220-223		

<p>"For the people that have middle income and up they will buy a new land in inland, there is no living in the sea line. So even now, if some people right now are still living there if they have quite enough money they will move. And also, it's very expensive now inland, 5 or 6 time than before. For example, in the sea line is about 300 or 400 thousand Rupiahs. #00:29:34# Let's say around 25 US dollar per square metres but inland you can times six or eight, even ten. So, it's quite expensive. So, for low income people will still live there except for the fishermen. Fishermen always want to live close to the sea, it's ok it's no problem at all for the fishermen."</p>	<p>Bahagia, 2016,p.6/§241-248</p>	<p>It is mainly people with low incomes that are living in the coastal area. The people with middle income just buy land further away from the coast. Poor people cannot afford this since land is more expensive further inland compared to the coast.</p>	
<p>"But also then the government had already abandoned the first blueprint of people not living within three kilometres by the sea. They tried to, for example people in coastal towns like Ulee Lheue, they were going to move them up to Janto which is the capital if you like of this sub-district here which is a farming area, it's forest and farming. So, you gonna move all the fishermen to the forest and of course most of them didn't want to go. They wanted their livelihoods, the only thing they know is from the sea. So that didn't go down very well. There were a few people who were relocated [...] So a few people from Ulee Lheue were rehoused in another area, those who's land had all gone there was no chance of them ever having a house there"</p>	<p>North, 2016,p.5/§186-194</p>	<p>The government tried to move people from the coast to the mountain, out of the danger zone. Since the people were fishermen and not farmers most of them did not want to move. As a consequence, the government abandoned their first blueprint with a three kilometre no building zone. There is no promising future for the fishermen anyway. The corals are bleaching and they are overfishing but they are still the poorest members of the community. But there are no alternatives and nothing is being done.</p>	<p>B1.E</p>
<p>"So, all we can do really is trying to set up areas where they protect the corals at least in any way they can. Whatever happens with bleaching there is nothing we can do about that. The fishermen have no idea about what they gonna face in the future. No idea. And they are overfishing. But their view is how can they be overfishing – if they were overfishing they would be rich and they are not. They are still the poorest of the community. I mean they are and they've got no alternatives and nothing is being done."</p>	<p>North, 2016,p.14/§608-613</p>		

B1.L: NGO shortcomings

Quote	Source	Synopsis	MA
<p>"On one side the NGO cannot provide everything but on the other side the survivors need diverse things not only one type."</p>	<p>Mahdi, 2016,p.2/§60f</p>	<p>The NGOs are usually specialised on one thing and they cannot answer the victims real requests. Everyone will get the same no matter whether it is needed or not.</p>	
<p>"One of the challenges at that time was that the NGOs is not a construction agency."</p>	<p>Kamaruzzaman, 2016,p.8/§342f</p>	<p>Not all the NGOs knew how to do construction, some were specialised in food or in water. In Aceh they still started to build houses which presented a problem.</p>	
<p>"Not all NGO is a construction NGO, they don't have their field in the construction. So, they forget this when they come help. The NGOs support food or water or something like this."</p>	<p>Kamaruzzaman, 2016,p.8/§345f</p>		
<p>"In Aceh, they built the house! What's the lesson learned from Aceh to a lot of the NGOs – how to build a house. Some of the last conflict..."</p>	<p>Kamarizzaman, 2016,p.8/348f</p>		
<p>"So the lesson learned from that is because they are no experts in construction so when they implement a project sometimes they take a wrong contractor to build it, always happened like that. That's one condition at that time."</p>	<p>Kamarizzaman, 2016,p.8f/§351-353</p>		
<p>"And it was east wind season. It is the rainy season, really strong winds. The NGOs had no idea about tides, cause these were coastal villages – high tide, low tide. We had Oxfam building houses in the sea because they researched it when it was low tide. And then we came past when it was high tide."</p>	<p>North, 2016,p.4/§153-156</p>	<p>Some NGOs built houses during low tide and then during high tide the houses were flooded or washed out to sea. The NGOs were not used to working in coastal areas like this and yet, they did not do examinations or listen to locals.</p>	<p>B1.Cd</p>
<p>"Oxfam built house in Meraksa, you know, Deyah Glumpang. They build and then after a month high tide, half house flooding."</p>	<p>Istens, 2016,p.4/§158f</p>		

“The works, materials, everything gone out to sea... That was the beginning of the most ridiculous things, there were many others. And because also they wouldn’t believe us. I’m like, you know I know, I’ve lived here for a long time, I know the situation. They weren’t even looking because it never occurred to them that there are tides even. You know, these people aren’t used to work I guess on coastal areas like this and a lot of the areas like Ulee Lheue there was a lot of land lost as well.”	North, 2016,p.4/§161-166		
“Of course, what international NGO had any experience in building houses. Really. I don’t think so. None of them do, they don’t. They don’t build houses. I mean they might do now because of big disasters but they never did before. I’ve been working for international NGOs for quite some time and I’ve never been in a project. The most they might build would be health facilities, things like that but never building houses.”	North, 2016,p.8/§314-318	A lot of international NGOs did not have experience in building houses. And a number of organisations worked outside their normal field of expertise, for example Save the Children, Oxfam and UNDP all built boats, but they all sank.	
“Building house problem with NGO been not experienced. Ok. Save Children they not save children, they save money. Save Children build house and then boat. They not experience for that.”	Istens, 2016,p.12/§404-406		
“World Vision built boats, UNDP built boats, they sank. They all sank. We’ve got pictures of it.”	North, 2016,p.12/§508f		
“You need strong wood not just wood, not furniture wood. They built furniture wood and then they give for fishermen. Fishermen looking why? What this wood? We don’t want it. And then not in operation this boat.”	Istens, 2016,p.12/§516-518		
“So we went to this meeting with all the local Save the Children partners and there was like six organisations. And we were the only one who was doing something with children. The others were all micro credit and micro finance projects. I thought that’s terrible. This is Save the Children this is not even doing anything for children.”	North, 2016,p.17/§757-760		
“I asked the same question to for example the World Vision, I forgot what they did, the mistake, but I asked, "how come you did this mistake" because I know that World Vision have experience all over the world. Like many other big NGOs. But apparently, the experiences, the knowledge which is gained from the experiences are not stored in their organisation. Maybe also because they are too professionalised, meaning the consultants work as consultants, not as what we call solidarity worker.”	Kusumawijaya, 2016,p.6/§252-257		

B1.M: More houses got built than houses destroyed

Quote	Source	Synopsis	MA
“Maybe before the tsunami one didn’t have a house, maybe only rented a house but the same treatment was for them, they got replaced to another land.”	Kamaruzzaman, 2016,p.2/§50f	People who were renting places before the tsunami got their own house and their own piece of land in the reconstruction.	
“One of difficulties in this time, at that time after the tsunami a lot of young men got married. They wanted a house too.”	Kamaruzzaman, 2016,p.4/§148f	Young men got married during the reconstruction process and then also needed their own house.	
“So, everybody wanted a house.”	Kamaruzzaman, 2016,p.4/§151		
“After the tsunami, they got married and then they wanted a house. This is one of the dynamics that we had in the process of reconstruction.”	Kamaruzzaman, 2016,p.4/§153f		

<p>"So, there is another case that happened at time after the tsunami. Maybe that's a challenge for BRR also because there are many people requested for a new house. For example, suddenly just many of young men wanted to get married because after that they can get a house. So that's another new phenomenon that happened because before they don't have a house and to get a house they suddenly got married and then after that they have to get a house. From BRR also they have to make a house."</p>	<p>Kamaruzzaman, 2016,p.4/§156-161</p>		
<p>"So, the first planning they wanted to build 96,000 houses but in reality, it became around 142,000 houses, so it's more than they were planning."</p>	<p>Kamaruzzaman, 2016,p.4/§166f</p>		
<p>"We had to change the blue print. Every year we changed the blue print to get new blue print."</p>	<p>Kamaruzzaman, 2016,p.4/§169f</p>	<p>Since there were more and more houses being requested, the blue print was getting changed every year. In the end everyone who wanted a house got a house because people were protesting.</p>	
<p>"Yes [everyone who wanted a house, got a house in the end]. A lot of demonstrations..."</p>	<p>Kamaruzzaman, 2016,p.5/§178</p>		
<p>"The point at that time, because they have so much money, the point is just wasting money. Building something that sometimes this is the building of the people but actually no, because not enough participation. So just building, we have so much money."</p>	<p>Mardhatillah, 2016,p.5/§216-218</p>	<p>Several buildings were built during the reconstruction process but then were never used. The people or future owners were not involved in the planning, so the houses were not of use and were a waste of money.</p>	<p>B1.J</p>
<p>"Was there a timeframe for the money to be spent?"</p>	<p>Interviewer, 2016,p.5/§220</p>		
<p>"In the range of four years from the beginning after tsunami until the BRR finished up – four years. But for NGO can be extend, if they have some kind of spending they have to talk to you. So, we don't have a stiff frame time. We have some kind of flexibility in time."</p>	<p>Mardhatillah, 2016,p.6/§222-224</p>		
<p>"There are so many places that have been built the house, it is a crisis among the people in terms of owning. There are so many people want to have their houses even they don' have right to own a house because they are not a victim of the tsunami."</p>	<p>Mardhatillah, 2016,p.6/§228-230</p>	<p>Numerous people received a house even though they were not tsunami victims.</p>	
<p>"At the end, facing the ex-combatant people, the state can be tending to promote them. There are so many houses that have been owned by the ex-combatants even though they don't have right to have this house. But the government tend to be ok."</p>	<p>Mardhatilla, 2016,p.6/§251-253</p>	<p>Ex-combatants got promoted by the state and got houses even though they did not have the right to get a house.</p>	
<p>"And of course, a lot of Acehese who were overseas who came back because at the same time the piece deal was moving forward as well so we also have to have that into the mix. So, people were beginning to come home so also families who had moved out of Aceh during the military conflict were also coming back. That also added to the dilemma of who got houses. What about these people who had left and who were now back, do they get a house or not? That was another big deal. I think in the end most of the agencies just went how many do you want, where do you want us to build it, we build it and that's it cause they just couldn't get down to that level of trying to organise everything."</p>	<p>North, 2016,p.9/§354-361</p>	<p>A lot of Acehese who had left their home came back after the tsunami which added to the problem of who will get a house. Most agencies just handled this situation with giving a house to everyone who wanted one because it was too hard to organise.</p>	
<p>"We had problems with Oxfam as I mentioned in our area where they promised to build this one particular village who had nobody committed to building for them. They promised to do it and then they couldn't do it because they didn't have the money but then they promised to organise for another organisation to come in and build it, that was a really long process. And I think even the organisation they got in to do it couldn't do it either."</p>	<p>North, 2016,p.10/§403-408</p>	<p>While some NGOs ran out of money and could not finish the houses they promised, a lot of houses were built that were not needed. Also, several houses were of such bad quality that nobody wanted to live in them. Houses were built for children</p>	<p>B1.H, B1.J</p>

<p>“So, what you end up with is houses that have been half built and then abandoned because of the quality and they couldn’t do it. Or those that belonged to children because they were the only survivor and there was no way they were gonna live there on their own. They were obviously taken care of by somebody else and they may or may not need that house. In many areas, too many houses were built by the end of the day and so there is also a lot of empty houses but also one of the reasons is because after the tsunami during the reconstruction, if you are a female by yourself and you have a child or you are a female by yourself and you’ve lost all your children then probably the first thing you are thinking about is you need a husband and the same for the man. They’ve lost their wife they’ve lost their children they want a wife. So, then people began to get married and the usual situation is that the man would come and live in the village of the wife here anyway. So, if both of them had a house then one of them would be empty. In Meraksa at least quite a lot the houses are being out to rent now.”</p>	<p>North, 2016,p.10/§410-421</p>	<p>that lost their parents but they would not live in these houses by themselves. In a number of cases people who lost their partner in the tsunami got remarried and therefore did not need their house anymore. So as a result, there were a lot of empty houses.</p>	
<p>“[...]all they were talking about was how they could get the proper number of people that they had to help. I mean it was impossible for them to have a number because they had to report to their donors, everybody was obsessed with the number of people and what you gonna do with that number of people and the numbers changed. As I said people got married, more people came back from outside of Aceh when the piece deal was done. The NGOs and their donors were not flexible enough to cope with the changing situation in Aceh, the areas hit by the tsunami[...].”</p>	<p>North, 2016,p.11/§459-465</p>		
<p>“As far as I know since after the tsunami we kind of have limited coordination from the government initially, but then it was organised by what we call the rehabilitation and reconstruction agency, BRR. But even though it was established, but then the disaster was really huge to deal with in a very short time, but on the other hand there are a lot of... How to say... Helps coming from outside with different agencies and NGOs coming over to Banda Aceh and to help rehab and reconstruct the housings and other infrastructures. What I understood early on that stage the coordination was not really good. So, like the NGOs that wants to build housing immediately, they just directly connected to the district, the village leaders, and asked them to collect the data of how many households and how many family’s needs to have new houses, and because of this mechanism then there’re always some... [chuckle] Background stories behind it which is not really... Is not supposed be that way.”</p>	<p>Meilianda, 2016,p.1/§30-39</p>	<p>After the tsunami there was limited coordination from the government until BRR was implemented. Since the disaster was huge there was a lot of international aid coming in through NGOs and agencies. At the start the coordination was not good. The NGOs wanted to start building houses and just directly cooperated with the communities in the villages. This led to a number of unwanted results. The master plan that was made at the same time does not match up with the current result. The housing was already getting rebuilt at the coastal zone and there was no possibility for the government to change the layout. In the end even more houses than before got built in the dangerous areas right on the coast.</p>	<p>B1.Bc, B1.F, B1.Q, B1.Cd</p>
<p>“And after a while, BRR has established and has been well-structured, in the internal. So, then all this kind of donation of building houses was coordinated through BRR. But still when we think about early on, at the same time in parallel, the government started to... By the help of other foreign agencies trying to re-plan the master plan of the city. Make the master plan of the city. Which seems to be not really connected with the housing construction because the land use that was set on the master plan was not... So, the housing construction was not obeying the master plan that has been newly set. So, then it means that in reality now, we see that the area, the coastal areas which is supposed to be empty for buffer zone, but then more houses were built even more in quantity than before the tsunami. Yeah so, that's what happened.”</p>	<p>Meilianda, 2016,p.1f/§40-48</p>		
<p>“[...]I think, from my opinion it's because there's no immediate implementation of the master plan. So, the master plan was already set, a new master plan was... On the early stage until 2007 or so, there was no new master plan, but then, once the new master plan was released with a decree or something. But it's not immediately effective to the rehab recon process. So, it's not going hand-in-hand. So, I think that's one of the reasons as to now what we see, the housing was really spread over the coastal areas.”</p>	<p>Meilianda, 2016,p.2/§52-57</p>		

<p>"So there are probably, the family got even better housing than before. Since there were a lot of poor people for example and they live in one small house and then there are two family cards so they got two houses better one than before. That's the advantage of the housing at that time."</p>	<p>Mardalena, 2016,p.2/§73-76</p>	<p>Some poor families benefit from the reconstruction process since there was a new house built for every family card.</p>	
<p>"She said the first thing they need to collect the data of landowner. So, in the case that one household they have - there is here the card of family so in this card of family it consists all, the parents, the children and so on. But when they got married they normally make a new family card. But there are cases where the children get married but still live with the parents. So, in this sense - when landowner, if there are two family card if the land is big enough they gonna build two houses."</p>	<p>Mardalena, 2016,p.2/§64-69</p>		
<p>"So, there are also housing already built but no people inside. No one lives there. So, there are two cases. The first one is there is the house but no one lives, this is the case where the parents were live there and the kids will be like somewhere else like Medan or somewhere and the tsunami happened and the parents are passed away so no one was there. But the kids they have the certification that the land belongs to them so they send a letter to the government to get a house. So, got a house but no one lives there. And the second one those are people who rent the house. They are not from Banda Aceh they don't own a house here. Tsunami happened and they got no place to live. They don't have the land of their own so there's a problem."</p>	<p>Mardalena, 2016,p.3/§98-106</p>	<p>A number of houses got built but stayed empty. This was the case, when parents passed away and their kids were outside the city. If the kids sent the land certification they got a house built for them even if they did not need it. Also, people who were renters and lost their rental house got their own new house in the reconstruction process.</p>	<p>B1.J</p>
<p>"They need 130,000 houses but we built a little bit more because of the GUM coming in and also part of the conflict resolution. Because the GUM coming back and want to have some house. But we are to getting the inside the community because of the part of the conflict resolution."</p>	<p>Purwanto, 2016,p.1f/§44-47</p>	<p>130,000 houses were needed but the BRR built more since the GUM was coming back [from Malaysia] as a result of the conflict resolution so they also got houses.</p>	
<p>"In that master plan, it was stated that we should build around 90,000 houses. Wrong - at the end we had to build around 139,000 houses, more than 50 percent. Ok? Why? Because process very simple one. You build houses or things that used to be there before. So, if a village is totally destroyed you will rebuild this village."</p>	<p>Mangkusubroto, 2016,p.1/§18-21</p>	<p>First the number of houses needed was estimated with 90,000. In the end around 139,000 houses were built, more than 50 percent more. All the houses that used to be there before were rebuilt.</p>	

B1.N: There were no assessments done afterwards

Quote	Source	Synopsis	MA
<p>"They [BRR] have a short time because BRR is only for four years so there is only for reconstruction and rehabilitation so there is not enough time to do the monitoring."</p>	<p>Kamaruzzaman, 2016,p.5/§215f</p>	<p>BRR was only put in for four years to do the reconstruction so there was no time to do assessments or any kind of monitoring afterwards.</p>	
<p>"But of course, we have the - a call centre to report..."</p>	<p>Kamaruzzaman, 2016,p.5/§218</p>		
<p>"They have like a call centre to complain and for any input the beneficiaries want to share."</p>	<p>Kamaruzzaman, 2016,p.5f/§220f</p>		
<p>"Because Aceh learned from the long conflict and a lot of NGOs also here in Aceh so maybe from the central government we felt insecure with a lot of international will be in Aceh so there is only for - kind of a politic issue - so it's only four years emergency to construct."</p>	<p>Kamaruzzaman, 2016,p.7/§229-231</p>	<p>The national government implemented the BRR for the reconstruction in Aceh and Nias. BRR was being put in charge for four years. This time limitation was due to the conflict history between Aceh and the Indonesian government. The government did not want to have international workers to be in Aceh for long.</p>	<p>B1.F</p>
<p>"You know in Aceh there was a conflict before, it was a conflict area. In the conflict, we wanted to be independent from Indonesia, that's why a lot of international communities in Aceh makes..."</p>	<p>Kamaruzzaman, 2016,p.6/§225-227</p>		
<p>"They [BRR] have a short time because BRR is only for four years so there is only for reconstruction and rehabilitation so there is not enough time to do the monitoring."</p>	<p>Kamaruzzaman, 2016,p.5/§215f</p>		

<p>"The assessment was during the BRR we did a lot of the assessment and then in fact before we start any activities then the project is in monitoring as well. But the moment the organisation was closed in the 2009 then after that the BRR [?] so the organisation is dismiss and all the activities on the rehabilitation and reconstruction basically concluded."</p>	<p>Faisal, 2016,p.5/§196-199</p>	<p>In 2009, when the four years of the BRR were completed, all the assessments ended and nothing was done after this.</p>	
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B1.O: Limited experience of the institution in charge

Quote	Source	Synopsis	MA
<p>"By understanding the name of my department, socio-, cultural and religious affairs, and then I have to break down this terminology because we don't have any guidance at that time. This is the new institution and we have no example yet. This is the task, this is the destroying, please come down and make something that - in terms of rehabilitation and reconstruction."</p>	<p>Mardhatillah, 2016,p.2/§55-58</p>	<p>Within the BRR the role of the departments was not always clear. Since this was the first time this institution got put in there was no experience and sometimes no guidance.</p>	
<p>"We learned so many thing at that time. Like what we have never known before. Like this, about data - how many house destroyed for example. We have data about thousand houses and then we tried to make a validity of this. Today we can get for example, 200 for example. When we try to valid it can be 400. Come again it can be 600."</p>	<p>Mardhatillah, 2016,p.13/§542-546</p>	<p>The number of the houses that needed to be built kept changing along the process and BRR was not prepared for this to happen. Breaking a house into two households guarantees the replacement of two houses instead of one.</p>	
<p>"The numbers changed quickly. So, this more kind of situation can be like that so we have to be thinking before. They make a double family card, they broke the house into two household. The house guard in one household they broke into two or three. So then from one house they can get three houses. So, if it was 200 then it will be 600. This is one of the case that we have not known before. How come the number of housing destroyed can be come up any time."</p>	<p>Mardhatillah, 2016,p.13/§550-554</p>		
<p>"Since you never did something like this before, did you look at other countries or other reconstruction projects?"</p>	<p>Interviewer, 2016,p.3/§125f</p>	<p>There was no time for the BRR to view examples of reconstruction projects even though they had little experience.</p>	
<p>"No. I didn't have time to do that. The only place that I went was Kobe but they are too advanced for us to follow. And they are too - yes, they are too advanced. So, I didn't go anywhere. Just follow my instinct."</p>	<p>Mangkusubroto, 2016,p.3/§128-130</p>		
<p>"And there are 8,000 foreign people at that time. So that is my approach. That's why I decided - not including, basically they are not part of it - I put them in my payroll the district members. I bribe them. There is a list of names. BRR was designed for 300 people, at the end it's - maybe 300 to 400 - but at the end there are more or less 1,500. And Jakarta shout at me 'what happened?' he works to hard but basically, I hired around 1,100 1,200 GUM, sub-district level, leader that kind of things. I had to bribe and pay them because otherwise they will shoot."</p>	<p>Mangkusubroto, 2016,p.9/§368-373</p>	<p>Since Banda Aceh was at civil war when the tsunami happened, and since many internationals came in to help, there had to be an end to the shooting. Thus, about 1,100-1,200 GUM leaders were hired in order to bribe them.</p>	

B1.P: Problems that came with international helpers

Quote	Source	Synopsis	MA
<p>"[...]we thought we could rent a few houses in Banda Aceh because at that time it was really cheap. It was about 10 million Rupiah which is about 8,000 dollars I guess for a big six/seven bedroomed house. But the media got here first like CNN and BBC and all those people with loads and loads of money and wanting places to stay and were prepared to pay anything to find somewhere to stay and then followed swiftly by all the UN agencies who also have so much money or they began to have money actually because they didn't have much money before the tsunami and they were renting all the big houses that were not hit by the tsunami. So, there was like a</p>	<p>North, 2016,p.2f/§83-95</p>	<p>Once all the international NGOs and media got into Banda Aceh they rented all the big houses that were not hit by the tsunami which made all the prices for renting go up by a lot. Therefore, it was impossible for Acehnese survivors to rent these empty houses and stay there instead of in tents.</p>	

border. Everything here was gone and here was big big houses. [...] So, our idea of renting houses was then completely out the window[...]"			
"While they [international emergency people] were living in these huge houses, some of which had swimming pools and air conditioning and all this, what a hard life. I mean not everybody was living like that but you know agencies were living like that. The communities knew that they were living like that and they thought that was really really unfair. And they were all driving around in great big cars, four wheel drives and all that and these people didn't even have enough food on the table."	North, 2016,p.12/§486-490		
"And the doctors that came over they were put in these great big houses, very nice houses and they actually said they didn't expect to be in those conditions. They expected that they would be the ones in tents, not the communities in tents and them in these big houses."	North, 2016,p.16/§699-702		
"[...]the international organisations did not think about it from the perspective of an Acehese person who had just gone through a conflict and probably lost people through that and now lost most of their family. Everything is gone."	North, 2016,p.10/§427-430	The international organisations did not try to imagine the situation from the perspective of an Acehese person. They went through a conflict and lost people and now they lost most of their family and belongings. Also, the villages were not healthy as a consequence of the civil war. There was not enough understanding about the condition and situation in Aceh both after and before the tsunami.	
"[...]not enough understanding about the condition and situation in Aceh. The day of the tsunami, the day before, how was it here and then the day after how was it."	North, 2016,p.445-447		
"During the conflict time, the way that Indonesia works in conflict is putting villages against each other, so you got people who are bullied and tortured into informing about other people. [...] It was really really bad. So, you are not working in a village that is a healthy village. It's just not. Conflict within the villages was also rife."	North, 2016,p.10/§430-435		
"[...]some people they survived and they rush out of the area and they had cars and so after the tsunami they had a hand phone and they had a car and then the organisation didn't believe that they were people who had lost everything because they had a car. That was another thing I think is that people came in with the mentality of it's gonna be like Africa or something but it wasn't in Band Aceh it wasn't like that actually and I remember at one UN meeting, UN OCHA and I hate to say that it was a British woman as well, she said that she was really surprised at the levels of reading and writing amongst Acehese women."	North, 2016,p.10f/§436-442		
"There had to be some better coordination between the villages. But you know what - it was so complicated. Ok so you've got an international NGO that comes in, some may have already been in Indonesia before the tsunami but they are all working on long-term development projects, they are not here on emergency response. Then emergency comes. So, the first people up into Aceh are the long-term development people who are committed to Indonesia, who know more and understand a lot more about what is going on. Some have been in Aceh some have not. Then, in comes all the emergency response people and they have a totally different attitude. So, what I saw was, a lot of the friends that I had in the agencies, who were the development people, they all left. Cause they just couldn't cope the situation. Because all the emergency response people that came in - it was like a big game for them - you know, flying in helicopters and boats here or there."	North, 2016,p.11/§473-482		At the beginning there were international NGOs coming in that were already working on long-term development projects in Indonesia and knew the country sometimes even knew Aceh. Then the emergency response people came and they had a totally different attitude. For some of them "it was like a big game [...] flying in helicopters and boats here or there". As a result a number of development people left because they could not cope with the situation.
"I remember there was one guy who was asked what did he think about his experience - why was he here and he said for money and glory. Because they were paid a lot of money. And also, every two months or something they went off to Bali for a weekend or off to Australia because it was such a stressful place to live. While they were living in these huge houses, some of which had swimming pools and air conditioning and all this, what a hard life. I mean not everybody was living like that but you know agencies were living like that."	North, 2016,p.11/§482-488		

<p>"I don't know how you can make the connection really because they hired mostly non-Acehnese people for the management positions within their organisations because Aceh hadn't had a lot of NGOs there weren't a lot of people with experience. #01:09:20# So if you say the senior manager was national and that's probably Javanese not always but probably and then they hired more people under them and generally the Acehnese would be at the bottom, the drivers, the security, the cleaners. In some cases, there were Acehnese who could – who were a bit higher level than that. So, then you've got national staff who can't speak Acehnese with local staff who can speak Acehnese going to the communities to speak Acehnese – the level of miscommunication with the villagers was just ridiculous. What was fed back up and what was come down could be completely different. So, a lot of miscommunication."</p>	<p>North, 2016,p.12/§490-500</p>	<p>There was a lot of miscommunication. NGOs hired mostly non-Acehnese people for the higher positions because there were not a lot of Acehnese people with experience. Often, they were national, which means mostly Javanese. The Acehnese were generally on the bottom line. At the same time, they were the only ones being able to communicate with the locals.</p>	
<p>"BRR was actually set the standard and also the building code and NGO and also the donor followed the same standard. And the standard of 36 square metre is actually from BRR. So not to create jealousy among refugees because when the 2005 begin a lot of the NGO was promise to the community they are building 42 square metre and also more."</p>	<p>Purwanto, 2016,p.9/§361-364</p>	<p>BRR set a standard for the size of the houses. They all had to be 36 square metres and the NGOs had to follow this. At the beginning some NGOs promised the people bigger houses so the BRR had to step in to prevent jealousy.</p>	<p>B1.Bc</p>

B1.Q: Lack of institution/no preparation

Quote	Source	Synopsis	MA
<p>"Absolute chaos and there was really no coordination amongst anybody at all and the local government of course was completely decimated and anyway not functioning because there had been conflict for how many years? Two years, a military operation from the militants but even before the military operation it was still a very heavy military in Aceh and also the previous governor was put in jail for corruption so there wasn't any transparency or any real functioning local authorities in existence here. So, when all the international NGOs came in they were expecting to work with the local government and it was very frustrating for them that there wasn't anybody really with any capacity here. And also, there was no information. Because say for example like Meraksa the sub-district offices that held information about people was gone. And it wasn't stored anywhere. Nothing on computer at that time, it's just files in an office, all gone. And that is what happened at many places, just no information. They were getting very frustrated about the lack of direction and clarity from the local authorities that had survived."</p>	<p>North, 2016,p.3/§121-132</p>	<p>There was an absolute chaos in Aceh since the local government was not functioning, a lot of the data and information was lost in the tsunami. The NGOs that came in were expecting to be able to work together with the government which was not the case and therefore there was no coordination at the start.</p>	<p>B1.A</p>
<p>"As far as I know since after the tsunami we kind of have limited coordination from the government initially, but then it was organised by what we call the rehabilitation and reconstruction agency, BRR. But even though it was established, but then the disaster was really huge to deal with in a very short time, but on the other hand there are a lot of... How to say... Helps coming from outside with different agencies and NGOs coming over to Banda Aceh and to help rehab and reconstruct the housings and other infrastructures. What I understood early on that stage the coordination was not really good. So, like the NGOs that wants to build housing immediately, they just directly connected to the district, the village leaders, and asked them to collect the data of how many households and how many family's needs to have new houses, and because of this mechanism then there're always some... [chuckle] Background stories behind it which is not really... Is not supposed be that way."</p>	<p>Meilianda, 2016,p.1/§30-39</p>	<p>After the tsunami there was limited coordination from the government until BRR was implemented. Since the disaster was huge there was a lot of international aid coming in through NGOs and agencies. At the start the coordination was not good. The NGOs wanted to start building houses and just directly cooperated with the communities in the villages. This led to a number of unwanted results. The master plan that was made at the same time now does not match up with the result. The housing was already getting rebuilt at the coastal zone and there was no possibility for the government to change the</p>	<p>B1.Bc, B1.F, B1.M, B1.Cd</p>
<p>"And after a while, BRR has established and has been well-structured, in the internal. So, then all this kind of donation of building houses was coordinated through BRR. But still when</p>	<p>Meilianda, 2016,p.1f/§40-48</p>		

<p>we think about early on, at the same time in parallel, the government started to... By the help of other foreign agencies trying to replan the master plan of the city. Make the master plan of the city. Which seems to be not really connected with the housing construction because the land use that was set on the master plan was not... So, the housing construction was not obeying the master plan that has been newly set. So, then it means that in reality now, we see that the area, the coastal areas which is supposed to be empty for buffer zone, but then more houses were built even more in quantity than before the tsunami. Yeah so, that's what happened."</p>		<p>layout. In the end even more houses than before got built in the dangerous areas right on the coast.</p>	
<p>"[...]I think, from my opinion it's because there's no immediate implementation of the master plan. So, the master plan was already set, a new master plan was... On the early stage until 2007 or so, there was no new master plan, but then, once the new master plan was released with a decree or something. But it's not immediately effective to the rehab recon process. So, it's not going hand-in-hand. So, I think that's one of the reason as to now what we see, the housing was really spread over the coastal areas."</p>	<p>Meilianda, 2016,p.2/§52-57</p>		
<p><i>["...]at the beginning people interesting with this concept because involvement, participation. But there is the positive advantage for the Turkish housing support because it can be built faster and same quality because conducted by contractor. But in Oxfam because they need discussion it take a little bit longer time compared. But if you ask about interesting or not, at that time the people interested also about this programme because about community involvement."</i></p>	<p>Haiqual, 2016,p.2/§62-67</p>	<p><i>[People were interested in community involvement and participation, but the process took longer compared to contractor driven construction which was a negative effect.]</i></p>	
<p><i>["Oxfam already provide the design just offer or socialise in the meeting 'we have design like this' and the villagers mostly agree with the design. But the role of the people is to identify what is the location in the village for example. So, because the village already washed away and no maps anymore so Oxfam needs the community involvement and the role of them is to discuss, identify where would they build the house. And also arrange the materials like they need the cement, sand. So, people in the village help to find the source of material, where and has to get the material until in the village and find the carpenters and workers. And also for monitoring and evaluations. They monitor the reconstruction."]</i></p>	<p>Haiqual, 2016,p.2/§77-84</p>		
<p><i>["The Turkey government or the Turkey embassy for example just hire one company and say for example, 'ok, please build one hundred houses', people are not involved. People just waiting until the house is finished, that is the difference."]</i></p>	<p>Haiqual, 2016,p.2/§84-87</p>		
<p><i>["The community involvement is good but it needs some more preparations, design and maybe village plot to be able this village better in the future. Rather than just come and build quickly and then after certain period or during the process there are some friction among the people and also after certain years the village is not changed. The road is still like this, small. It is better wait some time, make a good plan, village layout is better and then it can last longer."]</i></p>	<p>Haiqual, 2016,p.4/§146-151</p>		

B1.R: Costs went up

Quote	Source	Synopsis	MA
<p>"So it went up as the progress went along. And the other thing was they couldn't find anyone to build the houses either. But actually [Indonesian] 36 Million and then 46 - so as time progressed prices raised, so did the budget for housing. #00:39:49# So it started off at 36 and in the end houses Adi says under BRR would being built for 90 Million. 27 to start with. Because based on the prices that there had been before the tsunami, that was no longer the case."</p>	<p>North, 2016,p.7/§272-277</p>	<p>The prices for building and materials continuously went up. It started at 27 Million Rupiah and in the end it went up to 90 Million Rupiah.</p>	

<p>"And I have been trying to say to them do you realize what you are doing? You are putting the villagers between each other, in conflict with each other cause one of you will give this and you won't and you're gonna give them more livelihood help and you are not – how is that fair? #00:45:27# That's not fair. They all suffered the same thing, they should all get the same response. But they just wouldn't have it. They said no, we've got our funding, we've got our way of doing things and we gonna do it."</p>	<p>North, 2016,p.8/§309-314</p>		
<p>"The other thing here in Aceh as well is people had no idea what an international NGO was because there hadn't been any. There had been a few little programmes but nothing really big. And so, all the international NGOs came in and they were all talking about their projects and projects for an Acehnese person means some corrupt deal between the government and contractors to build a road or do something where loads and loads of the money is [?] of. That's the Acehnese perception of a project. So here is all these NGOs wanting to do this project and that projects and they didn't know what an international NGO was. They don't know are they profit, non-profit, they don't care. They have no concept of what that is. All they know is that village down there is getting a really nice Turkish house and we are just getting this shitty Oxfam thing here so[...]"</p>	<p>North, 2016,p.8/§326-335</p>		
<p><i>["Oxfam at the beginning they make a design of semi-permanent housing. But after two years, after one year people complain and then Oxfam again replace the semi-permanent become full permanent."]</i></p>	<p>Haiqual, 2016,p.3/§126-128</p>	<p><i>[Some organisations first built semi-permanent houses and later replaced them with permanent ones.]</i></p>	
<p>"There is not such a planning that is comprehensive planning in that kind of situation. You do, you try, you talk to the community and then you do the planning. And that's why I suggest the budget system, the planning system for the reconstruction programme really needs to be flexible. It cannot be like ok a year before it's being planned and what happened next year that would be... no no no. The budget process should be flexible and then."</p>	<p>Sabandar, 2016,p.6/§236-241</p>	<p>A reconstruction programme does not work with a fixed budget system. This has to be flexible.</p>	

B1.S: All plots in the settlement area are privately owned

Quote	Source	Synopsis	MA
<p>"The areas to the west have the hills behind them, so there are paths that are provided for the people to escape to the hills or to the higher ground. And the paths are identified, and I think, first there are also signs, [...]. But the funny thing is the people do not want to give their land for the widening of the path, except but people can use it. So, I think the set back the fence so the path they can use is wider but still it belongs to them. So, it's not giving the land to the public but giving the public the right to use it as a path."</p>	<p>Kusumawijaya, 2016,p.2/§62-70</p>	<p>People did not want to give parts of their land to make it possible to widen the paths for escape reasons. Instead they only agreed to move their fences, so the public can use it, but the land is still owned by them.</p>	

B1.T: Expensive temporary shelters

Quote	Source	Synopsis	MA
<p>"And at that time, they were still struggling because there is a shortage of timber, you might see at that time even - is it IOM or what - still build temporary shelters, with imported pine wood and steel from Europe. Amazing. And the cost of these temporary shelters are more than the cost of our house. I think their budget is like 10,000 Dollars together with all the management cost would be 11 to 12 thousand Dollars per house and our budget is only 5,000."</p>	<p>Kusumawijaya, 2016,p.8/§324-328</p>	<p>Some temporary shelters with imported material were more expensive than permanent houses, with a budget of 11 to 12 thousand dollars compared to 5 thousand dollars.</p>	

<p>["ICRC and IFRC they have emergency shelter which is made of pine wood and steel frame. It's so beautiful, you love it when you see it. I mean, I'm from Indonesian background, I like to see that. So, the first thing that they do, ICRC and IFRC when they came to Aceh and Nias, they built that emergency shelter. And then us and other agencies later on built the final house. And what would you do with this? Sphere said it has to be disbanded because you already have the final one. But people in Aceh and Nias doesn't want to dismantle that, because they can use this for other purposes, which is permanent activities, like kitchen, extra bedroom and this and that. So, one of my first decision is to not allowing the Red Cross to have that kind of approach because it makes the survivor, a family, has two houses. Because this temporary, sorry, emergency shelter is considered as a house, because it is better than their original house already, because they are poor. So, we don't want to give them two houses, we will give them only one houses. So, when I took office, one of my first decisions is not to use that Sphere approach in regard to the housing."]</p>	<p>Samadhi, 2016,p.5f/§262-273</p>	<p>[Some emergency shelters were made from wood and steel and looked better than the normal houses of the people because they are poor. After the permanent houses were built these shelters were meant to get taken down. But the people in Aceh and Nias did not want to do this and instead kept the shelters as an additional room or a kitchen or something alike. This led to a situation where some families had two houses in the end which was not fair. So, building emergency shelters was not an option in Nias which added to the time pressure for reconstruction.]</p>	<p>B1.F</p>
<p>"In a big disaster like this I propose to use that three-step method although it's expensive. It's very expensive."</p>	<p>Mangkusubroto, 2016,p.4/§154f</p>	<p>The three-step process works well for a big disaster as a tsunami or an earthquake, but it is a very expensive method.</p>	
<p>"First go to the real emergency shelters or tents and then you have temporary shelters. The light steel structure is temporary shelter, the barracks is temporary shelter. So, you put them first in the tent or in mosque or everywhere, schools. Works the areas hit by earthquake or tsunami. After a while, after you have the temporary shelter, you move to temporary shelter. Once you live in the temporary shelter - in a tent you cannot live for more than one month - that's my theory. But in a temporary shelter you can live more than two years, three years. And after that you move to the permanent house."</p>	<p>Mangkusubroto, 2016,p.4/§144-150</p>		
<p>"The barrack is easy but building barrack with wood then you create illegal logging. The forest will be destroyed by that. Now we come up with the idea, after discussion with the Red Cross to provide with the steel structure. Now there is a problem because you have to manufacture it - where? We need 22,000 of this structure. Do you know where after that? Built by a factory in Bangkok because there are no facilities available in Surabaya or Jakarta. And we still need the wooden plank. You know where we get the wooden planks from? New Zealand and Germany."</p>	<p>Mangkusubroto, 2016,p.4/§163-168</p>		
<p>"Because the quality, some of the temporary houses produces by agencies at that time I give a little bit of money so they can still be used as the permanent houses instead of - temporary houses normally get destroyed after the permanent houses but instead of destroyed they can be used in Nias. Actually, they can be used for permanent houses so I modify a little bit, put some money and that's becoming permanent houses."</p>	<p>Sabandar, 2016,p.5/§201-205</p>	<p>The quality of some temporary houses was so good in the context of Nias so they were modified a bit and kept as permanent houses.</p>	

B2 Reconstruction process – Success

This chapter presents statements taken from the interviews concerning the below assumptions from the interview guideline:

II: Knowledge from the reconstruction process must be included in the current planning process for housing. This is not yet fulfilled.

III: The planner must have a clearly defined role throughout the entire planning process, take responsibility for occupiers and ensure adjustment efforts. This has not yet been accomplished.

[18] *The planning process for housing reconstruction was partly successful however, had gaps and shortcomings.*

The statements in the form of direct quotes are allocated to the following categories:

- B2.A: Community/local actor involvement**
- B2.B: Houses were built earthquake resistant**
- B2.C: Escape roads and buildings implementation**
- B2.D: Raising disaster awareness**
- B2.E: New know-how**
- B2.F: One agency with full authority for coordination and implementation**
- B2.G: Monitoring**
- B2.H: Everyone received a house**

Some of the categories are rather extensive and are therefore further divided into subsets in the form of CODES.

The evaluation tables show the original 'QUOTE' from the interview as well as the 'SOURCE'. Multiple allocations of quotes to more than one category are indicated in the column 'MA' with an abbreviation referring to the other categories. Example: If a quote under category 'B2.A' has a 'B2.C' in the last column this signifies that this exact quote can also be allocated to the category 'B2.C'; square brackets '[B2.C]' indicate it can be allocated to category 'B2.C' in the broadest sense. Quotes are left in the original state and have not been corrected grammatically in order not to influence the content of the statement. For reasons of practicable handling, a short 'SYNOPSIS' was done by the author, in some instances combining several quotes of the same interview. This synopsis does not show the opinion of the author but rather maintains the opinion of the interviewee.

B2.A: Community/local actor involvement

Quote	Source	Synopsis	MA
"And then when they build also we do the, what do you call it? The bottom up. So, when we design, so we have to choose the consultant, and then the consultant design the house, and then they have to socialise to the community, who will get the house. So, if we build in here, in the 'A' area, they have to come to the 'A' area to explain. "This is the house, blah, blah, blah" and then we ask the person there "any comments?" Oh, in Aceh, for example, because the first time, when they build, it's not really like 'Acehnese culture,' they don't really regard with the custom, and then they say "oh, in Aceh you cannot build, you cannot have house without rooms like maybe in abroad you can have like studio rooms, but here you cannot do that because parent has to have their own room, and the kids and the daughter has to be separated" so they say that, and then we did modify it."	Hasan, 2016,p.2/§78-87	The ADB followed a bottom-up process. The house was designed by the consultant and then presented to the community.	
"...that's our rule, so we cannot just build there without asking the community."	Hasan, 2016,p.3/§93f		
"Local who knows how to build. That's even more effective, better house, actually, if the local involve."	Hasan, 2016,p.3/§128f	Locals were involved in the construction of houses.	

<p>"We don't want use the labour, they do have to build it, they have to buy the materials. When we do the planning we also asked them do they know how to do it. We don't want to do something that they cannot build. I think that time was quite simple the menasa."</p>	<p>Adamy, 2016,p.2/§82-85</p>	<p>The design was done according to the local knowledge or capabilities. [local NGO]</p>	
<p>"And then we discussed that with the head of the village and they agreed and the people agreed and then we did, this is the most important thing, participatory planning for the housing."</p>	<p>Irwanyah, 2016,p.2/§49-51</p>	<p>The decisions were discussed with the leaders and the planning was done together with the community.</p>	
<p>"After they have a commitment with the community and then the consultant came again here. And then together with the community they have a FGD [?] so they show the design of the house. Very draft because it's not the same one with this one because they want to get an input from the community. They had a meeting four times to get a design."</p>	<p>Irdus, 2016,p.3/§93-96</p>	<p>The design of the house was discussed with the community in four meetings.</p>	
<p>"After tsunami this area is empty, almost all the houses are destroyed, it's clear. No building. So, there is no people or anything here. So, the people from Kampung Pande they maybe move to the relatives or somebody, so when they made a meeting here they were like a base camp so ADB and some of the males. Most of the community who join the meeting is male. There is no woman. It's difficult to invite the women at that time."</p>	<p>Irdus, 2016,p.3/§109-113</p>		
<p>"The importance of knowing the local social structure of the culture is very important. In all the sectors those interventions that are successful are mostly that involve local actors, local leaderships or at least understand the local social structure so they operate to this local social structure. I don't want to mention names of organisations but there is always this tendency of new organisation coming to new disaster, new place, a new region of disaster then what are you going to do? Of course, you can choose to work with the local government but in Aceh case our local government was paralysed after the tsunami. Some organisation that has been already in Aceh seems to be more successful. So those organisation that has been here around before the tsunami Safe the Children, Oxfam and other organisation they has been here even before the tsunami. They tend to have more sustainable programmes, more sustainable results of the programme. Why? We think it's because they know the local situation and the social structure. I mean – have already produced one report on the sector governance and social society, you can search Gampong Aceh ten years after Tsunami, it's available on our website. That's on governance and civil society. And then also a follow up from previous ad-hoc research the finding that local leadership is very important. We did it in 2006 or 7 and when we visited the same village that main finding also came up that local leadership is important."</p>	<p>Mahdi, 2016,p.4/§141-156</p>	<p>Projects that involved local actors tend to be more successful. In some cases, organisations or NGOs were already in Aceh before the tsunami and their projects reached better results as they already knew the local situation and the social structure.</p>	
<p>"This is the planning for the village. So, this is from the community give a proposal. This is the process of verification for who will get the house. First the villagers give kind of a proposal or something like that to KP4D, Committee for reconstruction in the village. And then they sit together with the head of the village, they will verify the data."</p>	<p>Kamaruzzaman, 2016,p.2f/§86-89</p>	<p>The village planning was completed in a bottom-up process. The villagers gave a proposal about how they would like to have their village to be rebuilt and about who should get a house and then this was discussed.</p>	<p>B1.Cc</p>
<p>"In broad, there is several ways of planning. One is the one we talk about the blueprint or the master plan, and then we also have a bottom-up planning where people will give their ideas on what is required and along the way adjustment is being made to make sure that the planning really reflect the need of the affected population."</p>	<p>Faisal, 2016,p.1/§32-35</p>	<p>Besides the blue print and master plan, there was also a bottom-up planning, where "people will give their ideas on what is required and along the way adjustment is being made to make sure that the planning really reflect the need of the affected population".</p>	

<p>“And in Banda Aceh there is an example of good planning of housing, resettlement of housing. It's in Lambung, Lambung village in Meraksa sub-regency. It is near Ulee Lheue, near the beach. There is - the community of the village they really need to rebuild their home and so they plan. They do the land acquisition so the road is arranged good and the house.”</p>	<p>Zulfisni Meutia, 2016,p.1/§27-30</p>	<p>Lambung village is a good example for resettlement planning. Here, the community did a plan first, acquired land, arranged the roads and then built the houses. This led to a good result.</p>	<p>B2.A</p>
<p>“One institution established by the government the name is 'recompa', recompa is one of our try to facilitate local community to rebuild again their village. And he said this is a good approach how to communicate with the villagers to build especially Lambung. So Lambung is one of the examples how they tried to manage people.”</p>	<p>Haiqual, 2016,p.5/§180-183</p>	<p>There was an institution established by the government during reconstruction called 'recompa' which tries to facilitate local communities to rebuild their village. One example here is in Lambung, where people reorganised their own village.</p>	
<p>“So, they considered too about any kind of hazard, not only earthquake and tsunami but also flood, typhoon something like that. So, I think Lambung is one of the representative for us to see which of the village could be representative [?] the comprehensive - as disaster preparedness of the village in Aceh.”</p>	<p>Haiqual, 2016,p.5/§189-192</p>		
<p><i>“[...]collaboration [of BRR and the local government]”</i></p>	<p>Haiqual, 2016,p.5/§202</p>		
<p>“It's one of the big umbrella trying to coordinate every - it's not only on government side but also governments organisations. One of the important things we have funded by multi donor fund. So, this is one of the importance actors.”</p>	<p>Haiqual, 2016,p.5/§204-206</p>		
<p>“Lambung have a specific characteristic if you want to compare to another village. Maybe one of the reason because they have higher education, something like that. So, it is very difficult to replicate to another village. So, in a context of local it could be applicable but we are not sure if this programme could be replicated to another village because so many factors not only - it's not only about how much money we bring to them but also the most important how the local community cooperate with many actors in this situation. And then they can handle every step to see not only for short terms but also for long terms.”</p>	<p>Haiqual, 2016,p.5f/§217-223</p>		
<p>“Especially for building capacity we train the people, mainly tsunami victim to get something, to get skill, to get ability to get something. I mean we train them so they get a job. So when they get the house from BRR they can go anywhere - or with the skill - the skill of our train that the main aim for building capacity.”</p>	<p>Iskandar, 2016,p.1/§40-43</p>	<p>There were job training programmes offered by the BRR to teach people new skills and allow them to find new job.</p>	
<p>“Management, skill of technical - like to make something like make a chair, make cabinet, something like that.”</p>	<p>Iskandar, 2016,p.2/§47f</p>		
<p>“Because when tsunami disaster, after tsunami they lost any job...”</p>	<p>Iskandar, 2016,p.2/§50</p>		
<p>“So people need start to teach job to get the money for supporting their life.”</p>	<p>Iskandar, 2016,p.2/§54</p>		
<p>“So at that time building capacity is especially important for Aceh people as a victim tsunami.”</p>	<p>Iskandar, 2016,p.2/§56f</p>		
<p>“And you know how we were quick? We divided the construction in two groups. So, every ten households have to organise themselves into one group. So, we will not build house individually which is what is happening in many other cases, also in Taklobat now. So, it's ten houses, ten houses, ten houses into one group and then they organise. I think there are logistic issues that they have to organise themselves and also in terms of supervision.”</p>	<p>Kusumawijaya, 2016,p.8/§347-352</p>		

<p>"We train all beneficiaries the principles of good construction. No exception. Every family have to send one representative to follow this training to understand what is good. And then we told them you can only sign off the payment to your workers when these things are already following the principals. And we will give you technical assistance to check with you and then every time we will tell you this is right and this is not. But they sign it. When they agree, they sign it."</p>	<p>Kusumawijaya, 2016,p.9/§356-361</p>		
<p>"With the contractors, around 80% of the funds would go out of the island, to Medan, to Surabaya, to Jakarta, where all big contractors live. But with this community-based, it's the other way around, only around 20% going out of the island. The 80% is spent inside the island, to buy food for the labour, to buy building materials within the island, and so on and so forth. #00:10:15# Aceh later on follow the case in Nias, so Nias doing that first."</p>	<p>Samadhi, 2016,p.2/§63-68</p>	<p>With a contractor-based approach, in the case of Nias, 80% of the funds went outside the Island. It is the other way round with a community driven approach, 80% stay within the island, for example for food or labour.</p>	
<p>"And the second is to, as much as possible, involving survivor within the process. Even the planning process. Yeah. At one point during the public consultation, what they need is actually not housing. Yeah. We can build our house on our own resources, but we cannot build that road. And the bridge. With good roads and good bridge, then we would be able to come up with economic... What you call it? Capacity to build our own housing. So, we were wrong from the start at some location."</p>	<p>Samadhi, 2016,p.3/§125-130</p>	<p>It is important to involve survivors into the process as much as possible, even the planning process. Sometimes they can build their houses on their own however need assistance to build roads and bridges.</p>	
<p>"That's why the community-based is very powerful because it is sensitive to the kind of needs, the different needs of different families. But we provide the basic, like for example this is the design of 42 square meters and the cost is, let's say, 50 million. You cannot build less than that, but you can build more than that, but you need to provide the funds, the resources, everything."</p>	<p>Samadhi, 2016,p.5/§202-206</p>	<p>The community driven approach is sensitive to people's needs. A basic house can be provided which can be extended according to the family's needs and with their own funds.</p>	
<p>"Yeah, and with the community-based approach, we are allowing people who have more resources to build bigger or even more better than the rest."</p>	<p>Samadhi, 2016,p.5/§188f</p>		
<p>"And people who doesn't have that resources accept that because he is more richer than... Is more rich than us, so it is only logical that they build bigger, but they build it based on the design that we have. Like, for example, we build 42 square meters housing with two rooms, they can add rooms or they can make the flooring better quality, but they have to chip in, in order to do that."</p>	<p>Samadhi, 2016,p.5/§194-198</p>		
<p>"One thing that I am very proud of and just realised that this is an indicator of success, is up to now there is no social dispute whatsoever when it comes to land. And you can imagine after tsunami hit the area everything is washed, including the land of people. With the approach of this village map they come to a consensus and because of this consensus approach there is no disputes or concern between neighbours or the village or whatever."</p>	<p>Mangkusubroto, 2016,p.2/§53-58</p>	<p>Up to now, there was no social dispute about land. This is due to the village map where people had come to a consensus.</p>	
<p>"That's why grant is better for me because people can modify, people can have their own. I give you thirty million, you are free to design in the community but the money is only 30 million. I have already one house but I have money I will build myself in the back."</p>	<p>Sabandar, 2016,p.4/§139-142</p>	<p>A grant is a good option when it comes to reconstruction because people are free to do what they want whether they want to modify their existing house or build a new one.</p>	
<p>"So, I forget the Bappenas planning which is actually building, building, building. And I think it helped. I talked with the community, I talked with the - trying to bring the sense of community using very much community development in housing. The quality might not be as good as if you are using right contractor but the value of sense of the community is there and I am happy enough I think compared to when I came there, schools were broken, not because of the earthquake it's because they are constructed wrongly."</p>	<p>Sabandar, 2016,p.5/§177-182</p>		

<p>"The third lesson learned is the community housing programme. I think this is very important. The way you build should be community driven. Give space for developing because you are not just building houses you are actually building the community, you are building the settlement instead of just single house. You are building the settlement you are building the community."</p>	<p>Sabandar, 2016,p.6/§230-234</p>	<p>Using the community driven approach for housing development is a good option to give space for development. Reconstruction is not just about building houses but about building a community. "You are building the settlement you are building the community."</p>	
<p>"The good things about Indonesia is very well known as the corrupt country so how can the international community can trust you if they cannot trust you how can they want to put money. Since the beginning that has been my standard. #00:50:25# So the NGO come I just implemented I don't want the money but this is the standard and then you can deal directly with the community. So, no corruption cases happening in my case. And the housing programme that I designed is actually reducing the risk of having corruption because actually the money here, the community here. So, the money going directly in the community."</p>	<p>Sabandar, 2016,p.9/§348-354</p>	<p>With the housing programme that was being used in Nias, the aid money went directly from the NGOs to the community. This reduced the risk of corruption and led to the necessary trust.</p>	

B2.B: Houses were built earthquake resistant

Quote	Source	Synopsis	MA
<p>"[...]we had the special I-beam on some of the houses..."</p>	<p>Hasan, 2016,p.4/§142</p>	<p>Some of the houses [ADB] were built with an I-beam to make them earthquake resistant.</p>	
<p>"[...]we came back in 5 years, and then 10 years, and they said, "it was OK" they didn't have problem, the construction was good – if there's a crack, it's only in the surface, not really in the structure. Sometimes a crack in the surface, like in the masonry..."</p>	<p>Hasan, 2016,p.4/§133-136</p>		
<p>"This is from his opinion it's like this, the idea the consultant make a socialisation about the construction. So, they start from how the beam is and then about the form, so they make a socialisation for it about the resistance for the earthquake. So, before they construct this this show to the community how the construction of the house. So, this was an issue. We can see it is very strong because it's only a small house but the structure with the wire mesh and then the beam diameter is around 12 cm that's quite strong for the small house."</p>	<p>Irdus, 2016,p.4/§155-160</p>	<p>Earthquake safety was an issue that was discussed before the construction of the houses. The community as well as ADB were supervising the construction work.</p>	
<p>"The name of the structure... So, the ADB request to the community to make like this kind of group so each group could supervise the work of the contractor who builds the house. So, they got some finding because some of the contractor make some mistake in the house, not all house, about the roof construction, there is no beam to support and then they request to demolish and then they make again. So, there are supervisors from ADB also and also from the community so it was very tight."</p>	<p>Irdus, 2016,p.4/§171-176</p>		
<p>"Earthquake I think so far what I have seen before, what under the strength of the building it's ok I think. Two small very new building that were destroyed that time even 9.8? I think the scale of Richter scale."</p>	<p>Mardhatillah, 2016,p.10/§427-429</p>	<p>The buildings are mainly earthquake resistant. This is the result of the last earthquake Banda Aceh had in 2007 with 9.8 on the Richter scale.</p>	
<p>"There is not so many buildings that were destroyed. Very limited, only a few buildings. This can show us that the orientation of people in building their house goes [?] even though there is a reduction of quality. Still in the tolerance."</p>	<p>Mardhatillah, 2016,p.10/§433-435</p>		
<p>"Actually, in Banda Aceh, our people in Banda Aceh there is not too much buildings damaged from the earthquake, maybe about 85% damaged from the tsunami not from the earthquake."</p>	<p>Yubarsi, 2016,p.2/§81-83</p>	<p>Most buildings in Banda Aceh were destroyed by the tsunami [85%] not by the earthquake.</p>	

"But the construction before us, we a little bit after the big earthquake in 2012 about 8.5 magnitude. No house collapsed. Generally, we have a good construction for housing."	Yubarsi, 2016,p.3/§99f		
"Actually, they [Oxfam, UN Habitat] make an adaptation consider for the future disaster like earthquake. So, they design the house for earthquake proof until certain Richter scale. But not for tsunami because some built again near the coast. [Indonesian] They tried to adapt with the future disaster, especially the earthquake. But not for tsunami because they know that a tsunami very strong, the houses cannot stand for this. But earthquake yes, evacuation yes."	Haiqual, 2016,p.3/§107-111	Earthquake resistance was part of the NGOs' design strategy for housing. So was the topic of evacuation options.	B2.C
"We have a housing code. [...] And this is the building code. We issue building code separately for Aceh and Nias."	Purwanto, 2016,p.3/§127f	The BRR had a building code, one for Aceh and one for Nias.	
"How did you develop the building code?"	Interviewer, 2016,p.4/§134		
"First safe for future disaster. [Drawing] For example the column we add some like hook for the stronger massive concrete."	Purwanto, 2016,p.4/§136f		
"When UN Habitat was bring the process of reconstruction, design building code for Aceh."	Purwanto, 2016,p.8/§316f		
"So they did the building code. And did they take one they already had and changed it a bit or how did this work?"	Interviewer, 2016,p.8/§319f		
"Yes. Took the existing one from Indonesia, change to the new building code."	Purwanto, 2016,p.8/§322		

B2.C: Escape roads and buildings implemented

Quote	Source	Synopsis	MA
"[...]we also said that it's important escape road... and you also have to have the drainage, that's why we need more land to build a road, wide enough so two cars can pass."	Hasan, 2016,p.6/§261-263	The original road had to be expanded so it could work as an escape road for future events.	
"[...]Desa Lambung. That's quite tough process there. They successfully adopt the land consolidation process. So previously land parcel is like one village road and then one parcel they have about six households there. So that cause the problem there, when the tsunami attacked that the villagers could not flee. So, because of the land parcel and the road is not connect together. So, they did the land consolidation process so that every land owner give the land for the road and then they split the parcels. So, they already succeed with that. So that's an example for one successful land consolidation project in Aceh. You can visit. [Indonesian] It's not the housing, I am not talking about the housing. The process, the planning process. But the housing is not very good. The planning process through the land parcels and land consolidation is good. That's good. We learn about the planning process, that's a good lesson to be learned. Despite of the housing."	Hasan, 2016,p.14/§586-595	Desa Lambung is a good example for a successful land consolidation project in the reconstruction process in Banda Aceh. All the land parcels were split and every landowner gave a small section of their land to increase the width of the 'escape road'.	
"What ADB loved about the community here is that they were willingly to give their land to be used for the road reconstruction and to create a new access."	Irdus, 2016,p.1/§40f	The community in this case gave parts of their land to widen the road and create better access to the village. They did not ask for money in return.	
"So it can be said that what ADB loved is that the community here didn't ask for anything for their land."	Irdus, 2016,p.2/§47f		
"Normally there is a compensation for land in the other villages, they will request for some money but here they give it free, without compensation."	Irdus, 2016,p.2/§51f		

<p>“Lambung is a good new settlement, new planning because they have the village planning. Before tsunami the road in the Lambung village like labyrinth so when the tsunami come the villager cannot go anywhere because labyrinth. There is no - the road not straight. The head of the village in Lambung before tsunami he wants to make the village like the settlement in the Medan complex. In Medan there is a complex, a resettlement built by the private developer. A private developer built a housing project, good planning, big roads. So, the Lambung village wanted to make the new Lambung like that. So, they made a good settlement.”</p>	<p>Permakope, 2016,p.9/§377-383</p>	<p>The Lambung village is a good example for the reconstruction result. Before the tsunami the head of the village already had a plan to widen the roads and change the village plan from a former labyrinth to an open plan.</p>	
<p>“And in Banda Aceh there is an example of good planning of housing, resettlement of housing. It's in Lambung, Lambung village in Meraksa sub-regency. It is near Ulee Lheue, near the beach. There is - the community of the village they really need to rebuild their home and so they plan. They do the land acquisition so the road is arranged good and the house.”</p>	<p>Zulfisni Meutia, 2016,p.1/§27-30</p>	<p>Lambung village is a good example for resettlement planning. Here, the community did a plan first, acquired land, arranged the roads and then built the houses. This led to a good result.</p>	B2.A
<p>“Actually, they [Oxfam, UN Habitat] make an adaptation consider for the future disaster like earthquake. So, they design the house for earthquake proof until certain Richter scale. But not for tsunami because some built again near the coast. [Indonesian] They tried to adapt with the future disaster, especially the earthquake. But not for tsunami because they know that a tsunami very strong, the houses cannot stand for this. But earthquake yes, evacuation yes.”</p>	<p>Haiqual, 2016,p.3/§107-111</p>	<p>Earthquake resistance was part of the NGOs' design strategy for housing. So was the topic of evacuation options.</p>	B2.B
<p>“We are also building road and also port. If you see the road was actually much better than before. This is a condition after the tsunami and this is after reconstruction.”</p>	<p>Purwanto, 2016,p.3/§103-105</p>	<p>The roads that were built during the reconstruction were much better than the roads that used to be there before the tsunami.</p>	

B2.D: Raising disaster awareness

Quote	Source	Synopsis	MA
<p>“About this, of course the awareness of disaster risk reduction should be there. If we build a new building a new house you should be aware of the risk of earthquake, I think it resonance to some people in awareness but it might not be as much as we want. Well, it is for me. I mean I am trying to go back and try to get a traditional Acehese house instead of building a concrete building. But even for my mother she would say until now why would you build a traditional house everybody build modern house. I told her because the traditional Acehese house is earthquake proof, flood proof, and other thing and I would like to have one. I think you can see around including in the city of Banda Aceh that some people like to live by traditional houses. Made of wood, tilted and if there is an earthquake you can just wait in your house.”</p>	<p>Mahdi, 2016,p.4/§166-174</p>	<p>Some people now might be more aware of disaster risk reduction and the following reconstruction phase regarding housing compared to before the tsunami.</p>	
<p>“I think the awareness is increasing in different level of society. You can see how some very close to the - some villages close to the shoreline has been partly or mostly abandoned and the rent of the house in that area is decreasing, meaning the demand for the housing in the more risky area is going down and the houses and the building in not very risky area more expensive these days.”</p>	<p>Mahdi, 2016,p.5/§194-197</p>		
<p>“2006 I appointed by the president of the Syiah Kuala University Pak Abdil Hawaha do be director of mitigation centre in cooperation with the Kobe University Hyogo Prefecture. And then Syiah Kuala also have the one tsunami research centre. The director is Professor Sam Turisa[?]. When we are looking this is the same direction one tsunami centre one mitigation centre and then we try to combine it to be one centre, tsunami and disaster mitigation centre. Since 2006 we started programme how we can help the people to the knowledge.”</p>	<p>Dirhamsyah, 2016,p.1/§9-15</p>	<p>After the tsunami, a 'tsunami and disaster mitigation centre' was founded. Since 2006 they worked on a programme for community knowledge creation.</p>	

"2007 we tried to make some programme for the con[?] planning and also disaster plan for Aceh province. And also, we create the Aceh disaster risk map. This is the first disaster risk map of Indonesia and BNPB has all the province to make the same things for the disaster risk map."	Dirhamsyah, 2016,p.1/§27-30	A disaster risk map for Aceh was created as the first risk map of Indonesia.	B2.E
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B2.E: New know-how

Quote	Source	Synopsis	MA
"One thing for sure, there are a lot of new innovation, new ways of doing business including how widely GIS data and technology are now available compared to before. GIS something very strange for Acehnese we are talking about maps very easily, we produce map more than before, many more GIS specialist have been produced and they are not only produced by our own university but also produced by experience during the reconstruction."	Mahdi, 2016,p.7/§265-270	The GIS technology was introduced and, through the reconstruction process, a number of Acehnese became experts in this field.	
"2007 we tried to make some programme for the con[?] planning and also disaster plan for Aceh province. And also, we create the Aceh disaster risk map. This is the first disaster risk map of Indonesia and BNPB has all the province to make the same things for the disaster risk map."	Dirhamsyah, 2016,p.1/§27-30	A disaster risk map for Aceh was created as the first risk map of Indonesia.	B2.D
"I thought most of the BRR official learned something there."	Mardhatillah, 2016,p.13/§540	The people involved in the BRR learned a lot from the process.	
"BRR is like a university."	Mardhatillah, 2016,p.12/§528		
"Because at that time I am dealing with drainage system and I meet with the foreigners from Japan, mostly from Japan. They offer master plan for drainage system."	Zulfisni Meutia, 2016,p.10/§413f	Japan offered a master plan for the drainage system in the reconstruction process of Banda Aceh.	
"The knowledge maybe already here, we already know but the way we are dealing with the problem to do the knowledge we can do better. We can do better and easier. I think that's what I can learn from we dealing with the foreigners."	Zulfisni Meutia, 2016,p.10/§427-429		
"Those materials [risk maps] are available there. I think the most used maps are actually the maps issued by the European community or something. Someone made the maps available that time. We did map village by village. And we have very clear satellite pictures of the situation before and after the tsunami. And the measurement is very upgrade so it includes the levelling."	Kusumawijaya, 2016,p.10/§399-402	Risk maps from the European community were available during the reconstruction phase in Banda Aceh.	

B2.F: One agency with full authority for coordination and implementation

Quote	Source	Synopsis	MA
"I think there are several lessons learned from Aceh with that magnitude and with that big number of organisations involved coordination become very important. So even in the recovery the coordination also important. One of the thing that we see lesson is very important in the scale of that tsunami, particularly when the local government also being strongly affected by the disaster then there is one single agency to coordinate with full authority. So, the organisation must be empowered to function their coordination role also their implementation role by law."	Faisal, 2016,p.2/§75-80	After a disaster of this magnitude and with many organisations involved it was important to have a good coordination. Since the local government was strongly affected, it was good to have a single agency with full authority to coordinate the process. This agency needed to have both a coordination role and an implementation role.	
"So, by having one single agency with authority including reporting line directly to the president able to coordinate different ministries, different organisations that is one of we see is a very important element of success."	Faisal, 2016,p.2/§81-84		

"The other thing as well about breakthrough because this is something not a normal situation so we cannot take a normal approach in a condition which is not normal. So, ability to have a breakthrough in regulation, in management, in policy that we believe is also important."	Faisal, 2016,p.3/§ 89-92	The disaster was an unusual situation and therefore it was necessary to have an approach which allowed changes within the regulations, management and policies.	
"And building trust and confidence is another lesson which is very important. Aceh was very much a lot international organisation, so our organisation also focused on building trust and confidence which reflected into the integrity of the organisation."	Faisal, 2016,p.3/§92-94	The BRR managed to build trust and confidence within the international organisations. This was an important lesson learned from the process.	
"That's - normal planning process is full with politics. And the normal time for planning process - say you want that area build in Banda Aceh with all the city planning - I can't wait because the political process in the local parliament will take one year."	Mangkusubroto, 2016,p.5/§194-196	The normal planning process in Banda Aceh is very slow. Therefore, for the reconstruction this normal political process was suspended.	
"So, I walk past them. In general, I can say that a major disaster like this then you cannot wait for the normal procedure to start kicking off and let the reconstruction process wait for them."	Mangkusubroto, 2016,p.5/§198-200		
"I am having the policy maker approach because I give the full authority, I do my planning and I will execute it. So, I make sure that every single money coming to this I will spend it for development. So that's what I have that's why I can bypass all the bureaucracy[...]"	Sabandar, 2016,p.2/§77-79	The policy maker approach, having full authority to plan and execute turned out to be a good option to bypass bureaucracy.	
<i>["Unless you have a strong government because this situation is a political situation with India and Nepal. So, Nepal has their Nepal government who should take courage to lead this process, they set the trust fund for this and then we are helping. Other people can support but you have to have integrity on the organisation. Make a small integrity. Give the supervision, authority and power and to the chair and then make their own planning and do the management."]</i>	Sabandar, 2016,p.8/§299-304	<i>[There should be a strong government leading the process of reconstruction. "Other people can support but you have to have integrity on the organisation." The supervision, authority and power should stay with the local agency which should also do the planning and the management.]</i>	[B2.G]
<i>["...]the Philippines is fail because I think from my perspective I saw Philippines and it's about to happen also in Nepal. They don't actually build a strong institution, they don't give a strong power to the institutions. And when you don't have that power it's difficult. After you get the power now how the leadership actually play the role."]</i>	Sabandar, 2016,p.9/§345-348		

B2.G: Monitoring

Quote	Source	Synopsis	MA
"The assessment was during the BRR we did a lot of the assessment and then in fact before we start any activities then the project is in monitoring as well."	Faisal, 2016,p.5/§196f	BRR did assessments and monitored the projects.	
<i>["Unless you have a strong government because this situation is a political situation with India and Nepal. So, Nepal has their Nepal government who should take courage to lead this process, they set the trust fund for this and then we are helping. Other people can support but you have to have integrity on the organisation. Make a small integrity. Give the supervision, authority and power and to the chair and then make their own planning and do the management."]</i>	Sabandar, 2016,p.8/§299-304	<i>[There should be a strong government leading the process of reconstruction. "Other people can support but you have to have integrity on the organisation." The supervision, authority and power should stay with the local agency which should also do the planning and the management.]</i>	[B2.F]
<i>["...]the Philippines is fail because I think from my perspective I saw Philippines and it's about to happen also in Nepal. They don't actually build a strong institution, they don't give a strong power to the institutions. And when you don't have that power it's difficult. After you get the power now how the leadership actually play the role."]</i>	Sabandar, 2016,p.9/§345-348		

B2.H: Everyone received a house

Quote	Source	Synopsis	MA
"What BRR was trying to do was trying to make sure that all the areas were getting houses enough for the people that were there and they in the end stepped into some areas where they weren't getting houses, or nobody had committed to or had committed and then couldn't deliver. And also, the Worldbank. The Worldbank stepped in as well so the Worldbank was also doing housing in Meraksa in one village and I think their programme also included quite good sanitation systems and drainage and things like that."	North, 2016,p.9/§361-366	The BRR made sure that all areas were given enough houses for the people there and also, with the World Bank, stepped into areas were nobody had committed.	
"I mean at the end of the day people needed a house. No matter what. You got a house, that's it. You might be jealous of your neighbour cause they got something else or that village down there because they got a better deal, but at the end of the day you've got a house."	North, 2016,p.9/§376-379	Everyone received a house and at the end of the day this is what they needed. Even if they were jealous of their neighbour or another village, they did get a house. So, you have somewhere to live.	
"BRR was filling in. A lot of the donor was promise something but the realisation was not so good. [Drawing] This is what the donor promise. But maybe from my experience the realisation was this. I want to explore to donor, if donor want to be involved. So, I free leave them if they want to build but according to the master plan of BRR. At the end BRR was actually achieved 107 percent. It was because the one was actually have the free to choose."	Purwanto, 2016,p.10/§308-312	If a donor could not complete a project BRR would step in and finish it with funding from ADB and the World Bank. With this everyone got a house in the end.	
"For example, during the disaster in other country commitment donor was actually 100 percent but the area realisation was actually maximum 40 percent. I don't want to argue with that or not. If the donor want to build themselves ok. But according two months, then BRR."	Purwanto, 2016,p.10/§398-400		
"And then some donors only gave money and then you build with this money BRR houses."	Interviewer, 2016,p.9/§377f		
"In case it was ADB yes."	Purwanto, 2016,p.9/§380		
"Or also World Bank."	Purwanto, 2016,p.9/§384		
"But we are together with World Bank and also ADB. The engineering came from them."	Purwanto, 2016,p.9/§388f		

B3 Reconstruction process – Lessons learned

This chapter presents statements taken from the interviews concerning the below assumptions from the interview guideline:

II: Knowledge from the reconstruction process must be included in the current planning process for housing. This is not yet fulfilled.

III: The planner must have a clearly defined role throughout the entire planning process, take responsibility for occupiers and ensure adjustment efforts. This has not yet been accomplished.

[3] Lessons learned have not been included in the current urban planning, neither is there a preparation for a potential next reconstruction process.

[4] There is no exchange of knowledge regarding other reconstruction projects in other countries.

The statements in the form of direct quotes are allocated to the following categories:

B3.A: Changes in planning triggered by lessons from reconstruction

B3.B: Unaltered planning following reconstruction

B3.C: Assessments on reconstruction

B3.D: Exchange of knowledge

B3.E: Recommendation concerning handling planning

Some of the categories are rather extensive and are therefore further divided into subsets in the form of CODES.

The evaluation tables show the original 'QUOTE' from the interview as well as the 'SOURCE'. Multiple allocations of quotes to more than one category are indicated in the column 'MA' with an abbreviation referring to the other categories. Example: If a quote under category 'B3.A' has a 'B2.C' in the last column this signifies that this exact quote can also be allocated to the category 'B2.C'; square brackets '[B2.C]' indicate it can be allocated to category 'B2.C' in the broadest sense. Quotes are left in the original state and have not been corrected grammatically in order not to influence the content of the statement. For reasons of practicable handling, a short 'SYNOPSIS' was done by the author, in some instances combining several quotes of the same interview. This synopsis does not show the opinion of the author but rather maintains the opinion of the interviewee.

B3.A: Changes in planning triggered by lessons from reconstruction

The statements concerning Changes in planning triggered by lessons from reconstruction are further structured using CODES as follows:

- **B3.Aa Changes regarding organisational issues**
- **B3.Ab Changes regarding Construction**
- **B3.Ac Changes regarding urban planning**
- **B3.Ad Changes regarding people**

Quote	Source	Synopsis	MA
CODE B3.Aa Changes regarding organisational issues			
"There is a government office that specialises on the land owner and ownership. [Indonesian] DPN National Land something."	Hasan, 2016,p.2/§45-47	Unclear land ownership for reconstruction of houses and roads.	B3.Ac
"But they have now the copy."	Hasan, 2016,p.2/§50		
"ICAIOS now, we have project the aftermath where housing and settlement is one of the focus area of project with for the factor livelihood, and disaster reduction, governance and housing and settlement and demography. [...]. So, housing after 10 years we have three senior researcher and also one senior researcher from Singapore. We now finished our collection of data now we are in the process of writing after analyses and so on."	Sidiq, 2016,p.1/§13-18	ICAIOS is doing an assessment of housing, settlement and demography in Banda Aceh, 10 years after the tsunami.	B3.Ac
"You can meet Igna Mundzir the programme manager for that[...]"	Sidiq, 2016,p.1/§43f		
"More than 500 houses they sketched what is different before and after."	Sidiq, 2016,p.2/§88		

<p>“Three district. Banda Aceh, Aceh Besar and Aceh Jaya. Three districts. It’s a quite big project.”</p>	<p>Sidiq, 2016,p.3/§105f</p>		
<p>“I think there should be one [emergency plan] there already. The tsunami in Aceh actually also have many ??? legacy [?] but also on knowledge production and policy on disaster mitigation. It’s not until tsunami in Aceh did we actually have these BPBA or BNPB, the BNPB is not there so now we have this Badang Nasional Pulan[?] You already know about that and in Aceh we have BPBA. That is the agency that came up based on our experience working on tsunami. Of course, the main role of this organisation or this agency is to provide and develop emergency planning. So somewhere there I believe it should be there. So, if you ask whether the government of the city of Banda Aceh have this plan I believe the plan is there.”</p>	<p>Mahdi, 2016,p.3/§122-129</p>	<p>There is an emergency plan for Banda Aceh. This is under the BPBA and BNPB who are responsible to develop emergency planning.</p>	<p>B3.Ac</p>
<p>“We have done some drilling for evacuation for example but I don’t follow as detailed but I know my kids attend a school that is called [Indonesian name] a school that is aware of disaster. I mean they have trained the teachers and the students, they have programmes to increase the awareness about disaster mitigation among the teachers and the students and it’s still going on until now, they know how the process if a disaster happen. When there is an earthquake I don’t need to worry about finding my daughter for example anymore I would know that they will come to this escape building. In the case of my daughter attending one of the school around here she will be going to the tsunami museum which is also an escape building. So, it’s already planned.”</p>	<p>Mahdi, 2016,p.3f/§129-136</p>		
<p>“It mean this 2013 this is also the first creation of professional advisory board in disaster management office in Indonesia. In national level, we have but in province this also the one they build. Some area of province want to look what we are did right now, what we are tried to think through. This is 2013 and then 2014 we also still selected and then 2015 we are work here until 2019, four years. Our idea is how - as our advisory - we give it the direction for BPBD for rehabilitation and reconstruction and also how to make [?].”</p>	<p>Dirhamsyah, 2016,p.2f/§88-94</p>	<p>The tsunami and disaster mitigation centre provides direction to the BPBD for rehabilitation and reconstruction.</p>	
<p>“Maybe we try to look our presentation this year and then you can have some imagination what we try to do for the future, especially for disaster management in our province. This is what we are try to do how to make our city more resilience and how to make the city more safe and secure.”</p>	<p>Dirhamsyah, 2016,p.3/§95-98</p>		
<p>“Right now, Banda Aceh also part of the resilient cities around the world. Since [?] they also work together 2009 with the drill simulation. This involved 100,000 people. This is a good chance and a good opportunity.”</p>	<p>Dirhamsyah, 2016,p.4f/§176-178</p>	<p>Banda Aceh is part of the resilient city programme.</p>	
<p>“I think if we compare before the tsunami and now, after what ten years a lot of that progress being made. Not only in Aceh but also in overall Indonesia in area which is prone to disaster. And now we have a national agency specifically established for disaster risk management, the BNPB [National Agency for Disaster Management] in Indonesia which manage and coordinate the overall disaster, including the prevention in Indonesia.”</p>	<p>Faisal, 2016,p.3/§117-121</p>	<p>A lot has been done already in Indonesia, ten years after the tsunami. The BNPB [National Agency for Disaster Management] was put in place as the national agency for disaster risk reduction. Also, people are aware of how to react in the case of a tsunami warning.</p>	<p>B3.Ad</p>
<p>“I think at the national level there is a BNPB at the provincial level there is a local disaster management agency, I think at the provincial as well as the district. So, they have one national but then in each of the province they will have one and then also in each of the district. So, I think there is a lack authority and scope if it is a district level it would be the district level agency if it would be provincial there would be provincial and if it is national there would be the BNPB but I believe there is a coordination among these three.”</p>	<p>Faisal, 2016,p.7/§301-306</p>		

<p>“One example that when we had a few nights ago we had a earthquake 7.8 in Mentawai [a 7.8 magnitude earthquake which struck on 2 March 2016 in the Indian Ocean, approximately 800 kilometres (500 miles) southwest of Sumatra in Indonesia. Tsunami warnings were issued for Indonesia and Australia, but were withdrawn two hours later.] that we see that the people are already aware. The people already moving toward the higher ground and doing the evacuation. Although the areas for improvement still open, so this is like a long-term. So, when we talk about making a disaster resilient community it’s about the long-term.”</p>	<p>Faisal, 2016,p.3/§121-127</p>		
<p>“I think I’ve seen a lot of programme by the government of Indonesia in moving forward this resilient city, resilient community and a lot of activities in that areas. For example, in Padang, the earthquake that we have recently [occurred on September 30, 2009 off the coast of Sumatra, Indonesia with a moment magnitude of 7.6 at 17:16:10 local time. The epicentre was 45 kilometres west-northwest of Padang, Sumatra] that I hope I’m not mistaken but last year we had the emergency response exercise simulation there inviting international actors as well so that was part of the preparedness when their people get aware about the area prone for disaster but the same time it’s about developing the mechanism if something happen how do we work together in responding to disaster. But of course, this will include emergency response. And I think a lot of effort being done and will continue into that area. But as I said Indonesia is a big country and it will take time it should be a continuous effort in improving the resilience of the community in term of dealing with disaster.”</p>	<p>Faisal, 2016,p.3f/§132-143</p>		
<p>“[...]now after the Aceh tsunami the government set up the National Disaster Management Agency [BNPB]. So BNPB cover the full spectrum for disaster management, prevention, rehabilitation, recovery. So now there is an institution I think it’s been several years already and so this institution will be in charge because the institution was given the mandate by law to coordinate as well. I believe in the future that this would be the institution that will be in charge for any disaster in Indonesia.”</p>	<p>Faisal, 2016,p.5/§177-182</p>	<p>The BNPB was set up by the government of Indonesia to deal with disaster management including prevention, rehabilitation and recovery. In case of a future disaster in Indonesia, this agency would step in and coordinate the reconstruction.</p>	
<p>“We used the UNSDR standard for assessment our resilience. Only we invite the agency in Banda Aceh city, we also invite another stakeholder, the university, the private sector, electric company and also the defence and police department.”</p>	<p>Permakope, 2016,p.5/§188-190</p>	<p>A resilience assessment was made for Banda Aceh following the UNSDR standard. All the agencies of Banda Aceh city were involved as well as stakeholders from the university, the private sector, electric companies, defence and police department.</p>	<p>B3.Ac</p>
<p>“After we discuss we know we are not so resilient. So, with the data we have to make the new programme and activities how to meeting the resilience.”</p>	<p>Permakope, 2016,p.5/§194f</p>		
<p>“After the big disaster in Aceh province of course some of our city planning has changed. We have to seriously think about disaster. We have to make a programme how to build in Banda Aceh city. That’s why our city is seriously to take that. And then in the year of 2011 our government invent this BPBD agency of disaster management. In disaster management agency, here we have three departments - first the preparedness department, the second is the emergency and logistics department and the third is rehabilitation and reconstruction department.”</p>	<p>Yubarsi, 2016,p.1/§1-6</p>	<p>After the disaster in Banda Aceh some of the city planning changed. The aim was to make a programme how to build in Banda Aceh. In 2011 the city implemented the BPBD disaster management agency. There are three departments: preparedness, emergency and logistics, and rehabilitation and reconstruction department.</p>	
<p>“Our programme effectively started in the year of 2012 because we were established in the 2011 in the month of February.”</p>	<p>Yubarsi, 2016,p.1/§8f</p>		
<p>“So BPBD is for the district Banda Aceh and BPBA is for the province, so one level above?”</p>	<p>Interviewer, 2016,p.1/§24f</p>		
<p>“Yes.”</p>	<p>Rusmadi, 2016,p.1/§27</p>		

<p>"First - BNPB established in 2007 because of many many disaster attack in Indonesia. You know volcano in Yogya, Merapi and then of course major earthquake and tsunami in Aceh and then earthquake in Nias and then earthquake in Padang and then Yogya earthquake. Because too many many disaster hit Indonesia, then our president established we must manage disaster with one agency. This mean seriously how to make disaster from our past. After that they make the regulation in BNPB. Each province and city in Indonesia must establish disaster management agency in city, that's why."</p>	<p>Yubarsi, 2016,p.9/§372-378</p>		
<p>"Before we train we must make a programme, we must make SOP - standard process operation. For the first we have to arrange what kind of potential disaster could hit in our city. Because we are in coastal area of course tsunami is one of potential disaster because we are in the ring of fire, earthquake is the potential disaster also. And then flood, two kind of flood - forgot the two kind of flood, from the river and then from the rain. From the river and second is when the rain comes we have a flood because sometimes the [?] of the sea is a problem. They could flow, normally you must use pump."</p>	<p>Yubarsi, 2016,p.4/§163-169</p>	<p>BNBD [together with IOM] does evaluations on what kind of potential disaster could hit Banda Aceh. There is the risk of tsunami, earthquake and two kinds of floods.</p>	
<p>"For example when we are together to go to a village to make the data because we see the case of biggest case of flood in the year of 2000. That's why we made a data which area in 2000 is hit by flood. That's why this is the flood area."</p>	<p>Yubarsi, 2016,p.5/§180-182</p>		
<p>"So then after we arrange that potential to disaster we make - what should we do to manage one disaster, two disaster, three disaster. And then we train our people how to do that. When the flood come, what should they do and then when the tsunami, after a big earthquake what should you do - you must go out of the coastal area. You must go to the escape building, that's our programme to make our people know how to do that after disaster."</p>	<p>Yubarsi, 2016,p.5/§193-197</p>		
<p>"IOM [International Mitigation Programme]right now propose for 13 districts of Aceh including Banda Aceh of a study area. We conduct risk map for hazards including flood [?] And the we conduct other project for village and then for capacity building for stakeholder."</p>	<p>Yubarsi, 2016,p.5/§206-208</p>		
<p>"Preparedness department do before the disaster, they work before the disaster came and then when disaster came until our government say they are finish for emergency condition this is the area for emergency and logistic department. That's why in that time all the thing too quickly. We have a lot of money, bring that, give them, the money for the people. Because if we do that with the normal bureaucracy it will need long time to do that. Maybe many people will die because of our bureaucracy."</p>	<p>Yubarsi, 2016,p.7f/§305-310</p>		<p>The preparedness department work pre-disaster, therefore when a disaster occurs, and the emergency condition begins, everything can happen fast. The emergency phase must happen fast and without the normal bureaucracy.</p>
<p>"I think the government has improved much after that because we have an office dealing with BNBD to mitigate the disaster. I think they have a SOP [Standard operation procedure]what to do after the disaster. What to do after the disaster, how long and what to do after that. So, I think they already have a SOP about the disaster."</p>	<p>Zulfisni Meutia, 2016,p.3/§101-104</p>	<p>The office has improved much after the last reconstruction experience. There is an office dealing with BNBD to mitigate disaster. They have a Standard Operation Procedure [SOP] which regulates what to do after a disaster.</p>	
<p>"So there is three different sector. One is about the info about the mitigation kind of like a social division. The second is logistic for disaster. The third one is for rehab and recon. So, their agency is under the division of rehab and reconstruction so if there is a disaster then there will be rehabilitation and reconstruction. But in some places which has not yet happen the disaster they will give information and they prepare for logistics. This is after disaster. There will be rehab and reconstruction so this is before, so it's like giving the warning to people."</p>	<p>Kamaruzzaman, 2016,p.3f/§130-135</p>	<p>There are three different sectors. One is for information and mitigation, the second is logistic for disaster and the third is rehabilitation and reconstruction. If a disaster has not yet occurred, they will inform people and prepare for logistics. The reconstruction and</p>	

<p>“So actually from the government they keep monitoring and then they give advice. For example, if a house in on the river bank which has a risk for the flooding they warn for the community to move, they suggest to move because there is a risk. But the community don't want to move. So, what they did is keep monitor the area and then give the advice. For example, people living near to the landslide they warn about that but because this is not happen yet so it's difficult to make the owner move. But they keep to give that suggestion and advice.”</p>	<p>Kamaruzzaman, 2016,p.6/§224-229</p>	<p>rehabilitation sector only begins after a disaster has happened.</p>	
<p>“And then the government give the response, only give the aid, not the preparation for the education. They don't know about this yet. This disaster have a new education for the Indonesian. After that in 2007 we have produced a law regulation about disaster law. Before that, 2005... maybe first, 2004/2005 we have Hyogo Framework for Action in Japan and then 2007 we have law regulation about disaster. This caused by tsunami 2004. Caused by tsunami 2004 we have regulation about law disaster. And then we have national disaster agency, you can call BNPB in 2008. They produce some regulation.”</p>	<p>Sunarty, 2016,p.1/§23-29</p>	<p>The tsunami triggered a few regulations. From 2005 there is the Hyogo Framework for Action in Japan and 2007 there was a law regulation for disaster. In 2008 the national disaster agency BNPB was implemented and they produce regulations.</p>	
<p>“As you know Aceh have a big disaster, earthquake and tsunami, in 2004 but we know this was not first tsunami in Aceh. We have several tsunami before that. And then the researchers from Unsyiah have experience [?]about the [?] tsunami. We have tsunami in 19[?] in Simeulue and then several tsunami before that. But the people don't know what a tsunami is when the tsunami attacked in 2004. Because they don't have sharing experience from tsunami before and then now. And then in 2004 the people panicked and they don't have education and they don't have experience about what is this, why the wave from the ocean come to the land like this.”</p>	<p>Sunarty, 2016,p.1/§17-23</p>		
<p>“2008 we have national agency, BNPB. And then after the BRR programme in Aceh we have BPBA. BPBA involve in BNPB. Maybe in other province we have too, this in national and then province, Aceh province we have BPBA, Medan, Sumatra Utara we have BPBD. And then in Jakarta we have BPBD. It's different from Aceh because we have spatial regulation law and then you put 'A' not 'D'. We have BPBA and they work until now.”</p>	<p>Sunarty, 2016,p.1/§37-41</p>		
<p>“But in Aceh we have special regulation. They put 'Badan Pernangan Bencana Aceh'. Maybe BNPB in national, BPBD in province, BPBD in district. And Aceh we have BPBA, only in Aceh. And then in district we have BPBD. We have 23 BPBD.”</p>	<p>Sunarty, 2016,p.2/§45-48</p>		
<p>“This programme, we have four programme, preparedness, disaster risk reduction and then strengthening regulation and organisation. We have emergency and logistic and we have rehabilitation and reconstruction programme. We have four in BPBA.”</p>	<p>Sunarty, 2016,p.2/§92-95</p>		
<p>“But now in Aceh or in Indonesia the programme about the rehabilitation, the project is not in the BPBA. Only the Public Work. They must building for example 10,000 housing, they must building the road. Not in the BPBA. Here only the monitoring. Here is only about give the education to the people but the project not here. But I think advisory board team the Public Work must understand about the project based on disaster filling. If they want to build the house they must understand this must be representative for BRR.”</p>	<p>Sunarty, 2016,p.11/§442-447</p>		
<p>“[...]we have TDMRC. We have research, tsunami disaster mitigation research centre. [Indonesian] This activity we have research centre”</p>	<p>Sunarty, 2016,p.2/§69f</p>	<p>There is a tsunami and disaster mitigation research centre in Banda Aceh that was put in after the tsunami.</p>	
<p>“[...]we have the RES system and then risk map and then evacuation drill and road. We have crisis centre and then tsunami drill, escape building and so on.”</p>	<p>Sunarty, 2016,p.3/§74f</p>	<p>There is now a risk map and a crisis centre as well as an</p>	

<p>"This contribution in DRR programme in Aceh, we have Aceh disaster document plan. This the first document plan in Indonesia. We can adopt to other province. Aceh disaster document plan. We have tsunami early warning system, standard operational procedure, SPDA. We have Aceh early warning tsunami system. We have integration the disaster in education and then we have master degree, you know. And then risk map they use for revision spatial planning."</p>	<p>Sunarty, 2016,p.2/§76-80</p>	<p>evacuation road and evacuation drill.</p>	
<p>"In Aceh disaster document plan we have eleven disaster but the very increase and the very critical is the flood. Flood and then earthquake, tsunami. But the first is flood, direct in the city."</p>	<p>Sunarty, 2016,p.2/§86-88</p>		

CODE B3.Ab Changes regarding Construction

<p>"So up to now the most of the people will choose this one [brick] because they are thinking it is very solid and then it will be very strong but actually it is not as strong as we are thinking if the enforce is not well attached. Because for example this house look like very light and people will think that it will not sustainable for many years so people will choose this one."</p>	<p>Sari, 2016,p.5/§186-189</p>	<p>The choice of construction material and methods used in the reconstruction phase influence people's decisions when they build a house today. They think a brick construction is better in any case, even though this does not meet other requirements, for example climate conditions.</p>	
<p>"You know spatial planning after tsunami? We tried to make more green space, the mangroves. Before tsunami only here and small here. After tsunami, we try to make a green belt. And we give the limited permit for the - only for the fishermen, old fishermen. Because the old fishermen want to still stay here. But for the new fishermen we cannot give the permit."</p>	<p>Permakope, 2016,p.5/§252-255</p>	<p>The government only gives limited permits for fishermen housing close to the shore. The houses that are already there can stay but no new houses can be built.</p>	<p>B3.Ac</p>
<p>"Actually, after tsunami the central government wants to move the villagers to inland, two kilometre. But the people in especially the ones near the sea they said, "we are fishermen, we have to stay near the sea". So, we make the limited permit only for the fishermen."</p>	<p>Permakope, 2016,p.5/§255-258</p>		
<p>"How long is the limited permit?"</p>	<p>Interviewer, 2016,p.7/§265</p>		
<p>"Twenty years. And every five year we can revision."</p>	<p>Permakope, 2016,p.7/§267</p>		
<p>"I think we know we have to check the material not danger to people. And now I know the university have a planning for earthquake house, so what is the structure like. I think just that one thing."</p>	<p>Zulfisni Meutia, 2016,p.3/§129-131</p>		

CODE B3.Ac Changes regarding urban planning

<p>"There is a government office that specialises on the land owner and ownership. [Indonesian] DPN National Land something."</p>	<p>Hasan, 2016,p.2/§45-47</p>	<p>Unclear land ownership for reconstruction of houses and roads.</p>	<p>B3.Aa</p>
<p>"But they have now the copy."</p>	<p>Hasan, 2016,p.2/§50</p>		

<p>“The natural hazards should be put or inserted into the spatial planning, for the province, provincial spatial planning or district spatial planning. So, before the earthquake or before the tsunami, we had never had concern regarding the natural hazard or the natural disas... Sorry, the natural disaster towards spatial planning. But after the tsunami, then we have decided that the natural condition or natural hazard has to be put into the spatial planning documents. It must be implemented by the Public Works Department but the document should be prepared by Aceh Regional Development Planning Agency or Banda Aceh District Regional Planning Agency. That's according to the law of Indonesia, because we have National Board of Planning, we have the provincial and then we have district. Banda Aceh is a district, Aceh is a province.”</p>	<p>Irwansyah, 2016,p.3f/§126-134</p>	<p>Natural hazards should be a part of spatial planning. Before the tsunami there was no concern regarding natural hazards. This has now changed. The implementation is the responsibility of the Ministry of Public Work. The document should be prepared by Aceh Regional Development Planning Agency or Banda Aceh District Regional Planning Agency.</p>	
<p>“The strategy plan is not from the community but there is a... one of the NGO came here so they made a socialisation about the mitigation of disaster and then they prepared for the sign to evacuate. The access to evacuate, the tsunami. The access where to go and then the assembly point. Yes, they made a socialisation.”</p>	<p>Irdus, 2016,p.6/§127-130</p>	<p>Disaster mitigation means escaping from a possible danger. There are now escape road signs in the village to enable an evacuation process. Still there are no escape buildings that could be reached by the people of this community in a reasonable time-span.</p>	
<p>“So actually there is no escape building here in this village. He is not very sure for the evacuation access road from this NGO because if we want to run to the safer place we have to pass two villages and this is too long so the safer issue would be to have at least one escape building. Because it will take time to go to the outside.”</p>	<p>Irdus, 2016,p.6/§143-146</p>		
<p>“So actually, he already saw that there is a land, maybe it is prepared for the escape building but maybe some of the political interests or something... so it looks like they didn't build the escape building but the plot is already there. They start to sondate the ground but they did not continue to construct.”</p>	<p>Irdus, 2016,p.6/§251-254</p>		
<p>“So actually, the situation here in Kampung Pande actually the same like Ulee Lheue. In Ulee Lheue there is a village called Lampung, there is one escape building. Which is 0.2, one of the dangerous area for the disaster so it should be that here there is also one escape building but it is not constructed. But he can't be asked anything about this because he also didn't know why there is willing of the government to involve here.”</p>	<p>Irdus, 2016,p.6/§258-262</p>		
<p>“That's all in our spatial plan, it's already written there that we try to attract the south of the city in the inland. We move the bus terminal from the city to the south side and we also build a hospital. Not provincial, provincial hospital is still there it's still good but we try to move our hospital. So that makes people more comfortable to live in the south side. Even the land is quite expensive but I think in the middle-class group now, now are going to go by themselves to the south. It's good. We install the water supply pipe, bus terminal and also a hospital and let's say one third of our office partner now is going in the south side also. That's the idea how to make, to steer the community to go to there. Still in progress now. And also, the market, we also built a market but it's not running well because the community is not quite too much there. It's not so many there so we still have a problem with the market. But again, we have a plan that more people is living in inland. Cost to build, like in Japan they build a wall is quite expensive for us. It's not good. Nobody know because the history says that every 200 years or every 100 years we have to prepare for that. We also have a master plan for the mitigation so we follow that master plan.”</p>	<p>Bahagia, 2016,p.6f/§255-267</p>	<p>There is a master plan now where the government tries to move the city centre of Banda Aceh further inland, so people would slowly move their houses with it. Also, a sea wall similar to that in Japan is being discussed but there is no money to implement it at this stage.</p>	

<p>"We also give suggestion the floor level. We are now only 80 centimetres from the sea level in Banda Aceh. They will suggest in that area maybe the floor level is raised because ten years ago or fifteen years ago there is a flooding there so it's good or something like that. So, spatial planning is not only just exercise in the office but they also go to the field and then make some calculation"</p>	<p>Bahagia, 2016,p.8/§309-313</p>		
<p>"I think there should be one [emergency plan] there already. The tsunami in Aceh actually also have many ??? legacy [?] but also on knowledge production and policy on disaster mitigation. It's not until tsunami in Aceh did we actually have these BPBA or BNPB, the BNPB is not there so now we have this Badan Nasional Pulan[?] You already know about that and in Aceh we have BPBA. That is the agency that came up based on our experience working on tsunami. Of course, the main role of this organisation or this agency is to provide and develop emergency planning. So somewhere there I believe it should be there. So, if you ask whether the government of the city of Banda Aceh have this plan I believe the plan is there."</p>	<p>Mahdi, 2016,p.3/§122-129</p>	<p>There is an emergency plan for Banda Aceh. This is under the BPBA and BNPB who are responsible to develop emergency planning.</p>	<p>B3.Aa</p>
<p>"We have done some drilling for evacuation for example but I don't follow as detailed but I know my kids attend a school that is called [Indonesian name] a school that is aware of disaster. I mean they have trained the teachers and the students, they have programmes to increase the awareness about disaster mitigation among the teachers and the students and it's still going on until now, they know how the process if a disaster happen. When there is an earthquake I don't need to worry about finding my daughter for example anymore I would know that they will come to this escape building. In the case of my daughter attending one of the school around here she will be going to the tsunami museum which is also an escape building. So, it's already planned."</p>	<p>Mahdi, 2016,p.3f/§129-136</p>		
<p>"How to make the housing places and how to make some places for the vulnerability and the hazard information to be in there and how we can make the [?] issue to be one planning. And how we can reduce the disaster risk - the disaster risk reduction DRR for our next issue to make the disasters decision in development. It mean disaster is our needs how to look the potential disasters."</p>	<p>Dirhamsyah, 2016,p.1/§37-41</p>	<p>Having DRR as an issue in city development planning.</p>	
<p>"We used the UNSDR standard for assessment our resilience. Only we invite the agency in Banda Aceh city, we also invite another stakeholder, the university, the private sector, electric company and also the defence and police department."</p>	<p>Permakope, 2016,p.5/§188-190</p>	<p>A resilience assessment was made for Banda Aceh following the UNSDR standard. All the agencies of Banda Aceh city were involved as well as stakeholders from the university, the private sector, electric companies, defence and police department.</p>	<p>B3.Aa</p>
<p>"After we discuss we know we are not so resilient. So, with the data we have to make the new programme and activities how to meeting the resilience."</p>	<p>Permakope, 2016,p.5/§194f</p>		
<p>"The green site is for the mangrove area. If I have land here we cannot make a new building because the Public Work cannot give the permit for making a building. Only for the mangrove. That's our regulation."</p>	<p>Permakope, 2016,p.6/§232-234</p>	<p>In the new spatial plan there is a defined green area for mangroves. For this area there is a regulation that houses cannot be built. Therefore, the Ministry of Public Work will not give the permit for housing. When the tsunami came there was this green buffer area did not exist.</p>	
<p>"Not so big for the green space. When tsunami come, there is no bay here, so the tsunami comes all the way in."</p>	<p>Permakope, 2016,p.5/§204f</p>		
<p>"You know spatial planning after tsunami? We tried to make more green space, the mangroves. Before tsunami only here and small here. After tsunami, we try to make a green belt. And we give the limited permit for the - only for the fishermen, old fishermen. Because the old fishermen want to still stay here. But for the new fishermen we cannot give the permit."</p>	<p>Permakope, 2016,p.5/§252-255</p>	<p>The government only gives limited permits for fishermen housing close to the shore. The houses that are already there can stay but no new houses can be built.</p>	<p>B3.Ab</p>

<p>"Actually, after tsunami the central government wants to move the villagers to inland, two kilometre. But the people in especially the ones near the sea they said, "we are fishermen, we have to stay near the sea". So, we make the limited permit only for the fishermen."</p>	<p>Permakope, 2016,p.5/§255-258</p>		
<p>"How long is the limited permit?"</p>	<p>Interviewer, 2016,p.7/§265</p>		
<p>"Twenty years. And every five year we can revision."</p>	<p>Permakope, 2016,p.7/§267</p>		
<p>"And also, we can see the disaster maps, like the escape buildings, where is the escape building, the place for earthquake fault. In Banda Aceh there is two faults, and the tsunami risk you can see. If we have this want to make the building better we make not from the concrete, we make from the wood. Because it's a big earthquake fault here. We give the recommendation to the Public Work when they make the building permits. [Indonesian] Also we have the tsunami pool. The high ground up 3,7 metre, the distant from the spot line 2.7 kilometre. So, the people know, if they have the building here if the tsunami come again how do we run how do we escape."</p>	<p>Permakope, 2016,p.6/§241-248</p>	<p>There are disaster maps for Banda Aceh city showing the escape buildings, the two earthquake faults and the tsunami risk. In case a building is built in the fault areas it should be made from wood instead of concrete. This recommendation is given to the Ministry of Public Work when they make their building permits. There is also a tsunami pool that shows people were to run if they live in a tsunami prone area.</p>	
<p>"And we move the public service from the north to inland. [pause] Before tsunami the all public service in the centre of the city but after tsunami we try to move. We making the new CBD from here to here. We move the hospital, school, bus station from here to here. With this strategy, we tried to move the villager or the community, citizen not to stay near to the sea but more to the south because all the public service near here. That's our regulation. [pause]"</p>	<p>Permakope, 2016,p.5/§258-263</p>	<p>Public service building are being moved further inland which includes the hospital, school and bus station in order to move communities and villagers further inland, away from the sea.</p>	
<p>"I think if we have to make a rehab recon again before in planning we have to do many thing before we implement our planning. That's what is a lesson from the past."</p>	<p>Permakope, 2016,p.7/§305f</p>	<p>Before another reconstruction and rehabilitation, a lot must be achieved beforehand implementing the planning.</p>	
<p>"Banda Aceh, not Banda Aceh, maybe the central government in Indonesia there is no good data so after tsunami in Banda Aceh there is no data about the landowner, the border. Now every year we make the border for the village because we not have the border line and we not have the kind of the - maybe a border has a pole or a column in the ground, there is none. So that makes it difficult to make the planning."</p>	<p>Permakope, 2016,p.8/§322-326</p>	<p>After the tsunami there was no data about landownership in Banda Aceh. So now, every year the border of the village is being renewed.</p>	
<p>"I think, if we have to rehab recon, if we have this - someday the disaster come to Banda Aceh and we have to make the rehab recon we have the good data. And the next generation can use the data to make a better development, like in Japan. In Japan because they have the good data it's easy to make the development again because there is no conflict with the villager, one villager to another villager about the land because they still have data. In Banda Aceh, there is no data. So, we learn - Japan learned from Banda Aceh but we actually also learned from Japan. Especially for the development in the rehab recon."</p>	<p>Permakope, 2016,p.8/§327-333</p>		
<p>"Do you know of any tables or charts for expected future risk for Banda Aceh?"</p>	<p>Interviewer, 2016,p.4/§170</p>	<p>There was a presentation from Pak Permakope about an alarm system in Banda Aceh and some training for disaster mitigation was completed.</p>	<p>B3.Ad</p>
<p>"I saw a presentation from Mister Permakope about - there are some equipment, I think alarming system for disaster mitigation which has been installed in certain places in Banda Aceh. And there is some training which has been done for disaster mitigation including with the children but I am not sure [...]"</p>	<p>Hafizh, 2016,p.4/§172-175</p>		
<p>"Generally, not looking at housing, what is the city doing to adapt to natural hazards?"</p>	<p>Interviewer, 2016,p.5/§196f</p>		
<p>"It's part of government, I am not sure. I don't know much about that."</p>	<p>Hafizh, 2016,p.5/§199</p>		

<p>"As far as I know there they use also school as escape building for instance and also community centre et cetera [?] see the maybe such similar evacuation like here there. Here only a few escape building exist at the moment[...]"</p>	<p>Hafizh, 2016,p.3/§111-113</p>	<p>In Japan they use escape buildings which have a second function for example a school. The escape buildings in Banda Aceh have been built by Japan. In the event of a disaster the people tend to escape inland instead of running to an escape building.</p>	<p>A3.D</p>
<p>"The funding come from Japan."</p>	<p>Hafizh, 2016,p.3/§117</p>		
<p>"[...]at the moment the people here when disaster happen the people who run to the escape building not so many because they prefer to evacuate to another places. For instance, the places far away from ocean. So actually, the core of the project is want to utilize the escape building as the centre point of villagers' activity."</p>	<p>Hafizh, 2016,p.3/§104-107</p>		
<p>"And they [Japan] have them as well but different, so it would be a school or something else, it would not only be an escape building."</p>	<p>Interviewer, 2016,p.3/§119f</p>		
<p>"Ya."</p>	<p>Hafizh, 2016,p.3/§122</p>		
<p>"Yeah, we did that [risk map] in the past, in 2011, commissioned by the DRR-A project, which is the project between the government and the UNDP. But that was only for the provincial level, so it's still a rough map, risk map. And knowing that now it's 2016, any kind of risk map has to be evaluated every five years and maybe we should make a new one. So, I'm not yet sure whether any initiative from the government wants to revitalize or update the risk map until now. But in between, since 2013, there has been risk-mapping analysis for the level of districts, district-level, but we have like 33 districts. Only about now, it's about 10 to 13 districts has been... The government has made this more detailed risk-mapping and it was with the collaboration with IOM. So, I think IOM play a very important role, the main actor who do this district-level risk-mapping. Of course, it's coordinated with the government, the BPBA or the BPBD of every district."</p>	<p>Meilianda, 2016,p.9/§361-370</p>	<p>In 2011 there was a risk map being completed for the province under the DRR-A project between the government and UNDP. It is a rough map and there should be a review every five years. So far this has not been initiated. Since 2013 there are risk maps being made for the district level. By now about 10-13 districts of 33 have been completed. This was done in collaboration with IOM and was coordinated by the government, the BPBA and BPBD of every district.</p>	<p>A3.Bc</p>
<p>"The starting point was, I think, after the tsunami, but it's not only the tsunami disaster. So, all kind of disaster that identified in this district, they make the analysis for the risk and then they also consider the forecasting, I think at some point. So, in terms of the project itself, it only lasts, of course by project, so they will really finish the project this year, sometime in April, I think. Yeah, sometime in April or May, so they finalize the project and I don't hear anymore continuation to the other district. Yeah, so that's the status right now."</p>	<p>Meilianda, 2016,p.9/§375-380</p>		
<p>"We are now moving to this area, to the south part of the city, because of the disaster mitigation planning so we are moving to the south part of the city. Next slide. This is what I explained before. This is the old city centre and we are moving to this new town, they call it new town in the south part."</p>	<p>Noeriman, 2016,p.1f/§42-45</p>	<p>The government is moving the new city centre further to the south of the city for disaster mitigation.</p>	
<p>"House also has to have this permit. This recommendation will explain who is the owner of the land. This is to explain the owner of the house to avoid future problem."</p>	<p>Noeriman, 2016,p.4/§165-167</p>	<p>Now there is a recommendation needed for each house which documents the owner of the land and the owner of the house in order to avoid future problems.</p>	
<p>"So, there was four permit that has to be completed and then all of this permit have to get recommendation from the Kitji and the Jamat, Kitji is the head of village, you know Banda Aceh is sub-divided into 90 villages so the head of the village is the Kitji and then the Kitji will send a recommendation to the Jamat, Jamat is the head of the district."</p>	<p>Noeriman, 2016,p.4/§153-156</p>		

<p>“So, you know that post the tsunami – the tsunami I think destroyed this coastal area so the government now use this area as the conservation area. They plant mangrove, they rehabilitate mangrove and then the development in this area is limited. The green area is the conservation area, the development here is limited. So, people will not move to this area. This area is dangerous and also the government has made this area in a conservation area.”</p>	<p>Noeriman, 2016,p.6/§231-235</p>	<p>After the tsunami the destroyed coastal area was turned into a conservation area where mangroves were planted and rehabilitated. In addition, the development in this area is limited..</p>	<p>A3.Bc</p>
<p>“The infrastructure will not get significant addition in this area. For example, the public facility like school won't be developed in this area so there is no new school here in this area. But they build some escape building here, the donor from the Japan government, JICA [Japan International Cooperation Agency].”</p>	<p>Noeriman, 2016,p.6/§239-242</p>		
<p>“So there was house that was destroyed during the tsunami. Is was rehabilitated but the new house – there will be no new house in this area. They will only rehab the old house that was destroyed by the tsunami. So, some people they still stay here in this area, few fishermen village, still some fishermen live in this area but the infrastructure is very limited. Like new school is not build in this area, they will only have the old one. That is our strategy to direct our development to the south part of the city, far away from the coast line. The only function that is developed here is the tourism. It's like the Ulee Lheue here, it's the tourism and the port, the port to Sabang Island. If there was old building that is not fit with the masterplan, it's against the masterplan, the building will be destroyed. The government will take down the building, they will destroy the building. If there was a building that violated the masterplan. Including huge building. If there was a huge building that violated the masterplan, the building will have to be destroyed. The recommendation itself comes from the mayor, so the mayor himself recommend this building has to be taken down.”</p>	<p>Noeriman, 2016,p.6/§248-259</p>		
<p>“I think from the rehabilitation from the mangrove and also from the coastal forest we've already seen the successful of the programme on field. The trees are already big. And it is very important to reduce the energy for the tsunami disaster for the next time.”</p>	<p>Iskandar, 2016,p.7/§288-290</p>	<p>The rehabilitation of mangroves as well as the coastal forest already show a successful programme. This is an attempt to reduce the energy of a possible future tsunami.</p>	

CODE B3.Ad Changes regarding people

<p>“I think if we compare before the tsunami and now, after what ten years a lot of that progress being made. Not only in Aceh but also in overall Indonesia in area which is prone to disaster. And now we have a national agency specifically established for disaster risk management, the BNPB [National Agency for Disaster Management] in Indonesia which manage and coordinate the overall disaster, including the prevention in Indonesia.”</p>	<p>Faisal, 2016,p.3/§117-121</p>	<p>A lot has been done already in Indonesia, ten years after the tsunami. The BNPB [National Agency for Disaster Management] was put in place as the national agency for disaster risk reduction. Also, people are aware of how to react in the case of a tsunami warning.</p>	<p>B3.Aa</p>
<p>“I think at the national level there is a BNPB at the provincial level there is a local disaster management agency, I think at the provincial as well as the district. So, they have one national but then in each of the province they will have one and then also in each of the district. So, I think there is a lack authority and scope if it is a district level it would be the district level agency if it would be provincial there would be provincial and if it is national there would be the BNPB but I believe there is a coordination among these three.”</p>	<p>Faisal, 2016,p.7/§301-306</p>		

<p>"One example that when we had a few nights ago we had a earthquake 7.8 in Mentawai [a 7.8 magnitude earthquake which struck on 2 March 2016 in the Indian Ocean, approximately 800 kilometres (500 miles) southwest of Sumatra in Indonesia. Tsunami warnings were issued for Indonesia and Australia, but were withdrawn two hours later.] that we see that the people are already aware. The people already moving toward the higher ground and doing the evacuation. Although the areas for improvement still open, so this is like a long-term. So, when we talk about making a disaster resilient community it's about the long-term."</p>	<p>Faisal, 2016,p.3/§121-127</p>		
<p>"I think I've seen a lot of programme by the government of Indonesia in moving forward this resilient city, resilient community and a lot of activities in that areas. For example, in Padang, the earthquake that we have recently [occurred on September 30, 2009 off the coast of Sumatra, Indonesia with a moment magnitude of 7.6 at 17:16:10 local time. The epicentre was 45 kilometres west-northwest of Padang, Sumatra] that I hope I'm not mistaken but last year we had the emergency response exercise simulation there inviting international actors as well so that was part of the preparedness when their people get aware about the area prone for disaster but the same time it's about developing the mechanism if something happen how do we work together in responding to disaster. But of course, this will include emergency response. And I think a lot of effort being done and will continue into that area. But as I said Indonesia is a big country and it will take time it should be a continuous effort in improving the resilience of the community in term of dealing with disaster."</p>	<p>Faisal, 2016,p.3f/§132-143</p>		
<p>"Do you know of any tables or charts for expected future risk for Banda Aceh?"</p>	<p>Interviewer, 2016,p.4/§170</p>	<p>There was a presentation from Pak Permakope about an alarm system in Banda Aceh and some training has been done.</p>	<p>B3.Ac</p>
<p>"I saw a presentation from Mister Permakope about – there are some equipment, I think alarming system for disaster mitigation which has been installed in certain places in Banda Aceh. And there is some training which has been done for disaster mitigation including with the children but I am not sure [...]"</p>	<p>Hafizh, 2016,p.4/§172-175</p>		
<p>"Generally, not looking at housing, what is the city doing to adapt to natural hazards?"</p>	<p>Interviewer, 2016,p.5/§196f</p>		
<p>"It's part of government, I am not sure. I don't know much about that."</p>	<p>Hafizh, 2016,p.5/§199</p>		
<p>"Now we made the programme together with IOM International Migration Organisation in Banda Aceh so we have some budget. We have a programme we do together with them. We train our people in some villages and districts how to be resilient people to face with disaster. And then we are going to be a resilient city. Now we have three resilient villages in Banda Aceh. That's why we are so serious in thinking how to manage disaster."</p>	<p>Yubarsi, 2016,p.1/§31-35</p>	<p>The BDBD has a programme where they train people how to be resilient facing a disaster. The aim is to be a resilient city. There are already three resilient villages in Banda Aceh.</p>	
<p>"We train about disaster management, basic disaster management to know what should they do when disaster come. And then we train some people in district, in government district and then we hope they can train some people in their villages in one district. And then we hope also some people who had ever joined the training before of disaster management could transfer their knowledge to other people in their village. We made a programme too to the school in basic school, junior high school not only about disaster, about how to manage a fire also. Mister Rusmadi is one of fire brigade before his service at the BPBD. This is the different with other city. In Banda Aceh, we have the curriculum for the school - disaster in our school. And we make a collaboration with other department in our government like for example other agency in Banda Aceh city, we do cooperation and then train them about disaster, about fire."</p>	<p>Yubarsi, 2016,p.4/§149-158</p>		

B3.B: Unaltered issues following reconstruction

The statements concerning Unaltered issues following reconstruction are further structured using CODES as follows:

- **B3.Ba Unaltered organisational issues**
- **B3.Bb Unaltered issues regarding construction**
- **B3.Bc Unaltered issues regarding urban planning**
- **B3.Bd Unaltered issues regarding people**

Quote	Source	Synopsis	MA
CODE B3.Ba Unaltered organisational issues			
"There is stuff supposed to be transferred by the BRR to the local government as part of the sustainable goal. If you ask now both of them they will keep pointing fingers. BRR says 'well we give it to the local government look at them do they can handle it?' I don't know where do they keep any of their own document. And when we go to the local government we also know that they cannot even keep a document. But then the local government says, 'yeah but the BRR doesn't trust us so they never give us anything'. One of the most important asset after BRR want to be dismissed is all of that, all of the product, the physical product. The planning, the regulations all that stuff that was...a lot of people was thinking and producing those things like a library and what I know [...] that is the one thing they don't want to give."	Adamy, 2016,p.12f/§519-529	The knowledge that was gained by the BRR during the reconstruction process was not handed over to the Acehese government.	
"For new houses or if you do an addition to your house, is it still a rule to follow the earthquake safety?"	Idus, 2016,p.5/§184f	When new houses are being built there is no rule to make sure the house is earthquake resistant.	B3.Bb
"So, for new house there is no following for the rule."	Irdus, 2016,p.5/§189		
"We depart by three, Disaster managements, geo-science and hydrological and the third one is the humanitarian and education. Three concentration. It mean from the geo-science and hydrological we try to put GIS a part of tools for decision making and how to look like this map - how they can think about one-map policy. But this is different with the Bappeda because Bappeda sometimes not care about this but we are in disaster management we must put all hazard and how vulnerability and how what the capacity of community and also institution, community and also the capacity of knowledge. If we can increase in the capacity of institution it means that we can make it stronger like now."	Dirhamsyah, 2016,p.3/§123-130	Bappeda does not put all the necessary information together such as different hazards, the vulnerability and the capability of the people. They do not follow an integrated approach.	B3.Bc
"We tried to overlay all these things and some area for example Pak Didi, my friend here very strong with the geo-science, they try to make some geo-hazard in this area. They found something here. This is some energy still in place here and they try to formalise and then validate it. If that already validate and then we can inform to the people. Because the energy here is still on now, still in place and will be [?] directly. And also, some area here look like that hole here, this is some [?] still intact. It mean that some of the planning of the Bappeda still not consider about our disasters, the potential disasters."	Dirhamsyah, 2016,p.4/§142-148		
"How do you work together with Bappeda?"	Interviewer, 2016,p.4/§150		
"Through meeting. The meeting is over, we take a deep breath. There are so many things you must put in the same potential disaster in the development. And how to put the right decision of the highest level. For example, if they can create some industry they must think on is it in the disaster strong area or not."	Dirhamsyah, 2016,p.4/§152-155		

<p>"There are some reason I guess because during the reconstruction we had to build 100,000 housing in very short time. And then from donor side they need to [?] all of the money so they can get more fresh money to came to Aceh. A lot of problem during the reconstruction including the policy. Like our local government is not good - because during the reconstruction we came to the piece period. So, in some area we need to accept some opinion that maybe is not [?] through the reality. That's sometimes when we do the reconstruction some partner said, 'we need to push' so no standard for that. That make the condition like that. Until right now ideally the reconstruction is in local government side. But the concentration of our government is not there right now. They move to [?] a lot of - not connected to our reconstruction period."</p>	<p>Dirhamsyah, 2016,p.7f/§301-309</p>	<p>During the reconstruction the government was not strong enough and were strongly influenced by outside factors. It would be now a good opportunity to make sure for a next time the reconstruction would be controlled by the government but this does not seem to be an issue of the government in Banda Aceh at this stage.</p>	
<p>"I think the most important thing is how to bring people together to make a planning. In a general context, for example the city. We don't have to do something in whole city, trying to go away from the old city. We have to maintain this kind of city, what has been there. They don't have to diminish the harmony of what is already there. So, by asking the people sit together with the government official for example to find the new boundary for the housing for example or anything in the region. People should be asked to be participating. That is the core point. Everything then can be appreciated by having such a kind sense of belonging."</p>	<p>Mardhatillah, 2016,p.5/§191-197</p>	<p>People should make a city plan all together with officials. For example, people should be involved when it comes to new boundaries for housing.</p>	<p>B3.Bc</p>
<p>"I say if possible we have to be aware that the process of rehabilitation is not ideal. Something ideal in our way is not happen in the field. So, the point is how to make the gap to become narrower. That is the point. Trying to narrow the gap between something ideal and the reality."</p>	<p>Mardhatillah, 2016,p.6/§260-263</p>	<p>The process of rehabilitation will never be an ideal process in the field. It is important to make the gap between an ideal picture and reality smaller.</p>	
<p>"What do you think would help narrowing this gap?"</p>	<p>Interviewer, 2016,p.7/§265</p>		
<p>"By us, the people again. They can make sure who is the owner in the first step. We have to know who will be the owner of the house. We have to make sure who are they. By knowing that, then we ask them to monitor the process."</p>	<p>Mardhatillah, 2016,p.7/§267-269</p>		
<p>"So, the result is they can get a good house. And no corruption."</p>	<p>Mardhatillah, 2016,p.7/§273</p>		
<p>"Of course, the problem here is, rehabilitation reconstruction is after the disaster. We have no disaster we can't do more. We go to Jakarta, we meet our BNPB in Jakarta, we try to get some budget to Banda Aceh city not to give. We want some budget for Banda Aceh city to build something here but the problem, budget for rehabilitation and reconstruction must be recommended with our mayor. But this is not disaster condition, when we don't have disaster we don't want to make something. So sometime we can go to the city and see what the potential will be. Maybe we can see a flood and then what they say when in the sea high levels, sometimes in six months once in our central near the sea level. But if we want to build other we can do that but not in rehabilitation and reconstruction department maybe in preparedness department. Although about construction."</p>	<p>Yubarsi, 2016,p.3/§112-121</p>	<p>The rehabilitation and reconstruction department at BNBD only becomes active after a disaster. If there is no current disaster, there is no budget and nothing to do. There is no budget from Jakarta. Things can only happen in a disaster condition.</p>	
<p>"We should have a concept maybe but we didn't do that now. As I told you that is so hard to make a programme for rehabilitation and reconstruction. Before the disaster come, when we try to see and we try to make a programme and we see there is something with the potential to be a disaster we can make a programme then. We give the recommendation for our boss, this is the potential will be a disaster. And then we can give a bill of quantity then, we tried to make that. How to prepare that, how much money we need to make - for example something like brack water how much money we need to prepare that and then we give to our. When they respond to give some budget it's not in rehabilitation and reconstruction because before disaster."</p>	<p>Yubarsi, 2016,p.3f/§128-135</p>		

<p>"[...]during the disaster, before they started the planning there is a special agency for the disaster budget. So, to get that the conditions is - there have to be a disaster."</p>	<p>Bustamam, 2016,p.1/§9f</p>	<p>Before the planning can start there has to be a disaster first. This is the only way there is a budget available.</p>	
<p>"[...]for example in 2015 there is five district in Aceh supported from here. They receive allocation budget."</p>	<p>Bustamam, 2016,p.1/§22f</p>		
<p>"So then after they receive disaster budget they did allocation for disaster and then there was a [?] the central and then going to Aceh and then searching for the data and then for the data, after they collected all the data and then [?] they invited many house developers. In 2015, there is kind of disaster."</p>	<p>Bustamam, 2016,p.1/§15-18</p>		
<p>"[...]the budget is from the national level [BNBD] and then to the province and then from province they direct it to, for example to the district."</p>	<p>Bustamam, 2016,p.1/§31f</p>		
<p>"So because they are working under the mitigation work, if there is no disaster then there is no planning, no budgeting for that. If there is a disaster then have to give a proposal and then budget will coming and then establish for the project."</p>	<p>Bustamam, 2016,p.2/§119-121</p>		
<p>"The first step is after the district received the budget allocation for they start to develop and then all the planning will be given to the district. But first they have to provide allocation, new location or they provide other land but they should have provincial certificate for the land. That's the first step."</p>	<p>Bustamam, 2016,p.2/§69-72</p>	<p>After the district receives the budget from the national level they start the planning. For an allocation they have to provide new land and have the provincial certificate for this land.</p>	
<p>"Also have to consider about the risk for the next disaster - far from the landslide area, from the flood, should be find new location which reduce the risk for that."</p>	<p>Bustamam, 2016,p.2/§76f</p>		
<p>"For example the house in only half left and then they will give a support to build a half one. But there is no chance to, they have to move it because there is dangerous area so they will relocate to another place where it is safe."</p>	<p>Bustamam, 2016,p.2/§108-110</p>		
<p>"The government will be move out and build new settlements in the safety area. That's the planning. But after that there is another problem, for example people don't want to move from their former area because he is a fisherman and then he has to move to the mountain. They will let them live around the coastal area. But they try to adapt."</p>	<p>Bsuatmam, 2016,p.5/§180-183</p>		
<p>"About the safety area to think about the people. Because if you build houses or a settlement you have to think about how to build the [?]. Because for example if we build away from there we try to move but they have to move their business first and then they can move."</p>	<p>Bustamam, 2016,p.5/§192-194</p>		
<p>"And still I remember one time there was a [Indonesian] there was another earthquake a few years after - I mean there were constant earthquakes but another big earthquake so everybody was running away and then what happened was in the hospitals for example patients were taken out and then left on the road. And then with schools the teachers went home and left the kids. #01:16:45# So there was really no real organisation or anything. At the end of the day it's like survivors on your own. So, I don't know. The schools have had drills and all this kind of thing. Whether they are actually in coordination with the parents or the villages these parents live in or the work place where they work I doubt it really."</p>	<p>North, 2016,p.13/§548-555</p>	<p>There seems to be a lack of coordination in the event of a disaster. After an earthquake that occurred a few years after the tsunami there was chaos in the city. People were running away, "patients were taken out of the hospitals and then left on the road", in schools "teachers went home and left the kids".</p>	
<p>"Low capacity of the government or incapacity of the government. [...] They have no experience, they don't know anything."</p>	<p>North, 2016,p.14/§603-605</p>	<p>The government still has a low capacity in dealing with natural hazards. Changing conditions of the local government, splits within political parties and inconsistency in approach make it hard to move things.</p>	
<p>"And we work with the local government and they know nothing. So, the NGOs, local, international of which there are very few are building up the capacity of the government offices and just when they understand what they have to do they moved into another department and you get someone new. That's happening to us all the time. Or a new law comes out from Jakarta."</p>	<p>North, 2016,p.14f/§613-617</p>		

<p>"Also, as I said the different political parties or the different splits within the separatist's parties they are all against each other still so there is no consistency in approach to anywhere or anything and a serious lack of capacity"</p>	<p>North, 2016,p.15/§623-625</p>		
<p>"He thinks one of the basic concept of building back better is one of the - everyone wants to build back better but the problem is how to interpret the build back better approach. An example, because we have a comprehensive time because during reconstructions we have had so many problems so he thinks it would be better for the government to make sums of recommendations, make sums of the emergency stage for the future but because we have no policy, comprehensive policy to manage all of disaster we are not sure if this could be applicable for the future."</p>	<p>Haiqual, 2016,p.4/§168-174</p>	<p>The problem with the concept 'building back better' is the interpretation of this approach. During the reconstruction there were so many problems so now it would be good if the government would make recommendations for an emergency stage in the future. But since there is no comprehensive policy to manage a disaster this might not be applicable.</p>	
<p>"[...]after ten years tsunami there is no significant consideration of the common sense of the public especially in the government for the next. But maybe in the academic it's could be better because they establish post-graduate programme disaster science. But how to develop a programme for this is one of the big challenge for us. This is one of the big challenge for the future because we will face long-period after 2004 and now so he is afraid that there is no significant change for the next."</p>	<p>Haiqual, 2016,p.7/§279-284</p>	<p>Ten years after the tsunami "there is no significant consideration of the common sense of the public especially in the government for the next". It might be better at the universities since they established a post-graduate programme on disaster science. But so far developing a programme for a future disaster poses a big challenge. Presumable there is no significant change yet.</p>	
<p>"So the mayor and the government just involved in the - there are a lot of activities regarding the resilient city from the ministry, from the state ministry. But this resilient city doesn't mean only for the earthquake and the houses and so on, it's still general and somehow, she's expected that the government expected to get more money from the state regarding these things. They just involve in the activity but it hasn't executed yet, the programme."</p>	<p>Mardalena, 2016,p.7/§302-306</p>	<p>The government of Banda Aceh is involved in a resilient city programme. So far nothing has been implemented yet and the government expects to get more funding from the state.</p>	
<p>"So one mayor will have a five-year period so they have this programme for five years and it's also the master plan for that."</p>	<p>Mardalena, 2016,p.7/§293f</p>		
<p>"So, for example there is one mission that they, they have to build this Islamic tourism here."</p>	<p>Mardalena, 2016,p.7/§275f</p>		

CODE B3.Bb Unaltered issues regarding construction

<p>"But in my very simple rough observation in Banda Aceh people just build whatever they want. They don't learn anything so far. Maybe that's a very rough statement for me I don't know but we need more assessments to have that kind of claim. I see many projects that they still build like there has nothing happened ten years ago. And like they just start from zero again."</p>	<p>Adamy, 2016,p.9/§375-378</p>	<p>People in Banda Aceh currently build what they want. People did not learn from the experience ten years ago.</p>	
<p>"I don't know if they [the people living in the houses] really think about that [safety regarding natural hazards] again. Even during the reconstruction. I think this could be one of the failure that this risk is only been hold by the people that is involved with the construction but not by everyone. Even now they don't need to involve in the reconstruction process but at least they know that the risk is there. And I don't think that is spread well."</p>	<p>Adamy, 2016,p.15/§634-638</p>	<p>There is no awareness of risk from natural hazards concerning housing.</p>	

<p>"Because this house we want to make the house with the resistant to the earthquake. Before the earthquake, they don't care we have to build the strong house. After the earthquake, we have to influence everyone that if they want to build the house they have to think about the resistance to the earthquake. So, we explain to the contractor and the government and we make the technical guideline and we give to them."</p>	<p>Meutia, 2016,p.1/§22-26</p>	<p>There is a technical guideline that was made by ADB for earthquake safety of houses. However, this is not implemented or used in Banda Aceh today.</p>	
<p>"But it's an option they can do, but they don't have to? They are not forced to?"</p>	<p>Interviewer, 2016,p.1/§28</p>		
<p>"Yes."</p>	<p>Meutia, 2016,p.1/§30</p>		
<p>"For new houses or if you do an addition to your house, is it still a rule to follow the earthquake safety?"</p>	<p>Interviewer, 2016,p.5/§184f</p>	<p>When new houses are being built there is no rule to make sure the house is earthquake resistant.</p>	<p>B3.Ba</p>
<p>"So for new house there is no following for the rule."</p>	<p>Irdus, 2016,p.5/§189</p>		
<p>"Building code designed by the national level, just last year building code. 2004, 2015, only eleven years after 2004 we have the new building code. [laugh] Takes time. But must be one year we can build the building code and then adapt by people. For example, the housing still [?] because of the [?]. This is already eleven years but the road is exponential like this 2004 until 2009 because of the reconstruction. But still the building code is still not there. Right now, we have very simple like this to be declined because of the [?] political issues sometimes. The grow of the economic still not stable. That means we already have some building code but the housing development still decline. And this is the time horizon we need. Building code must be done quickly. But at the time we are facing about the human resources. Actually, if the UN can help us at this time UN can give us some code internationally, give to the tsunami prone area. You must build like this. For example, using the British standard international. Using the United-States standard, using the China standard. Right now, we have China standard, China products in great mosque using the China standard. [laugh]"</p>	<p>Dirhamsyah, 2016,p.7/§282-294</p>	<p>2015, eleven years after the tsunami, there was a national building code. However, this is still not being implemented now. The buildings codes brought in by other countries, or for example the UN during the reconstruction, could have been integrated into an Indonesian building code.</p>	
<p>"We cannot predict about the hazard or the disaster; how big the disaster will happen."</p>	<p>Kamaruzzaman, 2016,p.7/§287f</p>	<p>Adaptation to natural hazards was not an aim in the reconstruction planning due to the uncertainty of the time and the size of a next disaster.</p>	<p>B3.Bc</p>
<p>"That's why this is difficult. But we have some escape building something like that. If you directly to give some adaptational - this is so difficult, but how big the disaster in the future? We don't know."</p>	<p>Kamaruzzaman, 2016,p.7/§290-292</p>		
<p>"So, for example, like Japanese they very often have a disaster or a hazard, they are well prepared for that but it's always again, once again."</p>	<p>Kamaruzzaman, 2016,p.7/§294f</p>		
<p>"You experience already a little bit this changing in climate, the sudden change. It's like heavy rain with a high intensity and then suddenly it will be so hot and so sunny. So, this is one of the problem about the housing. The government already installed this pipeline thing for drainage so when there is rain they also collect, right. But as Banda Aceh is flat, the surface it doesn't really flow directly to the river so it creates puddle. It takes like half an hour or so to dry. But the problem with the housing, if they have money people are doing it themselves. If they have enough money they will build high from the main road and some other not. And the government didn't really have regulation about the height of the house they build. So, if they don't have money then they gonna suffer from this puddle."</p>	<p>Mardalena, 2016,p.6/§252-260</p>	<p>Banda Aceh is flat and gets rain with a high intensity and the current drainage infrastructure is insufficient. Higher elevated land, outside of the food prone areas, is more expensive and many people can't afford to build there.</p>	<p>B3.Bc</p>
<p>"Master plan. Banda Aceh is flat. One people build one house, one septic tank. This is master plan of site system. For example, zona four, the housing, the pipe, treatment plant. The treatment building. Waste treatment. But it's..."</p>	<p>Mardalena, 2016,p.4/§142-144</p>		

<p>"It hasn't started. There are a lot of problems. The people also have not accepted it yet and the pipeline, it's too crowded so they need a way to do the pipeline things. So, the budget is already there, from the country, the state [Indonesia] but it hasn't started and they are still planning on it."</p>	<p>Mardalena, 2016,p.4/§146-149</p>		
<p>"She said the problem with the landowner. So, the government has already some budget for building the infrastructure but the landowner where the infrastructure should be built they didn't really give the land for that. You have to pay for that but then the budget from the government will be less. Sometimes they just need a little bit just part of the land but they make it problem as well."</p>	<p>Mardalena, 2016,p.4f/§175-179</p>		

CODE B3.Bc Unaltered issues regarding urban planning

<p>"We depart by three. Disaster managements, geo-science and hydrological and the third one is the humanitarian and education. Three concentration. It mean from the geo-science and hydrological we try to put GIS a part of tools for decision making and how to look like this map - how they can think about one-map policy. But this is different with the Bappeda because Bappeda sometimes not care about this but we are in disaster management we must put all hazard and how vulnerability and how what the capacity of community and also institution, community and also the capacity of knowledge. If we can increase in the capacity of institution it means that we can make it stronger like now."</p>	<p>Dirhamsyah, 2016,p.3/§123-130</p>	<p>Bappeda does not put all the necessary information together such as different hazards, the vulnerability and the capability of the people. They do not follow an integrated approach.</p>	<p>B3.Ba</p>
<p>"We tried to overlay all these things and some area for example Pak Didi, my friend here very strong with the geo-science, they try to make some geo-hazard in this area. They found something here. This is some energy still in place here and they try to formalise and then validate it. If that already validate and then we can inform to the people. Because the energy here is still on now, still in place and will be [?] directly. And also, some area here look like that hole here, this is some [?] still intact. It mean that some of the planning of the Bappeda still not consider about our disasters, the potential disasters."</p>	<p>Dirhamsyah, 2016,p.4/§142-148</p>		
<p>"How do you work together with Bappeda?"</p>	<p>Interviewer, 2016,p.4/§150</p>		
<p>"Through meeting. The meeting is over, we take a deep breath. There are so many things you must put in the some potential disaster in the development. And how to put the right decision of the highest level. For example, if they can create some industry they must think on is it in the disaster strong area or not."</p>	<p>Dirhamsyah, 2016,p.4/§152-155</p>		
<p>"We cannot predict about the hazard or the disaster; how big the disaster will happen."</p>	<p>Kamaruzzaman, 2016,p.7/§287f</p>	<p>Adaptation to natural hazards was not an aim in the reconstruction planning due to the uncertainty of the time and the size of a next disaster.</p>	<p>B3.Bb</p>
<p>"That's why this is difficult. But we have some escape building something like that. If you directly to give some adaptational - this is so difficult, but how big the disaster in the future? We don't know."</p>	<p>Kamaruzzaman, 2016,p.7/§290-292</p>		
<p>"So, for example, like Japanese they very often have a disaster or a hazard, they are well prepared for that but it's always again, once again."</p>	<p>Kamaruzzaman, 2016,p.7/§294f</p>		
<p>"I think the most important thing is how to bring people together to make a planning. In a general context, for example the city. We don't have to do something in whole city, trying to go away from the old city. We have to maintain this kind of city, what has been there. They don't have to diminish the harmony of what is already there. So, by asking the people sit together with the government official for example to find the new boundary for the housing for example or anything in the region. People should be asked to be participating. That is the core point. Everything then can be appreciated by having such a kind sense of belonging."</p>	<p>Mardhatillah, 2016,p.5/§191-197</p>	<p>People should make a city plan all together with officials. For example, people should be involved when it comes to new boundaries for housing.</p>	<p>B3.Ba</p>

<p>"[...]it's so different now to before. Now there is traffic jams everywhere, there are so many cars. At that time, before the tsunami there were hardly any cars and yet still people were crashed and killed on the road in the rush to try and get out. Now everybody either has a motorbike or a car or a pickup truck or something so I don't know how they'd get out honestly. They wouldn't. It would be the same."</p>	<p>North, 2016,p.13/§538-542</p>	<p>Now most people in Banda Aceh have either a car or a motorbike and there are traffic jams on the streets. In the case of a disaster it would be very difficult for people to evacuate. Before the tsunami there were hardly cars and yet people were still killed on the road during the evacuation.</p>	
<p>"And the escape buildings that have been built they are not used at all, mostly and so it's not a familiar building and so that was a project once that we were in discussion with TDMRC was about having some activities at those buildings so that it became a familiar place for people to go. So that in the event of a major disaster again they could go to the escape building. Whether the escape buildings would hold I don't know or not but better than everybody trying to go out on the road."</p>	<p>North, 2016,p.13/§542-547</p>	<p>The escape buildings have no secondary function and therefore people are not familiar with them. There was a project on this, trying to get people used to these buildings so in the case of a major disaster they would go there.</p>	
<p>"So, we already have the new master plan for Banda Aceh City regulated in law, in Canun what we call it. And it's already includes disaster baseline use policy. But still, in reality, that the land use was not the... Yeah, the development was not following this master plan. For example,... So, we have a look at all the sub-districts along the coastline of, in front of us here and this is the hazard map from Banda Aceh City. You see already that all these areas up to three to four kilometres inland is actually the red zone where it's the highest risk. #00:22:42# And then we have a vulnerability because then the population was, well, initially was not really getting closer to the coastline, then the vulnerability is moderate, it's not really high. Yeah, because the population then was not growing during, this vulnerability map was made in 2011, so in 2011 there's not many houses were built there."</p>	<p>Meilianda, 2016,p.4/§154-162</p>	<p>There was a new master plan for Banda Aceh City which included disaster baseline use policy. However, the development did not follow this master plan. On the hazard map of Banda Aceh, the coastal area up to four kilometres inland is in the red zone with the highest risk. Until 2011 not many new houses were built in this area. Ever since then and still until now the development and number of houses is tremendously growing.</p>	
<p>"So, in 2005, we actually have not many houses, even, yeah, early, after tsunami, of course, was really like now, and the fact that this is really completely like a wetland. So only little pieces of land exist there.#00:24:05# 2011 then we... 2009 the housing was not really massive, but 2011, just after the master plan was set, people continued to build houses in these areas. So, it goes more even growing out to this. You see the changes a little bit here and here. So, we have more and more development of housings going on until recently. By numbers, you can see that... That was only the example of one village, well, yeah, sub-district. And segment two, segment three, we did also the same way. So, what we see here, 2009, the housing was fairly massive and then it's going up towards 2014. So, the number is really tremendously growing especially in the segment two here and even segment three even before early on and it was completely no houses, but now, I think, they reclaimed some of the land there and then make houses."</p>	<p>Meilianda, 2016,p.4/§164-175</p>		
<p>"Yeah, we want to have a say based on our research like this. So, the government would see the reality that the housing was growing in the area which is not supposed to be built. And just to... The idea is, maybe at the end, just to remind themselves that they made this master plan in 2009, and the reality is like this. So, please take... Reconsider what's to do in the future. Is there any regulation, new regulations that apply in the future and so on."</p>	<p>Meilianda, 2016,p.5/§196-200</p>		
<p>"I think... Yeah, it's more because the government was not really strict to follow the master plan. I think that was the problem. And the other problem is indeed in the reality that it is not easy to persuade people to move away from their land. Yeah, and that's another thing. But if the government took care of the second one in a persuasive way, yeah, there should be win-win solution for that that's a benefit for the community itself and then just to follow that master plan they've made, right?"</p>	<p>Meilianda, 2016,p.5/§205-210</p>	<p>The government did not strictly follow the master plan that was created in 2009. This was a problem. In reality it is not easy to make people move away from their land but the government should work on a persuasive way to deal with this problem and turn it into a win-win situation.</p>	

<p>"Yeah, we did that [risk map] in the past, in 2011, commissioned by the DRR-A project, which is the project between the government and the UNDP. But that was only for the provincial level, so it's still a rough map, risk map. And knowing that now it's 2016, any kind of risk map has to be evaluated every five years and maybe we should make a new one. So, I'm not yet sure whether any initiative from the government wants to revitalize or update the risk map until now. But in between, since 2013, there has been risk-mapping analysis for the level of districts, district-level, but we have like 33 districts. Only about now, it's about 10 to 13 districts has been... The government has made this more detailed risk-mapping and it was with the collaboration with IOM. So, I think IOM play a very important role, the main actor who do this district-level risk-mapping. Of course, it's coordinated with the government, the BPBA or the BPBD of every district."</p>	<p>Meilianda, 2016,p.9/§361-370</p>	<p>In 2011 there was a risk map being completed for the province under the DRR-A project between the government and UNDP. It is a rough map and there should be a review every five years. So far this has not been initiated. Since 2013 there are risk maps being made for the district level. By now about 10-13 districts of 33 have been completed. This was done in collaboration with IOM and was coordinated by the government, the BPBA and BPBD of every district.</p>	<p>A3.Ac</p>
<p>"The starting point was, I think, after the tsunami, but it's not only the tsunami disaster. So, all kind of disaster that identified in this district, they make the analysis for the risk and then they also consider the forecasting, I think at some point. So, in terms of the project itself, it only lasts, of course by project, so they will really finish the project this year, sometime in April, I think. Yeah, sometime in April or May, so they finalize the project and I don't hear anymore continuation to the other district. Yeah, so that's the status right now."</p>	<p>Meilianda, 2016,p.9/§375-380</p>		
<p>"So, you know that post the tsunami – the tsunami I think destroyed this coastal area so the government now use this area as the conservation area. They plant mangrove, they rehabilitate mangrove and then the development in this area is limited. The green area is the conservation area, the development here is limited. So, people will not move to this area. This area is dangerous and also the government has made this area in a conservation area."</p>	<p>Noeriman, 2016,p.6/§231-235</p>	<p>After the tsunami the destroyed coastal area was turned into a conservation area where mangroves were planted and rehabilitated. In addition, the development in this area is limited.</p>	<p>A3.Ac</p>
<p>"The infrastructure will not get significant addition in this area. For example, the public facility like school won't be developed in this area so there is no new school here in this area. But they build some escape building here, the donor from the Japan government, JICA [Japan International Cooperation Agency]."</p>	<p>Noeriman, 2016,p.6/§239-242</p>		
<p>"So there was house that was destroyed during the tsunami. Is was rehabilitated but the new house – there will be no new house in this area. They will only rehab the old house that was destroyed by the tsunami. So, some people they still stay here in this area, few fishermen village, still some fishermen live in this area, but the infrastructure is very limited. Like new school is not build in this area, they will only have the old one. That is our strategy to direct our development to the south part of the city, far away from the coast line. The only function that is developed here is the tourism. It's like the Ulee Lheue here, it's the tourism and the port, the port to Sabang Island. If there was old building that is not fit with the masterplan, it's against the masterplan, the building will be destroyed. The government will take down the building, they will destroy the building. If there was a building that violated the masterplan. Including huge building. If there was a huge building that violated the masterplan, the building will have to be destroyed. The recommendation itself comes from the mayor, so the mayor himself recommend this building has to be taken down."</p>	<p>Noeriman, 2016,p.6/§248-259</p>		

<p>"You experience already a little bit this changing in climate, the sudden change. It's like heavy rain with a high intensity and then suddenly it will be so hot and so sunny. So, this is one of the problem about the housing. The government already installed this pipeline thing for drainage so when there is rain they also collect, right. But as Banda Aceh is flat, the surface it doesn't really flow directly to the river so it creates puddle. It takes like half an hour or so to dry. But the problem with the housing, if they have money people are doing it themselves. If they have enough money they will build high from the main road and some other not. And the government didn't really have regulation about the height of the house they build. So, if they don't have money then they gonna suffer from this puddle."</p>	<p>Mardalena, 2016,p.6/§252-260</p>	<p>Banda Aceh is flat and gets rain with a high intensity and the current drainage infrastructure is insufficient. Higher elevated land, outside of the food prone areas, is more expensive and many people can't afford to build there.</p>	<p>B3.Bb</p>
<p>"Master plan. Banda Aceh is flat. One people build one house, one septic tank. This is master plan of site system. For example, zona four, the housing, the pipe, treatment plant. The treatment building. Waste treatment. But it's..."</p>	<p>Mardalena, 2016,p.4/§142-144</p>		
<p>"It hasn't started. There are a lot of problems. The people also have not accepted it yet and the pipeline, it's too crowded so they need a way to do the pipeline things. So, the budget is already there, from the country, the state [Indonesia] but it hasn't started and they are still planning on it."</p>	<p>Mardalena, 2016,p.4/§146-149</p>		
<p>"She said the problem with the landowner. So, the government has already some budget for building the infrastructure but the landowner where the infrastructure should be built they didn't really give the land for that. You have to pay for that but then the budget from the government will be less. Sometimes they just need a little bit just part of the land but they make it problem as well."</p>	<p>Mardalena, 2016,p.4f/§175-179</p>		
<p>"But you cannot impose that now. And actually, as the government itself eventually realised if they what to impose that just immediately after the tsunami they will have to remove 20,000 families. So that's why eventually the government did not go ahead with that idea, free the two kilometres' zone from the coast. But I suppose, if they make a new master plan now, then that have to be considered."</p>	<p>Kusumawijaya, 2016,p.1/§20-24</p>	<p>After the tsunami the government could not implement a two kilometre no-building zone from the coast. Now, if they are doing a master plan this should be considered. Not only in Aceh but in all of Indonesia the plans are not implemented and stay as dreams.</p>	<p>B3.E</p>
<p>"Not only on the planning for Indonesia, not only for Aceh but the whole country, there is a huge gap between the plan and - first, there is a huge gap between the reality and the planning and then between the planning for the supposed reality in the future. [...] A plan needs a list of instruments to make it implementable, to make it into reality for the future. But I think the first problem is also there is a gap between the current reality with the plan. It is often not connected at all, in terms of the process and not only the process but also with the physical reality. The plan become really often in my opinion, unfounded dream. It's not even an utopia, it's a dream."</p>	<p>Kusumawijaya, 2016,p.1/§25-31</p>		
<p>"For example, areas which are now occupied or settled by people and suddenly projected to be green in the future, without any clear consideration about how you do that and why - of course how to do that is for the future, but why you choose that particular area for example has to do with the process and with more understanding of the reality. It happens everywhere, not just in Aceh."</p>	<p>Kusumawijaya, 2016,p.1/§35-39</p>		

CODE B3.Bd Unaltered issues regarding people

<p>"I didn't see anything that people have learned so much through the tsunami building process. Especially in terms of good perspective, positive perspective to their future. There is no change at all."</p>	<p>Mardhatillah, 2016,p.7/§299-301</p>	<p>Many people did not learn anything from the rebuilding process after the tsunami. Their perspective did not change.</p>	
<p>"Because the mindset, how the people are still like it was before."</p>	<p>Mardhatillah, 2016,p.7/§305</p>		

<p>"We have to more look on the task to design the future when the next disaster come. This is naturally we have to learn something from the past. But I am not sure that we will be poor for the next ten years to go. People still change the way of people thinking and act and respond certain thing in the middle of radicalism. They have no creativity in thinking. People tend to be militant whether right or left. Extreme left or extreme right. Most people like that in terms of binary position model - black and white. In this kind of situation, it is very very difficult to bring the people creative. That is a long process. They don't have enough consideration to be creative. They tend to be the follower."</p>	<p>Mardhatillah, 2016,p.11f/§481-488</p>	<p>It is important to learn from the past and design something now for the future. This will be a hard task in Banda Aceh since people tend to be followers and therefore are not creative enough.</p>	
<p>"It is not because of tsunami, because of disaster. It is because of system of government. The past government system during the war. The disaster, tsunami or earthquake exist the moment for open them all, the characteristic of people is opened up during disaster."</p>	<p>Mardhatillah, 2016,p.12/§493-495</p>		
<p>"And now it is back to normal you would say? Or back to where it was before?"</p>	<p>Interviewer, 2016,p.12/§497</p>		
<p>"Yes, it is almost the same, nothing changed. Even though in the context of constitution, in the context of regulation there is to some extent it has been changed. Like the openness of information - open government - there is a regulation now for that but the tendency of the government stay exclusive. Tend to be very closed, close minded. Even though there is a regulation they have to be open now."</p>	<p>Mardhatillah, 2016,p.12/§499-503</p>		
<p>"Maybe we need ten years to go again - I don't know what is the exact time that we need for this changing. The education process, there is no change at all. There is no change in the education process at all. Even though we have a concentration. We have a serious thinking in education in national effort."</p>	<p>Mardhatillah, 2016,p.12/§407-410</p>		
<p>"The same [at the universities]. It is a little change, but not enough to haul the new generation."</p>	<p>Mardhatillah, 2016,p.12/§514</p>		
<p>"Well, the lesson learned is that we say we need to do it again. Not only in post-disaster situation but also in slum upgrading projects. We need to inform the people on site rather than moving them away and get them into the process. Because housing construction involve a lot of money meaning it use a lot of resources and if you want to use these resources at the same time to empower communities housing construction is the right thing."</p>	<p>Kusumawijaya, 2016,p.7/§300-304</p>	<p>Not only in post-disaster situations people need to be informed instead of simply moved away. They need to be part of the process. Housing development uses a lot of money and resources and this should be used to empower the communities.</p>	
<p>"The process of building houses is a very important empowerment process because there are a lot of decisions that have to be made in housing construction. And you can make the decisions in participatory empowering way."</p>	<p>Kusumawijaya, 2016,p.7/287-289</p>		
<p>"And that's what we have been trying to do for the past ten years, try to advocate policies, try to show more examples that we can not only build after disaster, but we can build our cities better through onsite participatory upgrading of housing settlements within cities."</p>	<p>Kusumawijaya, 2016,p.7f/§308-310</p>		

B3.C: Assessments on reconstruction

Quote	Source	Synopsis	MA
<p>"ICAIOS now, we have project the aftermath where housing and settlement is one of the focus area of project with for the factor livelihood, and disaster reduction, governance and housing and settlement and demography. [...]. So, housing after 10 years we have three senior researcher and also one senior researcher from Singapore. We now finished our collection of data now we are in the process of writing after analyses and so on."</p>	<p>Sidiq, 2016,p.1/§13-18</p>	<p>ICAIOS is doing an assessment of housing, settlement and demography in Banda Aceh, 10 years after the tsunami.</p>	<p>B3.Aa</p>

"You can meet Igna Mundzir the programme manager for that[...]"	Sidiq, 2016,p.1/§43f		
"More than 500 houses they sketched what is different before and after."	Sidiq, 2016,p.2/§88		
"Three district. Banda Aceh, Aceh Besar and Aceh Jaya. Three districts. It's a quite big project."	Sidiq, 2016,p.3/§105f		
"So when in UN Habitat, UN Habitat because especially they want to see whether the houses that have been built by them are good or are well accepted or any other complains from the people so that's why and then after assessing the UN Habitat house we also assess any other houses that were built by any other NGOs."	Sari, 2016,p.2/§77-80	A number of NGOs came back and assessed the houses they built. They mainly focused on the acceptance of the occupants. Some shared the results with the Ministry of Public Work.	
"So when in UN Habitat, UN Habitat because especially they want to see whether the houses that have been built by them are good or are well accepted or any other complains from the people[...]"	Sari, 2016,p.2/§77-79		
"So many NGOs did I think such similar thing because when I read an article there was CRS, Catholic Relief Services this is also an NGO and they also did such an assessment but only for the houses that have been built by them. But for UN Habitat they assess almost all of the houses that were built because so quite many houses."	Sari, 2016,p.3/§89-92		
"So once when I was involved in that work we were invited maybe two times or three times to go to PU, Public Works government sectory to publish what we have done and then – so for example we assess the house from Turkey, so the Turkey NGO were there so they listen what have been..."	Sari, 2016,p.3/§128-131		
"Officially most donors, NGOs, aid workers exited April 2009. That was about five years after the tsunami right. But not so much study on the long-term issues after the aid, so we are looking at that. We are using different available data but also, we collect data. Quantitative and qualitative data. So, the aftermath of aid project is trying to look at what happened ten years after tsunami with the aid that has been provided. We are covering five sectors, demography, which I personally supervise, housing and building environment, governance and social society, livelihood and economic issues and also the issue of disaster risk reduction. So, five sectors with local, national and international researchers. So that's it. And I cannot tell you too much about the findings because we are doing the analysis still, but some findings that we are still finalising the report so we don't want to give too premature result."	Mahdi, 2016,p.1/§9-18	So far not much research has been done on the results of the reconstruction in Aceh. Currently there is a big study called "the aftermath of aid" together with Singapore, where they look at demography, housing and building environment, governance and social society, livelihood and economic issues and also the issue of disaster risk reduction.	
"So first to make a database first. And then an assessment. We need to have a strong management for a quick and good response."	Kamaruzzaman, 2016,p.4/§145f	For a future study it would be important to have a database and complete assessments first in order to control the process of reconstruction.	
"We had to change the blue print. Every year we changed the blue print to get new blue print."	Kamaruzzaman, 2016,p.4/§169f		
"[...]last year I'm coordinating the assessment of the post-tsunami recovery after 10 years of tsunami. So, we also incorporate aspects such as, housing and infrastructures, economic revitalization of the affected community and then psychosocial problems during the recovery that emerged and then whether the program of disaster risk reduction has been well implemented so far and also about the preparedness of the community."	Meilianda, 2016,p.1/§17-21	There was an assessment completed on the post-tsunami recovery ten years after the tsunami which focused on housing and infrastructure, economic revitalisation of the effected community, psychosocial problems that emerged during the recovery, DRR programme implementation and community preparedness.	
"And the BRR, did you also do assessments after?"	Interviewer, 2016,p.5/§209	The BRR did not do any assessments at the end of the reconstruction and rehabilitation phase since they were only in charge for four years and these four years were over.	
"No. BRR was finished by - because of the four-year time."	Purwanto, 2016,p.5/§211		

B3.D: Exchange of knowledge

Quote	Source	Synopsis	MA
"We have a sister city Higashimatsushima in Japan, they also have a tsunami three years ago so we share the experience. Not only the civil servants but also the people. They send to Japan and also, they send some couple of people here."	Bahagia, 2016,p.5/§181-183	There is an exchange of knowledge with the sister city Higashimatsushima in Japan. They had a tsunami as well and ever since then there is an exchange of people between Higashimatsushima and Banda Aceh to learn from each other.	
"[...]the RAN database, the BRR database that supposed to collect all these concept note about every project a little concept note so you can see by the concept note what actually been planned. And if the NGO do progress report you can see the progress report. And then we saw the end result. So, we actually want to do that in most cases but ended up just being able to do some case studies on that issues because of the data availability. For example, sometimes the end results look interesting to investigate but we couldn't find the concept note or we can find the concept note but there is no progress report. So, you cannot actually tell the whole process in most cases. That's why then we decided to do case studies trying to look at the plan, the process and the end result. But we do that only for case studies."	Mahdi, 2016,p.2f/§83-91	The BRR RAN data base was meant to provide the details and all the planning processes for housing during the reconstruction phase but this data base is incomplete and therefore cannot be used to describe the process.	
"We all want to academic publication but also some policy publication or policy related publication. So, we targeted not only the academic work but also the policy networks."	Mahdi, 2016,p.3/§93f		
"We actually, I don't know whether we can change things that's been done here but we definitely want this lesson learned to be there for those who might be working at different areas in the future in the different setting but also different disaster. Because disaster are more frequent than ever so hopefully if there is issues on housing and build environment have been found here, somebody can use this for the future. We really look at more on the long-term perspective rather than short term. I mean short-term assessments have been done a lot, including reports by the NGOs, right? When they exit then most of them produce a report but the study on long term situation is not very much."	Mahdi, 2016,p.3/§109-116		
"There is also part of the problem of the people, knowledge management. There was so many information, data and anything - the problem of BRR. Big storey, big collection of data from the BRR. But now when we want to find it to read it again, I cannot say you where it is. Most of the government that has been introduced by BRR at the end of the BRR there is national archive come together, take that all."	Mardhatillah, 2016,p.13f/§571-575	Knowledge management is a problem. Today it is unclear where to find the data and information from the reconstruction process in Banda Aceh.	
"In terms of national, I don't know. There is a branch office here. But some people say when they come there they cannot get any information about it. It's very strange."	Mardhatillah, 2016,p.14/§583f		
"I think this is the problem of this national, this nation. This is the problem of the nation. Maybe the document of the information in foreign countries is more complete I think."	Mardhatillah, 2016,p.14/§597f		
"[We start] From zero. Even Pak Kuntoro. First day we come here they sit all together. Come here go to the Ulee Lheue looking for the destroying and then thinking what we can do, where do we start? Very philosophical question, even though there is a very simple question. Where do we start? What we have to do first? Simple question."	Mardhatillah, 2016,p.13/§563-566	The BRR did not have any experience in reconstruction. They got put in and then learned within the process. There was no time to look at other examples.	
"I think we don't have enough time to learn from other examples."	Mardhatillah, 2016,p.13/§559		

<p>"I don't know where they know my name. He said - I said you wrong decision, how could you know me. I don't know what is the information that they got at that time. Without any briefing, they asked me to go to Jakarta and we sat together in Jakarta and I was there."</p>	<p>Mardhatilla, 2016,p.12/§522-524</p>		
<p>"BRR is like a university."</p>	<p>Mardhatillah, 2016,p.12/§528</p>		
<p>"We handed over the – in fact we have the knowledge management portal at that time, so basically consolidated all the information and we have series of publication as well. So that was basically the knowledge. And we handed also that to the government in continuing spreading because they ask the BRR and after the reconstruction period so any knowledge we handed over to the government for continue dissemination."</p>	<p>Faisal, 2016,p.5/§187-191</p>	<p>The knowledge gained by BRR during the reconstruction process was handed over to the government.</p>	
<p>"[...]when we had the knowledge management actually it was on the portal, it was on the web so everyone could access. And at the same time, we did a lot of presentations sharing the knowledge at that time as well. Sometime until now we are being asked as well to share the experience. So again, I think the way we see it always good when a disaster happen in another country and then we get a different perspective a different experience."</p>	<p>Faisal, 2016,p.6/§233-237</p>	<p>The BRR had an online knowledge portal and did a number of presentations after the reconstruction process in Aceh. Even now they sometimes get asked to share their experience.</p>	
<p>"I remember after the earthquake in, tsunami and earthquake in Japan it was 2011, the Fukushima earthquake, Sendai. Was it 2011 or 2012? So that big earthquake. We, even the head of the BRR was requested to come to Japan to share experience. I was as well there twice. They ask on sharing the lesson or experience. I remember when we had the Haiti earthquake we sent as well a person from my centre being requested and then we share the experience. Cyclone Nargis [2008, Myanmar] in the Philippines I was there for about one year and with other BRR colleague. It's basically not a sharing in term not only the knowledge but also in doing it because at that time we were there for about a year. So those are – and not to mention the different international conference, seminar and all of those."</p>	<p>Faisal, 2016,p.6/§246-254</p>		
<p>"That's a lot of lessons learned. That we know disaster is – the first big disaster in the world and the first big tsunami in the world. Not in Japan. And what we have is a laboratory about this process. When I was in BRR we mix all the concept from the NGOs from the BRR also and anywhere. So, when I am in UN Habitat also maybe they have concepts when they work in the other country and they bring here and they test here, they try here."</p>	<p>Indra, 2016,p.3/§111-115</p>	<p>The tsunami in Aceh was the biggest disaster of its' kind. What happened after during the reconstruction was a big laboratory for the reconstruction process. Every NGO had their own concept and the BRR had an own concept and all this got mixed.</p>	
<p>"Like what we call the PRA, Participatory Rural Appraisal concept that is one of the concept that they bring from the other country to here. Ah sorry, sorry approach not appraisal. So, like UN Habitat have their concept Community Based Development and that the same like that just different word but they have different technique when they implement in the field. #00:27:04# When we used the PRA they make the people to make the decision by themselves. But if we use CBD this is concept, process is you learn how to build the house, you prepare your land, you make sure your land tenor, you make the meeting around you and make sure when the house will finish and me supervise what they are doing."</p>	<p>Indra, 2016,p.3/§115-123</p>		
<p>"Now we have a cooperation with a city in Japan Higashimatsushima city in the Niagi? Prefecture. We make relationship with that city two years ago and still planning now. Because the Japanese after tsunami 2011 one year after tsunami they not make any development, recon."</p>	<p>Permakope, 2016,p.7f/§306-309</p>	<p>Banda Aceh has a cooperation with Higashimatsushima city in Japan where they had an earthquake in 2011.</p>	

<p>"But I think the rehab recon in Higashimatsushima better from Banda Aceh city because in Higashimatsushima city before they make the housing, the building they make the infrastructure. They make the roads, the drainage, the line for the gas, line for the electricity. They make the good maps before implementing the planning. Why, because Japan has good data. After tsunami, they in they only took data from the central government and they use the central data to make the planning again after tsunami."</p>	<p>Permakope, 2016,p.8/§317-322</p>		
<p>"Totally we sent six civil servants and also, we sent community, the villagers of the Meraksa sub-district the tsunami victim to discuss with the villagers in the Higashimatsushima. And every year I go to the Higashimatsushima to bring the villagers and discuss with the civil servants in Higashimatsushima."</p>	<p>Permakope, 2016,p.8/§314-317</p>		
<p>"Japan went to Banda Aceh maybe for the social. In Japan, maybe people after the tsunami suicide. The old men suicide, the teenager suicide, they stress. Banda Aceh there is no people stress, there is easy going. Go to coffee shop, drink coffee like that. And the Japanese government come to Banda Aceh to learn about the habit and the culture in Aceh people. That's only the thing. Not for the rehab recon phase because they good about the construction after the tsunami."</p>	<p>Permakope, 2016,p.8/§333-338</p>		
<p>"This is a project which is a cooperation within two cities Banda Aceh city and city called Higashimatsushima in Japan. Both of the cities get affected by tsunami, Banda Aceh in 2004 and Higashimatsushima in 2011. One of the activity of the programme, exchange of participant from Banda Aceh to Higashimatsushima and the other way around to learn each other and then make some activities in the town. For instant, they ask civil servants from Banda Aceh city from certain government sent to Higashimatsushima and learn about waste management and about tourism and other programmes and then after they got idea there they brought the idea here and try to implement it."</p>	<p>Hafizh, 2016,p.1/§21-28</p>	<p>There is an exchange between Banda Aceh city and Higashimatsushima in Japan that got affected by a tsunami in 2011. They exchange participants and try to learn from each other for example about waste management or tourism.</p>	
<p>"For instance, basket fishing programme which originally come from Higashimatsushima to catch a crab done by the fishermen. We try to do here as a part of tourism attraction. And also, another programme like village garden which is run by the women in the village. They make compost from the organic waste and the they use it for planting."</p>	<p>Hafizh, 2016,p.1/§28-31</p>		
<p>"So what are topics that are looked at?"</p>	<p>Interviewer, 2016,p.1/§40</p>		
<p>"Waste management, community economic empowerment, disaster mitigation and also municipality capacity building."</p>	<p>Hafizh, 2016,p.1/§42f</p>		
<p>"Actually when we and other person who has been sent to Japan has been learnt about the rehabilitation and reconstruction process in Japan how it run but here it has been done before. So maybe just we see the comparison at the moment there[...]"</p>	<p>Hafizh, 2016,p.2/§68-70</p>		<p>People from Banda Aceh were sent to Japan to learn about the reconstruction and rehabilitation process there, but at this time the process in Banda Aceh was already over. So it is only possible to see a comparison.</p>
<p>"What are lessons that can be learned from Japan."</p>	<p>Interviewer, 2016,p.3/§89</p>		
<p>"Maybe beside basket fishing there are also about the waste management, there we saw a waste management system just like they have a waste collecting point for instance, [...] we want to implement it here but step by step because here the situation is different of course. Another thing is about the cultivation of oyster, here probably the size of oyster which is harvested by the farmers very small because they harvest it only in a few months so in Japan we saw sizes very big and of course the result could be much higher if we sell it. So, they want to learn also about the cultivation of the oyster and trying here also in the Syiah Kuala sub-district for implementing it."</p>	<p>Hafizh, 2016,p.3/§91-98</p>		

<p>"As far as I know there they use also school as escape building for instance and also community centre et cetera [?] see the maybe such similar evacuation like here there. Here only a few escape building exist at the moment[...]"</p>	<p>Hafizh, 2016,p.3/§111-113</p>	<p>In Japan they use escape buildings which have a second function, for example a school. The escape buildings in Banda Aceh have been built by Japan. In the event of a disaster the people tend to escape inland instead of running to an escape building.</p>	<p>A3.Ac</p>
<p>"The funding come from Japan."</p>	<p>Hafizh, 2016,p.3/§117</p>		
<p>"[...]at the moment the people here when disaster happen the people who run to the escape building not so many because they prefer to evacuate to another places. For instance, the places far away from ocean. So actually, the core of the project is want to utilize the escape building as the centre point of villagers' activity."</p>	<p>Hafizh, 2016,p.3/§104-107</p>		
<p>"And they [Japan]have them as well but different, so it would be a school or something else, it would not only be an escape building."</p>	<p>Interviewer, 2016,p.3/§119f</p>		
<p>"Ya."</p>	<p>Hafizh, 2016,p.3/§122</p>		
<p>"What happened with this knowledge now, is there any... Who has all this information now, these lessons learned? Is there someone collecting them?"</p>	<p>Interviewer, 2016,p.2/§80f</p>	<p>The knowledge from the reconstruction and rehabilitation process is not collected comprehensively. Some research has been done but this is not going through the policy maker yet. After the reconstruction everyone went back to their own business and knowledge gained is not being used for the future planning.</p>	
<p>"Not comprehensively I would say. For example, we did some small research related to some areas here. But it's really pure research. It's not really going through the policy maker yet because we need a lot of data for that and we're still doing some more assessment."</p>	<p>Meilianda, 2016,p.2/§83-85</p>		
<p>"I think after the rehab recon everybody is starting to deal with their own business. [chuckle] Back to their real life. We realize that's the pitfall of [chuckle] the process. There's no exit strategy and lesson learned after that, rather abandoned than really used for the planning for the future."</p>	<p>Meilianda, 2016,p.3/§96-99</p>		
<p>"And as we are also kind of trying to do more research including this kind of research maybe it still take a while until we... First, we have to make sure our research really make sense, the results, and then we could use it as the input for the policy makers. #00:14:09# So what we want to achieve is that doing research related to the... Including this kind of development research. And then give some recommendations to the government through policy brief for example. But since we need more human resources, and it just happened that this year we start to be able to do that hopefully, so we'll see after one or two years if we could come up with some recommendation for the policy makers, the government. Because the research itself is not easy because it involved different kind of aspect and spectrum of who's in charge in the power system. [chuckle] So we need more human resources to do that."</p>	<p>Meilianda, 2016,p.3/§99-108</p>		
<p>"Yes, they have an exchange of knowledge about the natural hazards. HANDS [?] project invite not only practitioners or the academic who interested in this field but also for students. So, they come here and learn about the Aceh tsunami and they discuss everything and go to the field."</p>	<p>Haiqual, 2016,p.6/§249-252</p>	<p>Japan initiated the HANDS project where students and practitioners from Asian countries come to Aceh to learn about the tsunami, discuss, go to the field and gain knowledge.</p>	
<p>"They are students from Asian countries initiated by HANDS project under the Japanese government. So, mainstreams we have to go to Japan to get some solutions from Japan but now Japan initiates, make one project called HANDS project to give the chance for the Asian countries, students, practitioners to go directly in the fields in Aceh to get some observations and gain knowledge."</p>	<p>Haiqual, 2016,p.6/§256-260</p>		
<p>"But at the same time Japanese government come to Banda Aceh also they would like to make more cooperation because as you know the Japanese government still pay attention to Aceh province. Because of we have similar sections [?] so we learn each other. Japan people come to Aceh, our people go to Japan in order to learn, to share our experience."</p>	<p>Haiqual, 2016,p.12/§491-495</p>	<p>There is a regular exchange between Banda Aceh and Japan to learn from each other.</p>	

“Did you do any evaluations or assessments regarding natural hazards as part of the process? Look at risk maps or something like this?”	Interviewer, 2016,p.6/§252f	BRR worked together with the university in Banda Aceh. They conducted a training. The university also initiated a master graduate programme for disaster mitigation.	
“Done by Unisyiah. Because we kind of cooperate with Unisyiah. And build the training and also conduct the training in Unisyiah because Unisyiah lasts longer compared to BRR.”	Purwanto, 2016,p.6/§255f		
“You call [writes something down]. And Unisyiah actually developed the master graduate programme for disaster mitigation. It's a separate programme since BRR have bring them the [?].”	Purwanto, 2016,p.6/§260-262		
“And for these risk maps, what was the time horizon? Did they look at past events and then make the solution or also into the future?”	Interviewer, 2016,p.6f/§264f		
“Yes. Something like four hundred year back and one hundred projecting in the future.”	Purwanto, 2016,p.7/§272		
“During the process we wrote a book along with a report. The report was actually the aim only for the government of Indonesia but the book was actually written for other states.”	Purwanto, 2016,p.11/§471f	BRR wrote a book about the process as well as a report. While the report was for the government of Indonesia, the book was aimed at other countries to share experience.	
“So, for me it is very amazing that how come we small NGO, we did not have any experience to build 3300 houses before and not to mention we have a budget of 30 million dollars, 25 from Germany from Misereor. How come we are much cleverer than this government? Maybe because we have help, from the Gujarati people. Because of their experience, they did not panic. So, we make decisions very clearly from the very start and with the community in our head all the time.”	Kusumawijaya, 2016,p.6/§225-230	A small NGO without any experience managed to build 3300 houses with only 30 million dollars. This NGO was working better than the government. Maybe this was thanks to the help of the people from Gujarat who brought in their experience for reconstruction.	
“Misereor brought them [the people from Gujarat]. Because the Misereor have funded the reconstruction of Gujarat after the earthquake. So, you see how this exchange of expertise are more relevant brought by Misereor, rather than brought by the World Bank.”	Kusumawijaya, 2016,p.6/§446-448		
“The same thing happened to us last July when we were asked to help the people in Takloban. You know Takloban? Takloban is in the Philippines destroyed by the Yolanda storm. So, we did the same. We went there to convince the communities, the NGOs that you can do it in our participatory way. And because of that I understood better and I appreciated better what the Gujarat people have done to us. Because we were asked to do the same [For the Canadian DNP, Development and Piece].”	Kusumawijaya, 2016,p.6/§270-274		
“I said that because I think the important role played by Misereor in bringing other experience which is very relevant I believe.”	Kusumawijaya, 2016,p.7/§294f		
“We cannot use Indonesian setting for China, Sichuan for example, because we try to do that, or Japan or the other way around. So, every situation has to be approached uniquely in accordance with the local situation. So that's the situation at hand now. That kind of detail that you need, that probably you cannot find in the publication even our formal publication.”	Samadhi, 2016,p.1/§20-23	It is not possible to use the setting from Indonesia and implement it in China or Japan, for example. “Every situation has to be approached uniquely in accordance with the local situation.”	
“It's plan as you proceed, if you like. Because there's no blueprint for such a situation. Yes, we learnt something out from Kobe because Kobe had struck first, but again Kobe provide us with different situation.”	Samadhi, 2016,p.4/§162-164		

<p>"During the Aceh and Nias Reconstruction, we had another earthquake, terrible earthquake in Central Java, in Yogya. At that time, there was thinking of creating BRR for Yogyakarta. So, we sent our team to go there, and it is of the setting, the cultural setting is different. They have a very strong or rich social capital, whereby the spirit of helping one to each other, those kind of things is different than in Aceh and in Nias. What we need to build a house in Nias is around 40 million Rupiah, in Yogyakarta what you need is only probably half of it. Because the other half is coming in kind, if you like, yeah. They get bamboo from their family back home, they share the cost of meal when they build the... Those kinds of things. And they have Sultan, and Sultan is the cultural leaders of Yogyakarta. When Sultans said, "Do this," they most probably would follow. Nias and Aceh doesn't have that kind of leadership. And when Sultan said, "We will give assistance to all." So, it's not just the one that is being affected by the earthquake but also their neighbours. So, it's a different setting, so Yogya cannot learn from Aceh and Nias. To some extent, yes, they can learn. They can learn that they cannot use this approach, [laughter] but yeah, we did have that kind of a situation where we compare in country and outside of the country."</p>	Samadhi, 2016,p.4f/§171-184		
<p>"And, where are they? Does the Indonesian government have them?"</p>	Interviewer, 2016,p.6/§259	BRR wrote 16 books about the process of reconstruction and rehabilitation in Aceh and Nias. These books were sent to all the major agencies worldwide helping during this phase. The government has one version of the book in the national archive.	
<p>"No. We print around hundreds and then I sent all over the world and those agencies that's helping me - the major ones - for sure they get one. The whole book, not the CD, the whole book."</p>	Mangkusubroto, 2016,p.6/§261-263		
<p>"And also, did something stay at the government, the national government?"</p>	Interviewer, 2016,p.7/§269		
<p>"Yes. In the national archive agency, they show everyone."</p>	Mangkusubroto, 2016,p.7/§271		
<p>"Because the magnitude of disaster in Aceh is so unbelievable huge that the disaster also paralysed the local government. That never happened before. And after that it doesn't happen. Even the Merapi, the local government is still completely there. So, they don't disaster reference in Aceh because they will say that we are here, the local government are here and we can work together with the central government to overcome the problem at the locality."</p>	Mangkusubroto, 2016,p.7/§275-279		
<p>"But the BRR experience is now adapted by the national agency. But the national agency is not the reconstruction agency. It's more of a disaster mitigation agency."</p>	Mangkusubroto, 2016,p.7/§283-285		
<p>"In Haiti, Nargis, Fokushima - those are close. Tacloban. But I believe - I don't know much about Nargis, Myanmar - Willi knows that better than me."</p>	Mangkusubroto, 2016,p.7/§290f	Haiti, Nargis and Fukushima are disasters that are comparable to the one in Aceh. Staff from BRR were involved in these processes.	
<p>"I have visit them. Even Myanmar, the Nargis I sent my - Willi who used to be my deputy in Nias was there for one and a half years."</p>	Mangkusubroto, 2016,p.7/§295f		
<p>"He is the one in charge for that in Myanmar. I have visit Tacloban, I visit Fokushima. I didn't visit Haiti but my deputies were there. Haiti is difficult, more complicated than Aceh because the central government is basically not a government. This is a difficult system. There are six or seven families who are doing the government."</p>	Mangkusubroto, 2016,p.7/§300-303		
<p>"I was asked to see Kobe for example, the earthquake in Kobe. I went there and see how the community did but even then, Kobe and Nias where very different, I think because of the community is very poor in Nias so it's - I cannot take a full reconstruction approach, I have to combine with development approach, so I call it Nias reconstruction is development approach."</p>	Sabandar, 2016,p.4/§155-158	There was an exchange between Kobe and Nias regarding rebuilding after an earthquake, although both places are very different. Nias is very poor the reconstruction approach had to	

<p>"So, I adopt some of the Kobe, for example Kobe has their ten years' framework of reconstruction for example. But in terms of implementation on the ground I have to adopt a lot in terms of building community, the villages these kinds of things."</p>	<p>Sabandar, 2016,p.4/§164-166</p>	<p>be combined with a development approach.</p>	
<p>"[...]well reconstruction and I learned in Myanmar I was there, it's the same thing happening. I was after cyclone Naris in Iraguagi? Delta. That is another poverty. In a situation like this you have to address reconstruction as development programme not only as reconstruction so the combination between recovery and development. This is my main."</p>	<p>Sabandar, 2016,p.5/§212-215</p>		
<p>"Of course, if like Japan, communities are ready you will see good houses. We cannot compare to Nias or Aceh because you actually restore the social fabrics of the community. In Aceh for example is the communities that is for long living in the conflict situation. Like Pak Kuntoro approaches, he has to deal with combats who are actually coming down and then manage this, requesting this. The same thing happened. They cannot just build houses on the coastal line. Combats, the GAM, Amponman people will come down and then say "well, we are the same Acehnese why don't we get this?". You have to see the local context. So, local context is very important to define your strategy feature."</p>	<p>Sabandar, 2016,p.6/§249-256</p>		
<p>"[...]never treat a disaster the same. Every disaster will have different characteristics. So, you don't - ok Padang, and then Myanmar I can bring. You can bring your knowledge, you have the knowledge. This is why it's important to do the reconstruction by those who have experience. But nobody can fully replicate the same approach for the different region. You really need to do the local planning."</p>	<p>Sabandar, 2016,p.7/§269-272</p>	<p>Disasters can not be treated the same since every disaster will have different characteristics and therefore needs local planning. However, it is important to do reconstruction by people who have experience. Even though it is not possible to replicate an approach, there is still knowledge that is of use.</p>	
<p>"At the beginning, I will let them do. At the beginning, they come and after the first six months they just come and they try to do it and then we tried to learn this process and then during the consultation process and then we learn ok, this approach is good. And then for example the German Red Cross come with a good example, the Italian NGO come with a good example, something like that. Even the traditional house that we see. For example, this is actually a good thing at the traditional houses, why don't we use this from the traditional house, this kind of things. So, everybody is contributing into shaping the approach and then I learned from this Island because I like to move from different part. For sure you make mistake and some will ah this is not the right thing for example when we build the first houses constructor approach, some were broken. The NGO approach with bringing their big houses that was not the right things but we fix it, very quickly. The first year is actually trial and error. But after the second year I start to see 'ok, this is good thing'. More knowledge come into the systems."</p>	<p>Sabandar, 2016,p.9/§370-381</p>		
<p>"But any time disaster happen, the last time I went with Pak Kuntoro to support the Nepal earthquake. I don't know whether Pak Kuntoro told you about this to help the Nepalese government after the earthquake and this same thing I said there."</p>	<p>Sabandar, 2016,p.7f/§297-299</p>	<p>Staff from BRR was involved in the reconstruction process in Nepal after the earthquake.</p>	

B3.E: Recommendation concerning handling planning

Quote	Source	Synopsis	MA
<p>"We look in donation from the housing is very variation. Some diagonal string and then some they put it with the coconut trees. You can look various houses in Aceh. It mean this is good for you to make some questioning, this is a housing from one donator, this is a housing from this donator. We can export it. This mean you can help the other people around the world. This is housing design in Aceh. Maybe you can put in</p>	<p>Dirhamsyah, 2016,p.6/§247-252</p>	<p>Aceh could work as an exhibition of house types used for other reconstruction projects. Every donor came with their own style and all the houses are slightly different.</p>	

Haiti or somewhere. This is very nice knowledge because when 2004 every good people helped us. The best people.”			
“I think if we talk about the current if we talk about planning for disaster more on the disaster risk reduction I think the first step is to understand the risk. So, the hazard mapping, risk mapping I think is important because it provide evidence, scientific evidence on understanding which area prone to what kind of disaster. So, this understanding will become the basis for the planning. Because we have still plenty example, Japan for example, Japan is in very prone area but that does not stop Japan to continue to have a good economy development. So, by understanding the risk when we can anticipate the risk, we can have a scenario planning if something happen what should we do. So that would lead to if we talk about housing, if we talk about infrastructure, we will need also importantly the soft side, the education starting from a very early year. If people are living in a prone area then they need to understand if this happen what should they do. And if we are able to have a – we are moving to a, not only on the education but becoming to a culture of resilience that would be something that very much will reduce a lot of disaster. Because the mind set the development paradigm, the education paradigm will always have this disaster resilience in their thinking and their flesh.”	Faisal, 2016,p.3/§100-113	A first step to disaster risk reduction is to understand the risk. Therefore, risk mapping is important to understand which area is prone to which kind of hazard. This understanding should be the basis of planning. Once the risk can be anticipated, a scenario planning can be made. Additionally, the education about risk needs to start at an early age. This would reduce the number of disasters.	
“I would say that for those who are living in the area that had been affected by the disaster and for the people that have been affected by disaster will have a different level of awareness compared to those that never hit by the disaster. So, this is where then the advocacy, the awareness is important saying that – I like one of the advertisement that I saw in Indonesia which is very good. It's one of I think the BNPB and Australia if I am not mistaken. This is about the earthquake and they said, 'it is not the earthquake, it is the house'.”	Faisal, 2016,p.8/§332-337		
“I think it's not only the city that need to prepare but those who are giving assistance also will need to prepare because we are talking about one city that being hit by disaster and people from all over the world with a good intention to help. Of course, this what the coordination all about. So, it's very important. So, when we talk about this the preparation will include one is the institutional setup who is in charge if something happens. Two is about regulatory support, is there any new rule or regulation will need to be passed in anticipating the situation. Three is about human resources, whether people are trained and the capacity being improved in handling this type of disaster. And also, finally is about funding, where the funding is available that can be used during this disaster time.”	Faisal, 2016,p.4/§150-158	Cities are not the only ones that need to prepare, also those who come into the country to give assistance after a disaster. This preparation should include the institutional setup, the regulatory support - whether there is any new rules or regulations -, human resources - "whether people are trained and the capacity being improved in handling this type of disaster" -, and the funding needs to be clear.	
“[...]one disaster is different than another because the context of where that disaster took place is important to be seriously considered. So, it's very difficult in having a copy paste approach from let's say the Aceh experience and then we bring it to Japan experience, Japan experience we bring it to the Philippines. Some of the principle might stay, principal of leadership, principal of authority, principal of a liquid finance. But if we go to operational detail then, any model will need to adjust because some of the disaster happen but the local government is still intact. So, in that case they might not need an international or national intervention. And some of the planning disaster happen in urban area and this of course different if it happen in the village area. Some which caused by typhoon, the other caused by earthquake would have a different implication. So, the way we see that ability to see the situation based on the context of where that disaster happened become very important. Would be a bit of challenge if we took the copy paste approach without understanding the context.”	Faisal, 2016,p.5f/§217-228	Every disaster is different and has a different context. Therefore, it is not possible to have a copy paste approach. While some principals might stay the same, every model would need to be adjusted to the local situation. If the local government is still intact, there may not be a national or international needed. Furthermore, there is a difference between urban and rural areas. The type of disaster has also a huge influence and it is therefore crucial to understand the context.	
“So again, I think the way we see it always good when a disaster happen in another country and then we get a	Faisal, 2016,p.6/§236-242		

<p>different perspective a different experience. But at the end the fact is that you self that need to decide which model best to fit the challenges or that can be a solution for that particular disaster in that country because we talking about technical, operational, political, social so a multi-dimension situation when we have a disaster. Again, ability to learn from others is very important but at the same time ability to choose what's appropriate for this particular context is important."</p>			
<p>"My observation and this is what I believe that whenever disaster happen the government must take the lead. So, the leadership must be with the government because the government will stay there forever and they will know their people, their territory, their system better. While organisation might stay one month, two months, three months or one year, whatever but there will be an end for the organisation. It is very important to also coordinate with the government because they might have a bigger plan and the way we see it is if we are coming to assist how can we fit into the plan of the government and if we observe that the capacity of the government can be improved then the question would be how can we support to improve that capacity. And of course, then if we able to make sure that the government will take lead and we contribute to the plan I believe it will have a bigger impact as well because now we are leveraging and synchronize among different actors which is coming toward one single purpose to build back the area or to saving life."</p>	<p>Faisal, 2016,p.6f/§259-270</p>	<p>The government should take the lead after a disaster and take over the reconstruction process. Unlike organisations coming from outside, the government knows the people, the territory, the system better and stays for a long time. Further, it is important for anyone who comes to assist to coordinate with the government in case there is a bigger plan. The question is how the capacity of the government could be improved. In this case, if the government takes the lead, the impact can be much bigger.</p>	
<p>"[...]when we deal with disaster then preparedness become important and my observation it's always multi-sectoral, multi-dimension as well and cannot have a single approach. For example, instead of putting a lot of money in the reconstruction why not put the money more on the preparedness to make even disaster come then less expected casualty and so on. But I think it would be a bit challenging when we talk about disaster that we put all the eggs in one basket. So, there got to be several ways in anticipating this and we will need to prepare but at the same time if disaster happen we will need to respond quickly and then after respond then we will need to help enough resources to immediately go to the recovery. With this again, there will be – we must see it from a different angle and we must anticipate in each of this before disaster, during disaster and then after disaster."</p>	<p>Faisal, 2016,p.9/§367-376</p>	<p>Regarding disasters, it is important to be prepared. This is always multi-sectoral, multi-dimensional and cannot have one single approach. Instead of putting all the money in reconstruction, some could be put in preparedness to limit the number of casualties if a disaster occurs. At the same time, it still needs to be possible to act fast and respond fast in the case of a disaster. All moments need to be looked at concurrently, the time before, during and after a disaster.</p>	
<p>"But in rehabilitation and reconstruction it's in normal condition. All of the activity in rehabilitation and reconstruction must be in tender. We can to buy something directly in rehabilitation and reconstruction, we must clean tender some project. Normally tender and normally bureaucracy. That's why we need more time for that, to do that, to prepare that. Of course, the symbol of rehabilitation and reconstruction is 'doing better'. This means we have to build something, we have to do something better than before. For example, if before the disaster, we make a construction for some bridge maybe normally construction. But after this disaster we have to prepare that. We try to build better, that's where the management of disaster we have thinking about that. And then the good construction and safe for disaster. Build back better."</p>	<p>Yubarsi, 2016,p.8/§310-318</p>	<p>Rehabilitation and reconstruction takes time. Things should follow a normal way of bureaucracy. Things have to be done and built better than before and this takes time.</p>	
<p>"I think between rehabilitation and reconstruction and preparedness department we can't separate that, we have one. Actually, we have three to do that together. It doesn't mean in rehabilitation and reconstruction they must wait until the disaster come and only then. We try to work together and then mister Rusmadi, of course they don't know about construction. Maybe in rehabilitation and reconstruction. But in the programme, we do together. Sometime they want me to make something, for example how to check how much money we need to build something for preparedness for disaster. Sometimes we make a recommendation for mister Rusmadi "this is not in a good condition". Actually, in Rusmadi's</p>	<p>Yubarsi, 2016,p.8f/§334-357</p>	<p>There should be no separation between the rehabilitation/reconstruction and the preparedness department. All the three departments should work together. The rehabilitation and reconstruction department should not wait for a disaster to come and then only act then. The only way to get a budget for rehab and recon efforts from</p>	

<p>programme how to manage a disaster it's about mitigation. Which means how mitigation, less people die, less property damaged, like that. So, we work together how to do that. Sometime with budget we try to. And I forgot to say you, in our regulation, in procedure in Jakarta when we rehabilitation and reconstruction programme need some budget from Jakarta we must give recommended from our mayor, from our government. This is the condition of emergency. But how do that because we are not in that condition. And then in rehabilitation and reconstruction we must prepare about damage loss assessment. How much money - the damage and loss assessment this mean in about how much money we need to rebuild our people. Because of that disaster in two sector. In one sector, for example housing sector we lose about 10,000 houses maybe and we need 10,000 for more people to stay. How much money we need to build that, how much money they spend, how to rent other house until they can build a new house. This is the damage and loss assessment. #01:05:08# After we find that, we can say to our BNPB in Jakarta this is our damage and loss assessment, we will need this budget. Because of that they will give this budget. Before that they will come to Aceh and see that where is the damage. They will come here to see, real or not. This is the rule how to find some budget to build from Jakarta to rehabilitation and reconstruction. That's why I have no budget from Jakarta because this is the condition still. Sometimes we have flood like I told you, small case only in some area."</p>		<p>Jakarta [BNPB] is through the mayor of Banda Aceh in an emergency condition. Before, damage and loss assessments have to be completed in the rehab/recon department and then Jakarta will send the budget that is actually needed.</p>	
<p>"We need the people concern about the Banda Aceh and Aceh programme, continuing sustainability programme I think. They use the knowledge, they use the experience to building better in Aceh. Must be sustainable. We must do work with harmonisation working. We must be integration, good collaboration with others. With others they concern in A, B, C, D but we can strength if we have really good coordination. Collaboration about the knowledge and practical in the field. For example, for housing they have experienced before what the problem, maybe they identify the problem and then what the good condition. We can compare these. What can we do to continue a good programme."</p>	<p>Sunarty, 2016,p.9/§384-391</p>	<p>The people need to be concerned about the Banda Aceh programme and continue a programme for sustainability. We must work in a good collaboration and coordination with others. There should be a collaboration about the knowledge and practical experience in the field. For example, housing problems have been experienced before. These problems should be identified and implemented in a good programme.</p>	
<p>"Majority of the people now are back to their village near the coast."</p>	<p>Sunarty, 2016,p.9/§369</p>		
<p>"For example, we must discuss with the people in the community and then we can see in the Public Work or in the architect view and then evaluation like this. I think they have evaluation maybe in the Public Work or architects. In the BRR programme they have audit resource I think. They audit all of building. Maybe this data in the BRR. They have audit resource about the building in Aceh. For example, this house is built by Turkey and so on, they have analysis. For example, include the well, the water is healthy or not."</p>	<p>Sunarty, 2016,p.10/§415-421</p>		
<p>"Well, for me because BRR is no longer there. If there will be any more or new construction in the future, everything has to be well coordinated through the government. And the government would distribute, who's really in need. Which community is really in need. They should have comprehensive information and data, about database for that. So, then the target communities... It's well targeted for this kind of humanitarian aids or donors. That's what was really the drawbacks of what happened during the rehab recon after the tsunami and this is I think the lessons learned for the government to be really well regulated and well-coordinated, and also integrated among sectors because... I didn't really answer that. #00:16:49# Actors that actually play a role on deciding or... Yeah, allowing this kind of housing built. I think everything's come through the Bappeda. Because it's really the planning agency of the government. But then the action was taken by the PU, the Public Work Department. And they should be able to coordinate to each other and also for the lower part of the government like the district or sub district."</p>	<p>Meilianda, 2016,p.3/§114-125</p>	<p>BRR is no longer there. Therefore, for a potential reconstruction in the future, the government would oversee the process including clarifying who is really in need. For this they need the information and data about these aspects, so the humanitarian help and the donors help will be well targeted. This was the drawback during the recon/rehab after the tsunami and should be a lesson learned. The government needs to be well-regulated and well-coordinated. Further, different sectors need to be integrated, such as Bappeda, the planning agency of the government and</p>	

		PU. They should coordinate closely with each other on both a district and sub-district level.	
"He thinks one of the basic concept of building back better is one of the - everyone wants to build back better but the problem is how to interpret the build back better approach. An example, because we have a comprehensive time because during reconstructions we have had so many problems so he thinks it would be better for the government to make sums of recommendations, make sums of the emergency stage for the future but because we have no policy, comprehensive policy to manage all of disaster we are not sure if this could be applicable for the future."	Haiqual, 2016,p.4/§168-174	The problem with the concept "building back better" is the interpretation of this approach. During the reconstruction there were so many problems so now it would be good if the government would make recommendations for an emergency stage in the future. But since there is no comprehensive policy to manage a disaster this might not be applicable.	
"[...]after ten years tsunami there is no significant consideration of the common sense of the public especially in the government for the next. But maybe in the academic it's could be better because they establish post-graduate programme disaster science. But how to develop a programme for this is one of the big challenge for us. This is one of the big challenge for the future because we will face long-period after 2004 and now so he is afraid that there is no significant change for the next."	Haiqual, 2016,p.7/§279-284	Ten years after the tsunami "there is no significant consideration of the common sense of the public especially in the government for the next". It may be better at the universities since they established a post-graduate programme on disaster science. But so far developing a programme for a future disaster poses a big challenge. Presumably there is no significant change yet.	
"It's a very important look [?] under the polician of the government of Aceh about this resilient housing. First should be finishing about what is the action plan and also spatial plan in the area of Aceh and also Nias and also district and sub-district."	Iskandar, 2016,p.3/§108-111	There should be an action plan and a spatial plan for Aceh and Nias.	
"The model should be followed of the culture and also what participation they need. So, we should more hear from them."	Iskandar, 2016,p.3/§111f	There should be a model for housing in Aceh that follows the culture. Also, participation should play a clear role.	
"I think the partnership is very important because maybe the problem cannot be finalised by one institution but by developed partnership we can finalise the programme comprehensive, something like that. For example, housing, road and maybe common facility, sort of partnership to combine them."	Iskandar, 2016,p.4/§114-117	It would be important to have a partnership between the different institutions to work on a programme together, as for example housing and road infrastructure.	
"But you cannot impose that now. And actually, as the government itself eventually realised if they what to impose that just immediately after the tsunami they will have to remove 20,000 families. So that's why eventually the government did not go ahead with that idea, free the two kilometres' zone from the coast. But I suppose, if they make a new master plan now, then that have to be considered."	Kusumawijaya, 2016,p.1/§20-24	After the tsunami, the government could not implement a two kilometre no-building zone from the coast. Now, if they are doing a master plan this should be considered. Not only in Aceh but in all of Indonesia the plans are not implemented and stay as dreams.	B3.Bc
"Not only on the planning for Indonesia, not only for Aceh but the whole country, there is a huge gap between the plan and - first, there is a huge gap between the reality and the planning and then between the planning for the supposed reality in the future. [...] A plan needs a list of instruments to make it implementable, to make it into reality for the future. But I think the first problem is also there is a gap between the current reality with the plan. It is often not connected at all, in terms of the process and not only the process but also with the physical reality. The plan become really often in my opinion, unfounded dream. It's not even an utopia, it's a dream."	Kusumawijaya, 2016,p.1/§25-31		
"For example, areas which are now occupied or settled by people and suddenly projected to be green in the future, without any clear consideration about how you do that and why - of course how to do that is for the future, but why you	Kusumawijaya, 2016,p.1/§35-39		

choose that particular area for example has to do with the process and with more understanding of the reality. It happens everywhere, not just in Aceh.”			
“Another lesson is, in an island like Nias you really need to deal with logistics. It's how you install the logistical system because otherwise you won't be able to try fix all the entry point, the road systems, building the education systems, the buildings and bringing the scholarship programmes. So, although it's four years but actually after the reconstruction the development part can continue because then if you involve the local community, involve the local government, involve the national government you can actually easy transfer this. This is something that I also exactly do in Myanmar situation. I didn't build anything. Because if I build big things there that is just collapsed, nobody will look after the process. #00:35:42# The indicators of reconstruction are not seen from the beauty of the house.”	Sabandar, 2016,p.6/§241-249	After the reconstruction programme the development programme could continue. If the local community, the local government and the national government are involved things can easily be transferred. With this, programmes can be maintained and efforts are getting carried forward.	
“The Nias reconstruction the planning is done locally. The government at the moment, because it's a big country, they still introduce this Bappenas type approach but I think learning from Nias, why you can do such a thing in four years because you are actually doing local planning. And local planning is exactly involving the local community on daily basis. If you do the planning like today, like in Jakarta - why BRR is a success case for Indonesia? Because you put the national organisation on the ground, on the ground zero. This is how you can do the planning on daily basis. But if you are in Jakarta you cannot see the ground. And you will rely on so many levels. So, my advice, even in the development planning is to try to empower the local community and then do the planning.”	Sabandar, 2016,p.7/§279-287	The government of Indonesia is still counting on the Bappenas approach. There should be lessons learned from Nias which showed that it is important to do local planning. In BRR, the national organisation got put on the ground and then did the planning from there. So, an empowerment of the local community should occur and then planning should happen from there.	

B4 Current state of planning

This chapter presents statements taken from the interviews concerning the below assumptions from the interview guideline:

I: Adjustment of housing to natural hazards can reduce the extent of a disaster. This link does not receive sufficient attention/consideration in the current planning process in Banda Aceh.

IV: Traditional building methods provide a solid basis for adjustment of housing to natural hazards. Obstacles can be eliminated. However, they do not play a role in current planning.

[1] Adjustment of Housing to present and future natural hazards is not an issue/not an important issue in the planning process for housing.

[2] Do-it-yourself construction is not being monitored. Appropriateness of construction, materials, building methods is not checked.

[10] Traditional architecture (materials, building methods) are not part of planning.

[11] An attempt to re-interpret traditional building methods and materials and learn from them is not made.

[16] Traditional buildings were considerably less damaged after the earthquake, partly as well after the tsunami.

The statements in the form of direct quotes are allocated to the following categories:

A: Adjustment of housing

B: Monitoring of construction and materials

C: Traditional architecture

D: Re-interpreting traditional building methods

E: Performance of traditional buildings in natural hazards

The evaluation tables show the original 'QUOTE' from the interview as well as the 'SOURCE'. Multiple allocations of quotes to more than one category are indicated in the column 'MA' referring to the letter abbreviation of further categories. Quotes are left in the original state and have not been corrected grammatically in order to not influence the content of the statement. For reasons of practicable handling, a short 'SYNOPSIS' was done by the author, in some instances combining several quotes of the same interview. This synopsis does not show the opinion of the author but rather maintains the opinion of the interviewee.

B4.A: Adjustment of housing

Quote	Source	Synopsis	MA
"Not yet. But maybe they will, maybe they will draft..."	Hasan, 2016,p.8/§335	There is still no building code for Banda Aceh.	
"[...]they have to get the codes from central government, what they have done, cause we have under the department the Ministry of Housing, so they have to work with the Ministry of Housing."	Hasan, 2016,p.8/§344-346		
"[...]then maybe they have several, or a few, local aspects, for example, in Aceh they have to be sensibility of earthquake, so something like that."	Hasan, 2016,p.8/§350f		
"Maybe in Jakarta, Bandung, they already have that, but not here."	Hasan, 2016,p.9/§356		
"Actually we should have one. Because we have learning lesson also from Padang, Yogya, the worst part. So, since we didn't have a building code I think we should have one because we have previous earthquake also. But I don't know until now - ten years passed from the tsunami but still not legalised yet. I was wondering also. Because Malaysia also have that long time ago. My project at the 2000 I had to create my housing settlements I had to open the building code."	Hasan, 2016,p.9/§359-363	Lessons from previous earthquakes and disasters have not been learned.	
"But we need that as soon as possible. Because Aceh is very fragile land for hazard. Any kind of hazard, flood, earthquake. Especially for earthquake, 6 scale. Minimum was 5 something. 5 point we don't feel it anymore. We have experienced 9.8 so 5 is nothing."	Hasan, 2016,p.9/§367-369		
"I am not sure about that, but I think no evaluation [evaluations or assessments concerning natural hazards which are part of the planning process for housing in Banda Aceh]. No evaluation on that like even no evaluation from government of or from third on the quality of the house related to natural hazard or disaster. Nothing."	Sidiq, 2016,p.2/§123-125	There are no evaluations or assessments regarding natural hazards that are part of the planning process for housing in Banda Aceh at this stage.	
"There are four or three disaster mentioned in spatial planning document of Banda Aceh. Of course, earthquake, tsunami, flood. I think only three most common. Then, of course because Banda Aceh is in coastal area so will be effected by climate change."	Sidiq, 2016,p.4/§143-145		

<p>"We have like zoning, zoning map of Banda Aceh. So, you see in the coastal area we have more green this is mangrove or river, and this one for housing. But the scale of the map is 1:25000 but they now are making more detailed we call detailed spatial planning 1:5000. In that document, we gonna have more detail and more zoning regulation."</p>	<p>Sidiq, 2016,p.5/§178-181</p>	<p>There is a zoning map for Banda Aceh in the scale 1:25000. This map is now getting turned into a detailed spatial plan of 1:5000 with more zoning regulations.</p>	
<p>"This one is housing, right? But sometimes in detail spatial planning maybe you could find in detail...actually in our document it's permitted for housing to be built here. I also discuss with development agency. That's quite difficult for them. The problem of law enforcement is quite difficult to make it. But they say we give the permit but with special condition. They should know evacuation rule, and there is evacuation building... Banda Aceh has nine sub-districts and every sub-district is gonna have one detailed spatial plan."</p>	<p>Sidiq, 2016,p.5/§185-190</p>		
<p>"Yes, we have document Indonesia Rencana Tata Ruang Wilayah Kota Banda Aceh, in English Banda Aceh Spatial Planning 2009-2029. So, 20 years planning of Banda Aceh. This is Banda Aceh District Planning. So, we divided it into several condition that we have housing, we have infrastructure, we have the social planning. So, we review this every five years. So, before 2009, we never inserted the natural hazard or the natural disaster to be as State Planning, but after 2000... Sorry after 2004... So, before the big earthquake... But after the earthquake, this Spatial Planning, Banda Aceh Spatial Planning, lot of hands helped, GTZ, USAID, CIDA, and all those overseas institutions helped. And then we won the competition, as Banda Aceh, we won one of the best spatial planning due to inserted of... Not insert, I mean embed, the natural hazard. That means in this spatial planning, we prepare the condition, what happen if earthquake or the natural hazard came to Banda Aceh, for example. So now we are reviewing the Banda Aceh Spatial Planning."</p>	<p>Irwansyah, 2016,p.11/§470-480</p>	<p>There is a Spatial Plan for Banda Aceh that includes housing, infrastructure and social planning. It is getting reviewed every five years. In this spatial plan they prepare for natural hazards.</p>	
<p>"So, a lot of academics involved, stakeholders and citizen. I was involved in reviewing of this and then the head of the Public Works, the head of the state Banda Aceh, State Planning Agency, and the mayors, the vice-mayors, the Secretary of State Banda Aceh involved in reviewing. But the person in charge is Head of Public Works."</p>	<p>Irwansyah, 2016,p.11f/§484-487</p>		
<p>"For new houses or if you do an addition to your house, is it still a rule to follow the earthquake safety?"</p>	<p>Irdus, 2016,p.5/§184f</p>	<p>When new houses are getting built there is no rule to make sure the house is earthquake resistant.</p>	
<p>"[...]the building code is quite complete I think but only we haven't used that well. Already very good but it is not function or distributed to people because the building code as I have overseen it also tells about thermal comfort, and then how to make drainage and then against the fire and then how large is the stair once it's in the fire area. So, it is very complete I think. And you can also access SNI – Standard National Indonesia. Some of them are published in internet."</p>	<p>Sari, 2016,p.10/§436-440</p>	<p>The National building code of Indonesia is already very comprehensive and detailed, but it is not being applied in Banda Aceh. There should be a building code for Aceh which is developed together with NGOs after the tsunami.</p>	
<p>"This SNI was already developed far before tsunami but I don't know whether it is already updated by learning the knowledge from the tsunami, whether it is updated or not. I should have been like that but I don't know whether it is updated or not. But the Aceh building code, so after tsunami they also, the NGO and the local government provide Aceh building code. I think that one is the one that's related to which have been learned from the tsunami. Aceh building code maybe you can try just google it whether it is published or not."</p>	<p>Sari, 2016,p.11/§446-451</p>		
<p>"Most of the Acehnese use air conditioner and then they don't – so most of the houses also have very small plot land and the hard surface were covered. That's why during the raining the water doesn't know where to go this is why flooding everywhere."</p>	<p>Sari, 2016,p.11/§456-459</p>	<p>Most houses in Aceh have air conditioning. Also, large parts of small plots have a covered surface which leads to flooding.</p>	

<p>"This is an example that a person who wants to build a building, houses. We have a one-stop services here with the exact days and exact-what we call it – tariff. And Public Works is also inside this one stop-services. In the ground level at that building is the one-stop service. And they will exercise the proposal. Is it the same land use that we have? We have a spatial planning and we will exercise if it is possible that this building is there because if the place is for the housing area is ok but if it's mixed area so we will suggest to the person that you may not do this building because it's not allowed there."</p>	<p>Bahagia, 2016,p.2/§48-54</p>	<p>If someone wants to build a house the plans must be handed into the Ministry of Public Work to be checked. They compare it to the spatial plan and check whether housing is allowed in this area.</p>	
<p>"Building code designed by the national level, just last year building code. 2004, 2015, only eleven years after 2004 we have the new building code. [laugh] Takes time. But must be one year we can build the building code and then adapt by people. For example, the housing still [?] because of the [?]. This is already eleven years but the road is exponential like this 2004 until 2009 because of the reconstruction. But still the building code is still not there. Right now, we have very simple like this to be declined because of the [?] political issues sometimes. The grow of the economic still not stable. That means we already have some building code but the housing development still decline. And this is the time horizon we need. Building code must be done quickly. But at the time we are facing about the human resources. Actually, if the UN can help us at this time UN can give us some code internationally, give to the tsunami prone area. You must build like this. For example, using the British standard international. Using the United-States standard, using the China standard. Right now, we have China standard, China products in great mosque using the China standard. [laugh]"</p>	<p>Dirhamsyah, 2016,p.7/§282-294</p>	<p>2015, eleven years after the tsunami, there was a national building code. But still this is not being implemented now. The building codes brought in by other countries, or for example the UN, during the reconstruction could have been used to be integrated into an Indonesian building code.</p>	
<p>"If they want to build a house people are really concerned about that [the safety of their house] and other people I think will be do the same. But for the government official, or for the government building for example, the contractor for example is not concerned about that. They are concerned only how to make bigger the profit. If there is a good monitoring we can meet the need of material that we claim to do this kind of labour. If not good monitoring it can be reduced the quality."</p>	<p>Mardhatillah, 2016,p.9/§358-362</p>	<p>People are concerned about the safety of their house, but contractors only care about the profit. So, if monitoring is not satisfactory, the quality may be jeopardized.</p>	
<p>"In terms of area - maybe we have not enough choice. If I have a land there, I have to build my house there. No choice. But what we can doing that is about how to make to adjust with my house there with the nature specials, like wind, the sun, anything connected to the environment situation. That is something that I can do if I have to build my house there for example. I have no other land to build the house. I would have to choose to build there and then plan and the trying to adjust."</p>	<p>Mardhatillah, 2016,p.9/§372-376</p>	<p>People have to build their house on the piece of land that they own. Therefore, the building needs to be adjusted to the natural conditions at this exact site.</p>	
<p>"I would say based on my understanding because I am not in the structural engineering so by my understanding this issue has been discussed and I believe that there is a building code particularly for those area being affected by disaster. Perhaps it goes of a minimum standard that need to be complied when people are building their what we call housing or infrastructure but then maybe at the same time I understand as well anyone who want to build any building will need to get a permit and this permit is something that outline what are the condition that need to be met. My assumption perhaps one city might have a different rule and regulation when it come to this although at the same time there is a national rule and regulation that regulate this one."</p>	<p>Faisal, 2016,p.4/§163-171</p>	<p>The issue of building codes has been discussed and there should be a building code especially for areas that are disaster prone. There is a building code by the national government and there might be special regulations from particular cities.</p>	

<p>“Particularly for the area that have been hit by disaster that will give a different dimension in the planning because now they have a real case to refer to. So that will always be in there when calculate planning and development because they know that they have been hit by disaster. For the area which is predicted but not happened yet, this is something more effort might be required because will need to be convinced that scientifically or by whatever means that this will happen and we will need to prepare. So, all of the local government become very important because at the end the planning will directly impact the local government. So, the local government will need to be very much aware about the potential risk in their area and when the local government do the planning then these factors will need to be considered.”</p>	<p>Faisal, 2016,p.7/§289-297</p>	<p>Areas that have been affected by disasters have something to refer to with their planning. In areas with a hazard risk where a disaster has not yet occurred, it is still necessary to convince the stakeholders that there is the need to prepare. The local government especially needs to be aware of the potential risk when they complete the planning.</p>	
<p>“For some countries, the risk is very obvious. I’ll pick Philippines for example, they know they’ll have typhoon every year. Some countries will have a flood that will happen. The slow onset disaster provide room for prediction and also anticipation before it comes. The challenge would be like the earthquake, we know which area will be hit by the earthquake but we will never know when. Because earthquake will be keep on coming it will come in five years, ten years, hundred years or whatever it is but that’s where the challenge will be. Now the other challenge is the unseen risk, this is we talking about climate change. Climate change will bring risk that we never realised before because this is something we call new, emerging risk. So, this requires a lot of the anticipation and when we talk about how long, what is the period of year that require in anticipating or preparing for this really depend on the type of risk and the potential scale that risk could produce if that things really happen. So, this again would be a go on the case by case, region by region, city by city, depending on what are the potential trap, what would be the probability and then what would be the severity if that trap come alive.”</p>	<p>Faisal, 2016,p.8/§315-327</p>	<p>Risk analysis has to be made region by region, city by city always depending on the type of risk that is expected. Slow onset disasters provide room for prediction and anticipation. Other risks, such as an earthquake, cannot be exactly foreseen and therefore is harder to handle. The same applies for the emerging risk of climate change.</p>	
<p>“So, this is something that is basically even myself we are so worried about the earthquake but actually we are in the let’s say in the field which is no building, just an open space, just a field then we just get shaking because of the earthquake. The casualty from the earthquake mostly because of the building collapse. And then this building with another building will have a different strength and also the location as well. If you were right in the epicentre that’s it. And then if the building is not strong enough. But if you are five kilometres, ten kilometres, twenty kilometres that will have a difference. So, what we could do in these areas is of course the ideal one would be all the construction would be based on the projected risk for hazard that might have impact into that areas. That would be ideal. Why is it ideal? Because it require the technical knowledge and capacity, it will require the regulation and law enforcement and also it will have a different cost structure. You build a building for this quality will cost then this or that. And that where the decision will need to be made. Whether you make one very solid, able to resist 9 scale of Richter of earthquake, one school with that solid, or then the other option not 9 but 7 but then you will have the opportunity to build three schools. So, when we have this comparative and that’s where the...”</p>	<p>Faisal, 2016,p.8/§337-351</p>	<p>Earthquake casualties are mostly due to collapsing buildings. So, it would be ideal to base the construction of houses on the projected hazard risk at this location. This would require "technical knowledge and capacity, it will require the regulation and law enforcement and also it will have a different cost structure". This is where the decision needs to be made, whether to build one solid building adapted to an earthquake of 9 on the Richter scale, for example a school, or whether to build three schools adapted to a 7 instead.</p>	
<p>“So again, if we come back at the end, a government would need to decide on several factors, whether they want to build a strong building, a better infrastructure and somehow it ties as well with the financial capacity of that particular city.”</p>	<p>Faisal, 2016,p.9/§359-361</p>		
<p>“After that we make the - with the public work - we support making the new spatial planning. [interruption] After tsunami we have to make the new spatial planning and we try to make the new spatial planning because the central government wants to move the citizen from the shoreline to the inline so we support that.”</p>	<p>Permakope, 2016,p.1/§24-28</p>	<p>After the tsunami there was a new spatial plan being made. Within this the central government tried to move the citizens from the shoreline to inland.</p>	

<p>"After tsunami, firstly we make the spatial plan... before tsunami Banda Aceh city have the spatial planning for 2003. After tsunami we have to change, we have to revision so we make the new spatial planning 2006, sorry 2008. But because the central government and the central council making the new regulation we revised again to be 2007 to 2029, so 20 years. That's what my centre give the support to some data and some analyses for the Public Work especially in Banda Aceh and also in the central government."</p>	<p>Permakope, 2016,p.3/§90-95</p>		
<p>"And also for the building code we made the limited and [?] the permit and we hope the citizen are making a building after they get the advice planning from the Public Work. Because after tsunami we have some data the affected area and also the flooding area, the highly tsunami effected area so maybe if they want to make the house in the near or in the Meraksa we give advice please make two floor, like that. We have the data, the tsunami. The data we give to the Public Work. That is our job. And the Public Work make the SOP and the permit for the citizen before they make the house."</p>	<p>Permakope, 2016,p.1/§38-44</p>	<p>The hope is that people build their houses according to advice received from the Ministry of Public Work. The decision to provide a building permit is based on data about the tsunami and flood prone areas.</p>	
<p>"We get the data with the survey. We go on the survey and take data and we process the data and give this information, give the data for the stakeholder, for the agency, for the university."</p>	<p>Permakope, 2016,p.2/§51-53</p>		
<p>"Actually we try to make our map easy to understand for all people but we don't have the feedback from all. I think firstly we have to get feedback from the people, from the community in Banda Aceh especially. With that feedback, we can make some activities. I think not so many people use this website. Not only for the community, maybe civil servants in the city government are not familiar with this map. I don't know why. We have a one-stop office in the city hall. Before they give a permit, they can use this map. They can use advise but I think they don't use this map. They only ask, "where is the company, what is the name of the street, what number, how many people, how many employees". They don't use this map. If they would use this map they can just give the parameter, this is the affected area, if you make this building you have to not use the well because the well not so good after the tsunami. Maybe you have to make the two-floor building because after tsunami we have data the water is 7 metre from that. In the one-stop office not used, maybe in the Public Work because we closely with the Public Work, every time discuss. But the one-stop service not. I think before we make the new plan we need to get feedback with our data."</p>	<p>Permakope, 2016,p.9/§361-373</p>		
<p>"I think housing construction here is enough. No housing collapsed after the big earthquake after the tsunami. In 2012, we have two earthquake with one 8.5 and one 8.2. We didn't hear house collapse, we are good in earthquake construction."</p>	<p>Yubarsi, 2016,p.8/§323-325</p>		
<p>"In Public Work here we have about the road, already visit Marga [?] and then we are dealing with drainage, the flood and also with the spatial planning. We have the division for the spatial planning and then one division dealing with building code. And here in settlement division we responsible for house and drinking water and sanitation. Because here - you know the limitation of the fund in Banda Aceh city and here we have a programme to build house for poor people. It's been three years and this year it's for the fourth year and we build house for the poor people."</p>	<p>Zulfisni Meutia, 2016,p.6/§224-229</p>	<p>There is a division for spatial planning and a division for the building code at the Ministry of Public Work.</p>	
<p>"Because here - you know the limitation of the fund in Banda Aceh city and here we have a programme to build house for poor people. It's been three years and this year it's for the fourth year and we build house for the poor people."</p>	<p>Zulfisni Meutia, 2016,p.6/§227-229</p>	<p>The city itself builds a few houses for the poor in Banda Aceh every year. This is done through the Ministry of Public Work.</p>	
<p>"In 2013, we built 60 houses and 2014 66 houses and last year we built 80 houses. But today the finance is a little bit not much so it's enough for 30 houses."</p>	<p>Zulfisni Meutia, 2016,p.6/§256-257</p>		

<p>"We have a typical prototype for the house but sometimes we need to make a little bit shifts because the land is not enough for our typical, so we have to make another. Last year we have three type of houses that can fit our money then can't fit the land. So sometime they [the future owners] consult with us, I move the door not here, I move here, so it's ok. They discuss with us."</p>	<p>Zulfisni Meutia, 2016,p.7/§266-269</p>		
<p>"You know the people, now the people always try to find a land far from the coastal. So it's directly, we don't have to check because it's already not near the coastal or the beach area. They want to build a house, they have to find land, it must be - they try to find it far from the beach, from the coastal area."</p>	<p>Zulfisni Meutia, 2016,p.7/§274-277</p>		
<p>"We build the house if they have land. We don't have fund to buy a land for them. Because I think it's - they have to cooperate. There has to be availability of the land, then we can build a house."</p>	<p>Zulfisni Meutia, 2016,p.7/§281-283</p>		
<p>"[...]sometimes we can't work ideally. We have sometimes to fit into the conditions, just like the regulations, the money - sometimes we have to deal with that. So, I think if we have much more time to plan or have not rush to the construction it would be better. Because I realise that sometime the planning is not ready but we have to move to the construction part. So, I think we have to - how to say - to do the planning better."</p>	<p>Zulfisni Meutia, 2016,p.9/§367-371</p>	<p>Sometimes there is not enough time to plan. If there would be more time the construction would be better. Sometimes the planning is not ready, but the construction needs to begin. The planning should be done better. The money is always just allocated for one fiscal year which makes large projects very difficult.</p>	
<p>"Sometimes the fiscal years, you know the fiscal year, we restrict the year. Sometime the planning is not completely finished but the fund is for the construction. And I think the difficulties in doing the ideal ways is that sometimes like the building, this building will be finished construction in more than six months or eight months. And you know the procurement process and the eight months or ten months is not in one fiscal year so they have to cut - to cut ok this year the money goes to foundations and to the structure thing, to the beam something like that. I don't think it's good. Actually, we already talk about that and we suggest that ok we have to build like a parliamentary building, we already have a good plan and it needs this much of money and under process it goes maybe two years but it's restricted - it's very difficult to build a multi-year's project. So, we just allocate the money for one year. So, in one year we can just build this and next year we do near the procurement, another company. Sometimes it is - with the owner it's not continuing process. The first year this company, the second year the other company win the project."</p>	<p>Zulfisni Meutia, 2016,p.9/§375-386</p>		
<p>"The first we must building better the house condition. For example, the building must be using the good standard. Of course, this very depend on disaster, we must be good about the building and then how to connectivity with the livelihood and so on. And then building culture. For example, we can adopt the Aceh cultures for the tsunami. The building must be depend on the characteristics of the district. If the district is very increased to flood there must be adaptation with the flood condition. For example, a tsunami and so on. The government not only think about the prize of the land. For example, it's very low, you can build here. But this connectivity is very difficult, it's not good I think. For example, they must understand about the geological process, not building in the fault area. And then not building the market maybe in the fault area and so on. They must... and then we have the spatial planning and then risk map and the geological planning, they must be connect. In the spatial planning programme and the disaster, we must connect about this."</p>	<p>Sunarty, 2016,p.9f/§396-406</p>	<p>Banda Aceh needs to build houses in better condition. There should be a good standard depending on potential disasters and then connect this to the livelihood and building culture. For example, the Aceh building cultures can be adopted for the tsunami. The building should depend on the characteristics of the district regarding natural hazards. The price of the land, what the government is concerned about, should not play a role. This connection is very difficult and, so far, is not very good. For example, nothing should be built in the fault area. The spatial planning, the risk</p>	

<p>"For example, we have a dam and then when the first flood they have a minor crack. And then flood and crack. When the big flood it's dangerous. But the Public Work must have a sense about disaster like this and they must building road. There must be expectations about geological area and then there must be safety area and so on. They must building with the high standard. But now only same, at the point A, B, C it's the same standard. Not disaster prediction."</p>	<p>Sunarty, 2016,p.11/§456-460</p>	<p>maps, the geological planning and disaster, this should all be connected.</p>	
<p>"[...]maybe in the good condition the Public Work and the BPBA must be good coordination about these programme. If not BPBA building, but if BPBA can do it some project they can't building really in disaster."</p>	<p>Sunarty, 2016,p.11/§465-467</p>		
<p>"So would you say there is a gap at the moment between."</p>	<p>Interviewer, 2016,p.11/§449</p>		
<p>"Yes."</p>	<p>Sunarty, 2016,p.11/§451</p>		
<p>"I mean if you look now at Aceh from the perspective of the coastal areas and potential for disasters it's even increased. It's not reduced because now we have all this illegal logging so lots of the forest has gone from the hills so every time it rains it's flooding so we have flash floods in some areas or total flooding. Here this area Kamada there used to be a big sand bank outer sea which protected the coastal areas and now in two years the beach is completely gone it's just been washed away, the sea wall which was built is falling apart. You can have a look when you go back, completely falling apart. So, there is nothing to protect the villages from the water right now and that's just climate change and rising sea levels. And also, this area we've had scientists out here from Singapore, from America through ICAIOS which is related to TDMRC and they have said that this area is sinking. So, this area is sinking three centimetres a year as well as sea level is rising. And nobody is doing anything. There is no discussion about climate change here and what that might mean for coastal communities."</p>	<p>North, 2016,p.14/§583-594</p>	<p>The potential for a disaster has increased for coastal communities. There is illegal logging which leads to flash floods. The sand bank, which was protecting the coast, is gone and now within two years the beach has been completely washed away. A sea wall, which was built for protection, collapsed and now nothing protects the villages from sea level rise. On top of this, there is evidence that the area is sinking three centimetres a year. "And nobody is doing anything. There is no discussion about climate change here and what that might mean for coastal communities."</p>	
<p>"So still right now it's really, I think it feels like the demographic system is really dynamic right now. And that also triggered more development for the housing and yeah unfortunately, what I understood it's not yet also well regulated. There are some developers which not has license to do the expanding the housing areas, but they still do it in their own way, so there are practicality that was not really following the, maybe the regulation was not there, I don't know."</p>	<p>Meilianda, 2016,p.3f/§131-136</p>	<p>The current demographic system is very dynamic which also triggers more housing development. At the same time these developments are not regulated and developers build without a licence.</p>	
<p>"One of the main tasks of the Public Works agency is to establish and implement the guideline for the spatial planning policy and the building permit."</p>	<p>Noeriman, 2016,p.2/§48f</p>	<p>The ministry of Public Work oversees the establishment and implementation of a guideline for both spatial planning and the building permit.</p>	
<p>"This is the regulation about building in Banda Aceh. The first one is act number 28 [undang undang code 28] so this about the building and then also about the building is the Kanun, Kanun is the local regulation. The most update Kanun about master plan is the Kanun number 4 of 2009 about the spatial planning of the city. I think this one is the key of all, this is the spatial masterplan, spatial planning in the city. This one is also important, the major regulation number 15, 2011 about the building permit. This is the guideline and also the requirement about the building permit, number 15, 2011. And then in 2011 they also issued another major regulation number 29, 2011 about the guideline how to about the building permit guideline for the building that is already established and used and utilised."</p>	<p>Noeriman, 2016,p.2/§50-58</p>		
<p>"[...]material, structure - the foundation, it has to fulfil the requirement for the earthquake, so when earthquake happen the building will not collapse. There was a term about it, I don't know."</p>	<p>Noeriman, 2016,p.9/§375-377</p>	<p>There is a building code that require buildings to be earthquake resistant. Also, there is a programme to implement</p>	

<p>“There was a programme, they will start to build a regulation about building which is suitable to the Islamic values – about the cultural, that fit the Islamic culture. There is a room for the boy and there is a room for the girl. It’s a programme to avoid mixing, gender mixing. They will start to do that pilot project that fits the local culture. It’s to avoid the criminal or sexual harassment.”</p>	<p>Noeriman, 2016,p.9/§385-389</p>	<p>Islamic values into the building codes, as for example, a wall which prevents guests from seeing directly into the living room.</p>	
<p>“So they will have to build this in the regulation to – it’s like an old Acehese tradition, for example if the guest come to a house, the guest cannot see directly to the living room. There was a wall that avoid the view of the guest so they cannot see the living room. It’s I think an old Islamic values that was implemented by the last generation. It is an old generation value so they will try to implement this old generation value to the building. So, they will start to campaign about this old value to the village to the family.”</p>	<p>Noeriman, 2016,p.10/§395-400</p>		
<p>“So, in the current Acehese house, for example, when the guest come to the house and they sit in the guestroom, they can see directly to the living room. For example, the house member is watching the television with no hijab, so they say that it is better for the home owner to build a wall or a curtain that so the guest cannot see directly to the living room. It’s an old Islamic value.”</p>	<p>Noeriman, 2016,p.10/§412-416</p>		
<p>“For the private house or most of the Acehese people consider about the safety of buildings, especially for earthquake. So, in Aceh culture we just try build a new house more higher than the national standard. So, this is why after 2004 the victims it’s not because the collapse of buildings but the most victims is because of tsunami. So, this is the indicators why the Acehese really consider, especially for earthquake.”</p>	<p>Haiqual, 2016,p.11/§469-473</p>	<p>Most Acehese build their private houses earthquake resistant. They usually stay above the national standard. Hence, in 2004 most houses did not collapse because of the earthquake but got washed away by the tsunami.</p>	
<p>“The previous one [building code] only, as I said, they don’t have that much rule. The rule was like the distance between the road and the house and so on but now the PU, the Public Worker are reviewing about it and Bappeda haven’t received anything yet so she doesn’t really know what is inside now.”</p>	<p>Mardalena, 2016,p.6/§225-228</p>	<p>The previous building code [from 2004] did not have rules concerning hazard safety. Now the Ministry of Public Work is reviewing this building code but the Bappeda is yet to receive the new version.</p>	
<p>“So this is the local regulation, kanon number 10, 2004 regarding development of building so here it explains everything in very simple term. So, it’s like if you build a house then you get free assistance from the government, from the specific agencies regarding building a house and so on. About the waste, there will be some agencies that collect the waste. And those general information. As you think it should be more specific like the material of building, this should be included in the programme, in the document.”</p>	<p>Mardalena, 2016,p.6/§234-239</p>		
<p>“Actually, nationally we have the standard, but it’s never been enforced. Yeah. That’s why you have a column with only one rod that explain there is no enforcement in the use of the building code. Yeah. But then again, the building code, the existing building code is not sensitive to the earthquake because it is create nationally. We do understand that Indonesia, it has different zone of earthquake. It has to have different approach, of course. So, the tsunami also creates a new understanding that we have to have different building codes from four different earthquake area. Then we come up with the area of... Sorry, the map of earthquake zone which has been resurrected from the dead. From the idle kind of condition.”</p>	<p>Samadhi, 2016,p.9/§374-381</p>	<p>There is a national building code for Indonesia but it has never been enforced. Also, this building code cannot be used nationally since there are different earthquake zones and therefore different risks. There should be a different approach for each individual area, this was underlined by the tsunami event.</p>	

<p>“Yes, of course, the building code is the first intervention, if you like, on everyday planning, in regard to more resilience, setting, be that the community setting, or the physical setting of a settlement. Yes, of course, the building code would be the first. So, if the question is, is it being used on everyday planning? Yes, the answer would be yes. But again, we have a lot of good regulatory instrument like building code, but what we are lacking... I'm talking not just about Nias and Aceh, but the whole Indonesia, is the enforcement system. We don't have that in place. And we haven't managed to have that even after the reconstruction. During the reconstruction, yes, we can deploy people. We do have quality assurance unit within each of the regional office to do that. But even the local public works agency doesn't have that capa... Not doesn't have the capability, doesn't have the drive to do that. Yeah. Even we managed to come up with the process of building permits that requires people to meet the standard, and not just in the design but also in the implementation of the construction.”</p>	<p>Samadhi, 2016,p.10/§409-420</p>	<p>There are a lot of good regulatory instruments in Indonesia, but what the country is lacking is an enforcement system. After the reconstruction nothing has fundamentally changed regarding this situation. Even the Ministry of Public Work does not conduct a quality assurance or make sure that people that build houses meet the standard in both design and construction.</p>	
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B4.B: Monitoring of construction and materials

Quote	Source	Synopsis	MA
<p>“[...]they check the first construction, from the Public Works, when we have the permit for building. After we have the permit then we can build our house. So, they will come the first check. When we put for the foundations, they will come and check. Because they want to check at first, is there any land that we cross to the borders, and if it's the same plan.”</p>	<p>Hasan, 2016,p.12/507-510</p>	<p>The Ministry of Public Work comes only once, if at all, to the construction site, when the foundations are built.</p>	
<p>“In some area we do have. But in some big city like Banda Aceh, Lhokseumawe, Sigli, we have building code, but unfortunately, we have like, tiga puluh dua, 32 state, district in Aceh.”</p>	<p>Irwansyah, 2016,p.12/§499f</p>	<p>There is a building code in Banda Aceh, but it is not checked after the building permit. There is no supervision.</p>	
<p>“Yeah. In advice planning [this building code is getting implemented], when... For example, one of your question asking how do you... To get the permit to build the houses. These are the design from architects or from non-architect being reviewed by Public Works, and then they will give a permit and advice planning. And then they will give a sticker when the permit is given”</p>	<p>Irwansyah, 2016,p.12/§507-510</p>		
<p>“One thing lack here is... We not... That's it. We don't have a rule or a law that public housing need to be supervised by supervisor. For example, I want to build a house, after I get a permit, no supervisor. So, as long as I just follow the rule from the design. Needs to be supervisor or consultant, supervisory consultant.”</p>	<p>Irwansyah, 2016,p.12/§519-522</p>		
<p>“That means, the safety just on her hand. The Public Works Department, they didn't check the strength of the cement, the strength of the reinforced concrete, for example. This depends on us.”</p>	<p>Irwansyah, 2016,p.12f/§528-530</p>		
<p>“So actually the government has supplied such standard for building houses but I don't know why the people just do with their own knowledge.”</p>	<p>Sari, 2016,p.5f/§220f</p>	<p>There are standards for housing but the people do not build according to them.</p>	
<p>“The material for the foundation if the quality of the land is like this, we should use such a stone. And then for example the enforcement should be very well attached. And then in standard also, so for example this is Sumatra Island we are divided into some of the earthquake zones, 1 up to 6. Aceh is in the 6 number which means it is very dangerous so that's why the quality should be like this. But I don't know, maybe it is not well distributed to all people or maybe people just want to have very simple one. Because once we follow this guidance we should pay more for the labour.”</p>	<p>Sari, 2016,p.6/§229-235</p>		

<p>“Actually the government already give standard and then also the strict rule. So once the people wants to build a house they should tell the government and then they should provide – because we have to get the permission. To get permission we should provide the picture and everything. And then once the government says ok, so this is good you can do it. But in reality, it is not like that. Once we have money just hire the labour and then do it. So, this is why I think the quality of the house sometimes doesn’t follow the standard.”</p>	<p>Sari, 2016,p.8f/349-354</p>		
<p>“And for example, the new development house, for me I think it’s very expensive because normally five hundred million. This is the normal price. I you want to have a 72-metre square house. Or 36 but very beautiful performance. So, this is the normal price. And I think this is really expensive because once I did it by my own I can make it less. And then most of them they have already their own house template, so this is the house already, you just choose which one. But I don’t know, after we don’t know the quality of the house even though they say so this is, looks very good because it is already there. This is why most of the people even though so many new development house, most of them they just buy the land and then once they have money they hire the labour and then the observe. So, it can ensure us in the quality of the house.”</p>	<p>Sari, 2016,p.9/354-363</p>	<p>People who want to build a house do not trust consultants to provide good quality. They prefer to do it themselves, they hire labourers and consult the building process themselves.</p>	
<p>“But the government [house] is cheap because the one is subsidised by the government, the price is only around 200 million for 36 metre square, but the quality just very simple material.”</p>	<p>Sari, 2016,p.9/§367-369</p>		
<p>“Yes. Already designed. But for example, some of this, I have ever seen the picture and then I see the name of the architect and then I say oh, this is my friend. So, I think our graduate is function by the consultant.”</p>	<p>Sari, 2016,p.9/§378-380</p>		
<p>“Because we also have from the Public Work department in Jakarta sent us the guideline, building code. But there’s problem. We have a problem also. We don’t have more people to make a supervise for the private building. That’s our gap right now. It’s very ashamed of course ya. But for government buildings they have a consultant for supervise. So, we sent our civil servants from Public Work to control that. So, we manage the project in that way. So, let’s say there is a clinic, the procedure is the same even if a government building, the same, they have to follow this procedure and then the head of health division is not civil engineering so we send one person to help him or her to manage the project as a supervise or a expert.”</p>	<p>Bahagia, 2016,p.3/§103-110</p>	<p>There is no supervision for private houses. The government has a building code from Jakarta but so far has trouble to enforce it since they are lacking supervision. For public buildings this problem is already solved.</p>	
<p>“[...]we cannot control the private building. We have now – there is a MOU[?] between the mayor and the head of Syiah Kuala University. We try to use students from the engineering, from the civil engineering to help us to control that. Our people is only fifty people and the building is quite a lot and they start any time, there is no schedule so it’s quite difficult for us.”</p>	<p>Bahagia, 2016,p.8/§324-328</p>		
<p>“We put warning with red plate. For example, if there is no permit we have to put that plate. So, every, not every day I don’t know exactly. Within the villager there is people that control if there is a new building or not. We have a communication with the head of the village, not head of the village sorry, head of sub-district because head of sub-district is under control by the city hall.”</p>	<p>Bahagia, 2016,p.8/333-337</p>		
<p>“We still have a problem with the supervise that we have to face. It’s a lot of building that we cannot control. Cause the civil servants only let’s say 20 people in that division. In the Public Work, there is five division building, irrigation[?], drainage, roads, sanitation, planning, spatial planning. So, about a hundred people for this division let’s say only 20 people is dealing with this. So, it’s quite difficult for us. And that is surely the same problem with other cities. Except</p>	<p>Bahagia, 2016,p.8f/§352-364</p>		

<p>Jakarta maybe. Jakarta the people is more concerned about the quality so the private company or private house can make a contract with the planning consultant and also supervise consultant because they want a good result. But here lot of traditional expert to build a house [chuckles] Sometimes they have only ten million Rupiah so they start to build a foundation first and then next two months and they have another ten million Rupiah they start to build a column and walls and something like that. So, we try to make [?] that if you want to make a building a self-building you have to follow the guideline, the building codes. That's the way how to pursue the quality even without supervise them."</p>			
<p>"There is – sometime we also make a workshop to the labour and also we put the building code in some place like in head of sub-district. But right now, we also have a programme with the call, our president introduce a blo[?] To the village. There is a facility [?] there, there is a civil engineer there, usually they recruit from the road in the village so they is a community engineer there so they can help."</p>	Bahagia, 2016,p.9/§368-372		
<p>"But for the consultation [?] planning they can go to Public Work. In business hour, they will help them for any question that they have when they want to build houses. Even the area, the service area, the rooms and things that they need."</p>	Bahagia, 2016,p.9/§376-378		
<p>"But if they have no people that can make the project, the plan we can help. We have an engineer, we have an architect, we can give an advice. Just pay some money that maybe is relative. There is we can help them but not for free. Let's say we can connect them with one person that can help him to make a plan."</p>	Bahagia, 2016,p.8/§343-346	The Ministry of Public Work offers the service to help people plan their house. This is associated with costs.	
<p>"It has a lot of things to connect with right including the education of our planners. I mean, if you have lousy planners what a difference is it going to make? And then ok planners are good, very well educated, like Asrul from great university but then the government is corrupt then it might not work. So, it is important but the most important thing is to have our people, the society know the risk. And if they know the risk they should be able to find resources to mitigate the risk. If they are not sure about how safe his or her house she or he would need to consult to somebody. I think that's how our country has been working unfortunately. But on the other hand, that also give more power to the people right?[...]But if you don't trust the government then why would you follow all this? So, I think this is not very easy, one perspective question to answer. But I would like to add on that. Maybe Banda Aceh compared to Aceh Besar or Aceh Jaya or the rest of the district affected by the tsunami, might be in a better position to get the trust of its people."</p>	Mahdi, 2016,p.5f/§217-230	The system of building and monitoring rests on a lot of trust. If the people do not trust the planner, the consultant or the government it might be the right thing for them to build themselves.	
<p>"If to register a building take a long time, a lot of money because of a lot of corruption I'm – an educated person will not even do that. But if I know that ok this system is trustworthy, it's long but it's transparent, it's accountable then I will do it."</p>	Mahdi, 2016,p.6/238-241		
<p>"We have the building codes and the process, the people, the citizens before they make a new building, especially housing they have to get advice planning from the public work before. After that they get a permit from the one stop service in the city hall. But in the Public Work they have to give some data and some the design the housing so the staff in the public work can do corrections and give some advice. Maybe you have to make the second floor, maybe you have to like that. Where the staff in the Public Work get data that is from our centre."</p>	Permakope, 2016,p.3/§100-105	There is a building code in Banda Aceh. People who want to build a house have to get advice planning from the Ministry of Public Work and then get a permit from the one stop service. The staff in the Ministry of Public Work can give advice and do corrections. They get the data to base their decisions on from the GIS centre at Bappeda.	
<p>"Actually we try to make our map easy to understand for all people but we don't have the feedback from all. I think firstly we have to get feedback from the people, from the community in Banda Aceh especially. With that feedback, we can make some activities. I think not so many people use this website.</p>	Permakope, 2016,p.9/§361-373		

<p>Not only for the community, maybe civil servants in the city government are not familiar with this map. I don't know why. We have a one-stop office in the city hall. Before they give a permit, they can use this map. They can use advise but I think they don't use this map. They only ask, "where is the company, what is the name of the street, what number, how many people, how many employees". They don't use this map. If they would use this map they can just give the parameter, this is the affected area, if you make this building you have to not use the well because the well not so good after the tsunami. Maybe you have to make the two-floor building because after tsunami we have data the water is 7 metre from that. In the one-stop office not used, maybe in the Public Work because we closely with the Public Work, every time discuss. But the one-stop service not. I think before we make the new plan we need to get feedback with our data."</p>			
<p>"They have to have a permission from the government, from the mayor. We have one roof office in the mayor office. They can just go to the office, they have the paper. Filling the paper and everything what they need. And then the Public Work here just give advice planning. So, after the register in the one roof office to the permissions they bring some papers that specifically need advice planning from the Public Work. You have the concern, maybe if you notice downstairs, they already have two or one people sit there to the people who want to have a advice planning. That's in spatial planning division. So, after the people come here and they have the design house or building or whatever and the spatial planning division will check about the spatial planning, our regulation spatial planning if they can build them. And if they can they check the building and they go to the site. After they go to the site then just sign is ok and you can proceed to the mayor office and the mayor office will release the permission to build the house."</p>	<p>Zulfisni Meutia, 2016,p.7/§294-304</p>	<p>To build a house people need permission from the government. They fill out a form at the Mayor's office and then get planning advice from the Ministry of Public Work. The plans get checked in the spatial planning division. After they conduct a site visit [again for spatial regulations] and everything is ok, they provide permission to build.</p>	
<p>"Is it for the housing or - for the spatial planning. Is it ok to build a house there because we have the region this is for office, this is for housing, this is for business place, something like that."</p>	<p>Zulfisni Meutia, 2016,p.7f/§308f</p>		
<p>"They don't build all the land, how many meters from the road they can build."</p>	<p>Zulfisni Meutia, 2016,p.8/§315</p>		
<p>"Recently we don't have human resource to do that. But you know, if there is some complaint from the community or from the head of the village, they just can send letter or just go directly to our front office to report 'this house they don't have permission I think. Then we can check. Of course, ideally, we have to supervise the construction but our human resource is not enough to do that."</p>	<p>Zulfisni Meutia, 2016,p.8/§321-325</p>	<p>At this stage there is no direct supervision of the construction because the city is lacking resources. A complaint must first be made before an investigation is carried out.</p>	
<p>"The houses that are newly built? Do you know if there are any evaluations or assessments concerning natural hazards which are part of the planning process?"</p>	<p>Interviewer, 2016,p.13/§557-559</p>	<p>To build a new house, people need to own the land and obtain a permission to build. No one is overseeing this or conducts a natural hazard assessment. Even if the land is in a hazardous area.</p>	
<p>"Well, you know we built our house here and no. Absolutely nothing. Buy the land, build your house."</p>	<p>North, 2016,p.13/§561f</p>		
<p>"Before earthquake this all house Aceh this good quality because earthquake not crash. Well crash because tsunami. Tsunami make gone all."</p>	<p>Istens, 2016,p.13/§564f</p>		
<p>"Ok so if I am right then all there is now is if you have land all you need - or you buy land you need permission to build a house and that's it. The end. And then you build your house. And there is no government body that overlooks what you are doing or checks whether that's good or not. Nothing to do with whether you are building it in a hazardous area or there is the potential of a disaster in the future so no. I mean that's what we know for this area in Banda Aceh."</p>	<p>North, 2016,p.13f/§569-573</p>		
<p>"And then in Aceh majority of house crashed not in earthquake crashed but liquefaction. Liquefaction area, for example..."</p>	<p>Sunarty, 2016,p.14/§575f</p>		

"Liquefaction, so like the structure of the earth underneath, that's what they collapsed, a few houses."	North, 2016,p.14/§578f		
"I think down to the contractor, they're already aware of this reinforcement of houses that could withstand the earthquake."	Meilianda, 2016,p.7/§299f	There is a building code, and everyone is aware of earthquake resistant construction, including the contractors. However, the regulations of the government are not strict which causes problems. If a building code is not well-coordinated by the government then there is no one who can enforce these rules.	
"I understood we have actually the building code standard already established, but I don't know whether it was... I'm not really sure, but there was one. But I don't know whether it was already established before the tsunami or during the reconstruction. But it was all with the concrete and metal reinforcement."	Meilianda, 2016,p.7/§286-289		
"The regulation was not really strict. That's always again the problem. And because like I said, the development of houses is kind of wildly arranged right now. There are some aspect to it, so if this was not well-coordinated by the government then how can anyone, well, enforced this kind of rules?"	Meilianda, 2016,p.7/§304-307		
"So it really depends on the contractor I think at this moment to decide whether, "Oh we have to reinforce this houses with a bigger metal frame or bigger column concrete, better quality of concrete." Things like that."	Meilianda, 2016,p.8/§311-313		
"[...]it's [the building code] difficult for the implementation because first of all, for the housing projects it's kind of loose coordination with the government, they tend to have loose supervision as well. The key point is the supervision, but then if the supervision is weak then we could ask ourselves whether it was really implemented."	Meilianda, 2016,p.9f/§394-397		
"So for the case of the house, the only permit that is required is the building permit."	Noeriman, 2016,p.4/§175f		
"It's for all building, so also the house has to provide the detailed engineering design. For the house they will not need the DED [detailed engineering design] but only the design. The structural design, not the DED. The column structure, it's just a simple structure, not as complicated as the governmental building or the [?] building. But the home owner has to provide the basic design of the house and give it to the agency."	Noeriman, 2016,p.5/§206-210		
"All the document that was submitted, the agency will check whether it is suitable with the masterplan. Whether the area, whether the house that is planned to build it's suitable with the masterplan. And then the agency should give recommendation whether it is suitable or not. If the house is located in settlement area the house will get the permit and if it is not for the settlement area the house will not get the permit, it's quite strict."	Noeriman, 2016,p.5/§214-218		
"So if the house is built in the green area it will not get the permit."	Noeriman, 2016,p.6/§223		
"It's very difficult to explain because... in Aceh if we want to decide to build a new house we have no specific plannings just show to the... [Indonesian] There is no rules or policy how to manage, how to regulate people to build a new house. So, it's very independent. So, there is no assumptions or rules regarding to how we build a new house in Aceh."	Haiqual, 2016,p.8/§317-320	If people want to build a house in Aceh they do not need to follow a specific plan. There are no rules or regulations on how people build their houses. It is very independent.	
"Of course they have code of the housing in relation with the spatial plan. For example, when they build the house they should have the permit of the agency, also in the building of the mall or everything. Under the standard of the state."	Iskandar, 2016,p.6/§254-256	To build a house, a building permit is needed. There should be a strong regulation for this but monitoring and evaluating is not easy. So far this does not work very well, there are regulations, but it is not implemented.	
"The regulation need very strong to have - the regulation is very important, it's basic. But how is to monitoring and evaluation is not easy. Is not one hundred percent. This depend of the services. But of course, they have already the regulation but the implementation is not one hundred percent."	Iskandar, 2016,p.6/§260-263		

B4.C: Traditional architecture

Quote	Source	Synopsis	MA
<p>"Yeah, during the planning, we should remembering what our ancestor taught us. But to some young modern architects, sometime they don't use that kind of local contents anymore. Especially during at that time in Aceh, what do we call it? We have like minimalist concept or maximalist, at the time the Spanish concept came to Aceh, and everything, housing built by the Spanish concepts. For example, no more sun screen, but our climate is very tropical, and with only two season, hot, dry and monsoon. So of course, we still need, what do you call that? Sunscreen or cantilever to protect the buildings and houses from the heavy rains, and heavy wind."</p>	<p>Irwansyah, 2016,p.7/§268-274</p>	<p>Old architecture concepts are not used anymore. The design of the new houses are very simple and not suitable for the climate.</p>	
<p>"So, we have our class we call it architecture and history, so they learn about the history of architecture in western as well and also from Indonesia. But in the current curriculum the hours of doing the traditional one is not enough. Maybe just two weeks. But in the next curriculum we are planning to have maybe the whole meetings of the class, 16 meetings, to real learn about the traditional one."</p>	<p>Sari, 2016,p.6/§260-264</p>	<p>Currently traditional architecture is not taught enough in architecture and civil engineering classes but there are plans to change this at Syiah Kuala University.</p>	
<p>"Because we have accreditation, how to top up our grade. So, there is the institution in Indonesia responsibility to give ranking for the university. So, once they assess our architectural department, we don't have any specific character of our department so we are just as normal as other architecture departments. So, they advise us it is much better if you have your special one, for example, if people want to learn traditional Acehnese house so you have to go to Unsyiah because this is the expert one. This is why we are planning to improve our quality."</p>	<p>Sari, 2016,p.7/§268-273</p>		
<p>"Yes [traditional architecture studies is also not so common in other architecture universities in Indonesia]. Actually, normally we know so for the traditional Acehnese houses is like this, in Padang is like this the roof. The general one we know that but the detail one we don't know. I think we should provide a special class for traditional house."</p>	<p>Sari, 2016,p.7/§275f</p>		
<p>"[...]actually the traditional Acehnese house is built from the wood. So, once I assess there the Acehnese traditional house right now it is still comfortable. Why, because maybe the proportional size. The size of the column, the wall and then the number of the openings and then the full of [?] so that's why the traditional Acehnese house can be maintained to be comfortable up to now. But the one that was built by the NGO just look like the Acehnese house but the comfort is not as the same as the traditional house. Maybe the number of the openings and then the size and then the ceiling is just very close to the occupants and this is from zinc but the traditional house is from leaf. So that's why. Zinc will transmit the heat in the house and then being trapped in the house."</p>	<p>Sari, 2016,p.4/§163-170</p>	<p>The traditional Acehnese house works well for the climate. It is made from wood and therefore does not get too warm at night. During the reconstruction some NDOs tried to copy the Acehnese house but failed due to choosing the wrong material. The design was copied but the function was not translated.</p>	
<p>"In that case I don't know exactly the answer because this is a global situation. Every people now in Europe, in America, in Singapore they have a good buildings for living and they try to copy. Even I know that the traditional building is very good, there is no nail, no nail, wood nail so they will move when there is an earthquake and save. It's just in dynamic. It's good. So that's why maybe in some cases we agree that the traditional building is more convenient in this area but again, we cannot push people to use that kind of thing."</p>	<p>Bahagia, 2016,p.7/§287-292</p>	<p>In Banda Aceh the "good buildings for living" from Europe, America, Singapore are being copied. Even though traditional buildings are convenient for the area since they perform well in earthquakes, it is not possible to convince people to use these building methods.</p>	

<p>"Only a few persons who consider to construct a traditional house. That's because of specific reasons. One of the reasons why Aceh people are not using the traditional is because it's expensive materials. Wood is not easy to get anymore so this is one of the reason and not real effective because the maintenance is really high. So, after five years we have to change some materials so this is why no more local people interested to build traditional house. So, the functions changed now. The behaviour has changed about the Acehese typus what is the function of the house. So, it is not really popular now using traditional house. Especially in Banda Aceh. But I think in rural area they still have the traditional house."</p>	<p>Haiqual, 2016,p.10f/§434-441</p>	<p>Only a few people still build traditional houses. This is because today wood is too expensive and not easy to obtain. Also, the maintenance of the traditional houses is very high. Therefore, it is not popular to build like this anymore.</p>	
<p>"[...]the traditional house I don't know whether you see traditional house that we fixed in Nias because Nias traditional houses were actually – architectural wise if you see Nias they actually live with earthquake since time memorial. Because if you see the structure of these houses it's very strong. They have the pillar and they have these kinds of things which is actually made because of the earthquake. But when the modern house came forgetting avoiding this kind of the normal standard."</p>	<p>Sabandar, 2016,p.3/§123-128</p>	<p>The traditional house in Nias has a very strong earthquake resistant structure. But when the modern house came people forgot or avoided this standard.</p>	

B4.D: Re-interpreting traditional building methods

Quote	Source	Synopsis	MA
<p>"Actually, we still use the traditional house, but the process is - I think we cut the process."</p>	<p>Hasan, 2016,p.9/§377f</p>	<p>It is expensive to build a traditional house. Some people, especially middle and high class, still want to have a traditional house.</p>	
<p>"[...]especially like people who has the middle and high class, because the wood is more expensive. I think not only that - they have the money and they buy an old house and they bring that to their own land."</p>	<p>Hasan, 2016,p.9/§391-393</p>		
<p>"[...]socially, like in the village, if you build like, bricks, it means that you have modern life. The modern mindset, if you have the same house all the time, it means that you are not developed. So that's why they want to make like they are really something, so they will build bricks, so they become 'modern'."</p>	<p>Hasan, 2016,p.10/§398-401</p>	<p>People consider brick houses as 'modern'.</p>	
<p>"But also, I think we also move, I mean the culture also change, many reason, actually, culture also change. You cannot stay in the room, like very dark rooms, with the small windows. When you get old you have to go down to go to the toilet. Even for young people it's not practice anymore, because of the culture is change."</p>	<p>Hasan, 2016,p.10/§401-404</p>	<p>The way traditional houses are built is not questioned. There is the one fixed layout and design. Building in a traditional way is understood as copying and pasting or a mere reproduction of the old.</p>	
<p>"I know there is one or two people who is still forcing to build traditional houses in reconstruction but I don't know if the concept is successful."</p>	<p>Adamy, 2016,p.15/§647f</p>	<p>Building traditional houses means an exact copy and paste. This might not be a successful way. It should be about the quality. A badly built traditional house does not offer safety.</p>	
<p>"But you know like again it's not about traditional house or not it's the way you build correctly somehow. In Aceh Jaya, there are many house build as like trying to adopt with the traditional house and it's a very bad quality and now it's been left behind. It's a very bad quality of project. You cannot just simply say traditional house in what kind of them when you say traditional house is much better because now you can see even there is a lot of stuff. If you want to go you go to Jalang, there is many stilt houses and it's in very bad quality because it's not been built properly or even planned properly."</p>	<p>Adamy, 2016,p.15f/§656-661</p>		
<p>"Acehnese traditional house, who designed the house, they already proposed the house to become more resistant to the earthquake and floods. They didn't realize that until several architects, what you call that, do research towards Acehnese traditional house."</p>	<p>Irwansyah, 2016,p.5/§205-208</p>	<p>Traditional Acehnese houses are more resistant to earthquakes and floods. This was not noticed until a few architects did research about the traditional</p>	

<p>"But no foundation. During the earthquake this probably will move, and then, we push it again, to be back in the same place. So that's one thing that we should learn from Acehese traditional house. It's very flexible, you know? When we have no nails. Of course, the building was not rigid, it's very flexible so. You know pegs, right? [chuckle] Some of the recent researcher they're not really familiar with pegs."</p>	<p>Irwansyah, 2016,p.5f/§217-221</p>	<p>Acehnese house. Still, researchers are quite unfamiliar with these methods.</p>	
<p>"Well, we can learn from the Acehese traditional house."</p>	<p>Irwansyah, 2016,p.6/§226</p>	<p>Students at Syiah Kuala University studying Architecture and Civil Engineering are taught traditional Acehese architecture.</p>	
<p>"We call it 'Local Contents' now. Local Content is a subject in Architecture Department, in Civil Engineering Department, mostly for those who dealing with the construction and the design."</p>	<p>Irwansyah, 2016,p.6/§234-236</p>	<p>Students at Syiah Kuala University studying Architecture and Civil Engineering are taught traditional Acehese architecture.</p>	
<p>"Unfortunately, our ancestor they didn't draw anything, just transfer from head to head, from brain to brain. That's, of course disadvantage. So, for example when the traditional architects, they die and then they just transfer to the sons or to the sons-in-law, not to the women. [chuckle] So of course when we transfer, there is something not really transfers correctly, you can correct me if I am wrong, that's is what we realised that, the limitation of remembering from the elderly architects or a traditional architect, to transfer the knowledge, they cannot transfer the whole knowledge. That's the weakness of the Acehese designer or architects, traditional architect, different from Java, they use paper from traditional papers, from kind of trees, they wrote on the skin of the... Or the bark of the trees, but never happened in Acehese. So, we should learn from the Javanese, they have transfer the knowledge through paper we call[?] at that time..."</p>	<p>Irwansyah, 2016,p.6/§240-249</p>	<p>The knowledge from the traditional Acehese architects is not kept anywhere on paper or in documents. Therefore, it is getting lost.</p>	
<p>"Most of the traditional houses, we survived from the earthquake and flood because we use what we call it 'lift-up construction'. And then to protect them from the wild life. Don't imagine Aceh, before like today. If you go to the village, to the remote area, there's still traditional Acehese housing. So, they can graze cows underneath their house, and chicken, for example. But one thing, during the flood it will survive in the flood, because it's about two meters high. So, but today young generation, we don't like to stay in the lift-up construction anymore. So, we put down the house now."</p>	<p>Irwansyah, 2016,p.6/§257-263</p>	<p>The young generation no longer wants to live in stilt houses although they are resistant for flood and earthquake events. Consequently new buildings are built on the ground.</p>	
<p>"In that case I don't know exactly the answer because this is a global situation. Every people now in Europe, in America, in Singapore they have a good buildings for living and they try to copy. Even I know that the traditional building is very good, there is no nail, no nail, wood nail so they will move when there is an earthquake and save. It's just in dynamic. It's good. So that's why maybe in some cases we agree that the traditional building is more convenient in this area but again, we cannot push people to use that kind of thing. Maybe we can do it as a pilot project. We will introduce a good buildings with that, learn from the history maybe reasonably. But there is no idea for that right now. [chuckles]"</p>	<p>Bahagia, 2016,p.7/§287-294</p>	<p>Currently there is no plan for introducing the functions of traditional buildings into the planning for housing.</p>	
<p>"It would be too costly to build a new one. Usually people who want to have that would buy it from a village, from rural areas unassembled it, bring it to the city where they have a piece of land and then assemble it together again. That's what many urban folks do now."</p>	<p>Mahdi, 2016,p.7/§280-282</p>	<p>New traditional houses are not built anymore. This would be too expensive. Instead existing old ones are getting sold and transported to the city were the owner puts them together again the way they were.</p>	
<p>"But even for my mother she would say until now why would you build a traditional house everybody built modern house. I told her because the traditional Acehese house is earthquake proof, flood proof, and other thing and I would like to have one. I think you can see around including in the city of Banda Aceh that some people like to live by traditional houses. Made of wood, tilted and if there is an earthquake you can just wait in your house."</p>	<p>Mahdi, 2016,p.4/§166-174</p>	<p>New traditional houses are not built anymore. This would be too expensive. Instead existing old ones are getting sold and transported to the city were the owner puts them together again the way they were.</p>	
<p>"Now the people in Aceh want just more convenience. Because at the old Acehese houses the door is very small and then go up by stair, using stair and then the inside is very</p>	<p>Dirhamsyah, 2016,p.6/§228-233</p>	<p>Traditional Acehese houses are not seen as convenient. People</p>	

<p>big. But right now, we make some party at the [?] you must put the big doors because so many people want to go inside. And also, there is some area we must put the [?]. But some people still like the traditional one but we told we need [?] for they sitting in the hut. Everyone want a more convenient live."</p>		<p>do not want to live like this anymore.</p>	
<p>"I think our traditional house very nice but we can leave our houses more open. Aceh traditional house like that. We think our natural resources about the [?]. That's why Acehnese housing very nice. We can cut the tree, cut one wood and we can cut material for the roof and very cool."</p>	<p>Dirhamsyah, 2016,p.6/§239-242</p>		
<p>"Mostly people change their orientation in building their own house. But yes, sometimes they try to maintain such a thing maybe in the roof or in the ornament."</p>	<p>Mardhatillah, 2016,p.8f/§352f</p>	<p>Sometimes people use traditional ornaments or roofs when they build their new houses.</p>	
<p>"We involve the traditional culture architecture to the modern house. We have the responsibility to bring that idealism or to make it exist in present and we can adapt to the house, to the façade, to the philosophy of the plan, or just the façade or just the roof but some of part from the house is adapted from the vernacular architecture, Acehnese house. Maybe what the governor office, you can see, that is adapt from the Acehnese house. And the more building like that in Aceh. So how about the house? It depend on the owners. Architect will be 'do you want to make your house like vernacular concept or you want to mix the other concept and maybe ecological concept, green house, you make low-budget?' They check the decision, we just do our job, design."</p>	<p>Indra, 2016,p.8/§313-320</p>	<p>Traditional architecture is used in architecture as a picture or ornament. There is no translation of the function.</p>	
<p>"It's very little, very few people follow the traditional methods to build their house. Because our great-great grandfather they built up-house in some area just like when I was in the drainage division, the people come here and complain they always have flooding. And when we go to the site, actually the place is like concave. And actually, our great-great grandmother they built up-house so if the flooding they don't impact by the flooding. But now because we build the house on the ground, when flooding it's raining our interiority [?] [interiour] something like that. So, but maybe the people don't think about that. And they want us to overcome the problem. So, we from government we try to not just blame them oh you build you have to build this up like that. We just try to find a solution. In one place we built a small pump station because - maybe it's concave, how can we just drain the water there? Because if we doing the gravitations it will be a deep dip. So, we drain the water to a reservoir or a tank and then we pump the water to the nearest drainage system that nor affect the region."</p>	<p>Zulfisni Meutia, 2016,p.10f/§439-450</p>	<p>In many flood prone areas, traditional houses used to be on stilts. Now the houses are on the ground and people complain about the flooding caused by the rain. People do not think about that and want the city to overcome the problem. So, they try to find a solution by putting pumps in for example. This problem is mainly caused by a lack of supervision and knowledge during construction.</p>	
<p>"Yes but they already have the house on the ground so it's difficult. But the new problem comes now is we cannot supervise every time. So, some new houses they just fill in the land and then they can have a floor a little up from the other house. So sometimes this is the difficulty. And the new house in will be higher, but not a up-house, it's still on the ground."</p>	<p>Zulfisni Meutia, 2016,p.11/§454-457</p>		
<p>"I think in some part of the building code we encourage people to just fit in just like maybe the decorations from the traditional. Especially if the something we build for the government we try to put the local wisdom or the traditional architecture to the building or to the monument something like that. But we cannot push people to do that we just encourage them. But for the - the thing that the government do, the planning always suggest maybe you can just collaborate this thing to here, this thing to here. We always do that. So is still the traditional local wisdom we can see it. I think like that. I heard that there is the project for history city something like that but I don't know exactly the detail of the project but there is planning about that."</p>	<p>Zulfisni Meutia, 2016,p.11/§463-470</p>	<p>In the building code people get encouraged to implement traditional architecture elements as, for example, decorations. So, there is still the traditional local wisdom to see. There is even a project for a historic city.</p>	

<p>"I think it [traditional building methods or structures] brings a new paradigm of how the students, at least, have an idea of different design from the modern design that really brings, give a useful... Yeah, it's useful for applying this kind of design revitalize, I would say, revitalize the traditional design to the modern, the modern time, because what I understood, at least, in civil engineering in the past we didn't really care about different design, aside from the standard that we apply, the modern standard that we apply now like concrete building and things like that reinforced by the metal frame. There should be another way to build a house that could withstand the hazards. So, in a way that's forcing students to see a different perspective of design."</p>	<p>Meilianda, 2016,p.6/§249-256</p>	<p>Revitalising the traditional design to the modern design is useful and opens a new paradigm for students. In civil engineering in the past, the modern standard, concrete buildings reinforced by metal frames, were the only design looked at. There should be other ways to build a house that can withstand hazards.</p>	
<p>"I think it is important for the architect students and also civil engineering student to be able to incorporate this kind of hazard parameters in their design, because otherwise, then you just simply have a normal, a regular modern design without being living here in the disaster area, they should incorporate this parameters I think."</p>	<p>Meilianda, 2016,p.6/§260-263</p>		
<p>"Because the material, because we have traditional house with wood materials that probably would against the natural conservation itself. So, in a way that it would trigger some alternatives to replace this kind of materials but they have the same quality of withstanding the earthquake or things like that that would lead to the building code."</p>	<p>Meilianda, 2016,p.7/§277-281</p>		
<p>"[...]we have actually the building code standard already established, but I don't know whether it was... I'm not really sure, but there was one. But I don't know whether it was already established before the tsunami or during the reconstruction. But it was all with the concrete and metal reinforcement."</p>	<p>Meilianda, 2016,p.7/§286-289</p>		
<p>"The traditional house was built with using wood material. It's completely wood, right? But people don't do that anymore as wood is more expensive than concrete so they don't really - they don't adapt, they don't do anything because of the prices and so on. People are more into the modern one. So, if you want to take the concept of the traditional house then you have to build a house using the wood. It can't be implemented with the concrete and so on."</p>	<p>Mardalena, 2016,p.9/§369-373</p>	<p>The traditional Acehnese house was built from wood. Wood is now too expensive, so people use concrete instead. "...if you want to take the concept of the traditional house then you have to build a house using the wood" it cannot be implemented with concrete.</p>	
<p>"But my critique is always, the teaching of the traditional architecture is more archaeological and anthropological than technical. Of course, to some extent it's understandable because I would say because of two things. First the lack of research on the more technical aspects of traditional architecture that can be used now. It's always more on the symbolic ideas behind traditional architecture. Because at least until ten years ago I think traditional architecture, the study of traditional architecture is more about the grand architecture, like the Nias architecture, like the Doradja architecture. That's why when I did my study on traditional architecture I studies very vernacular architecture. And I think for me it's more relevant rather than very grand architecture like the Javanese grand architecture."</p>	<p>Kusumawijaya, 2016,p.11/§456-464</p>	<p>"The teaching of traditional architecture is more archaeological and anthropological than technical." There is a lack of research on the more technical aspects of traditional architecture that could be used now. "It's always more on the symbolic ideas behind traditional architecture." The researched is used to focus on grand architecture while vernacular architecture is more relevant.</p>	
<p>"Ya, I think we need to do a lot of transformation of traditional architecture into contemporary architecture but we need to study the vernacular rather than the grand architecture."</p>	<p>Kusumawijaya, 2016,p.11/§369-371</p>		
<p>"So, it's simple houses, not a grand Doradja. It's impossible to build a Doradja house or a Nias house but it's very possible to learn from the simple houses. You don't need to kill some buffalos or pigs to build it."</p>	<p>Kusumawijaya, 2016,p.11/§477-479</p>		
<p>"Acehnese traditional architecture is also very - they have very obvious useful technologies that are often overlooked by people. But I think they learn it the wrong way. That's a problem. That's a challenge for our architectural education. I have been criticising them a lot but I don't think - I don't</p>	<p>Kusumawijaya, 2016,p.12/§496-502</p>		

know why this happen in universities. Aceh I wrote something about Acehnese architecture. The Acehnese house they have this right, that's supposed to be for the wind. And you might want to ask the question "why is the wind not channelled like this?" but like that. To slow it down. It slows the wind a little bit. So, when it enters it will be slower here."			
"Ya. Because it's shady here. Because if this is the west, it's always west wind, right? And of course, the Acehnese, the silly thing is "a this is towards the Mekka" which for me is silly. Acehnese have built houses before they are Muslims. So, this is the wind, of course it's in west because of the wind. And then that's Sumatra, if you have your houses here along the coast of course it's west. In Java, it would be north south, according to the coast. It's not about Mekka. And then if you have the section from this side, the roof is probably like that. This is very low. If you stand inside this point is somewhere here, so you can see the beams. But the point is then the sun does not touch directly the wall so it is cool. And if you sit here, if you sit on the floor, your head will be right at the opening of the window. So, it's very comfortable to sit there. And you look down, you don't look up. If you look up it's very bright. So, you look down. So, a lot of logic here. And then the post stands on the stone loosely so when earthquake came they will just move very easily. And you know the roof here? They are tighed. And they can just open one and everything falls down. That's for fire. Traditionally here there would be banana trees, why banana trees because banana trees are full of water. They don't burn. So, if the house catches fire you cut it down and the banana trees are full of water so it would put down the fire. They have built like this for many hundred years, right? Nobody told you about this in Aceh?"	Kusumawijaya, 2016,p.12/§506-521		
"See, that's the problem. I always also found that only me who can tell this story. That is very strange. I mean the Acehnese, the architect - is Asrul an architect?"	Kusumawijaya, 2016,p.12/§525f		
"The main thing is to ask them "what do you mean by 'not comfortable' and 'not affordable'". Do they know this? Why do you have to replace it with air-conditioning?"	Kusumawijaya, 2016,p.13/§538f		
"You walk upstairs anyway in the second story of houses or third story of houses."	Kusumawijaya, 2016,p.13/§531		

B4.E: Performance of traditional buildings in natural hazards

Quote	Source	Synopsis	MA
"[...]actually it's way way better to have that kind of traditional way, cause in Aceh also, most Acehnese house, it survive from the earthquake, but they ruined by the tsunami, cause the water, right? But from the earthquake they survive. And in a Simeulue way, we also build many houses in a Simeulue. They reject to build the brick house, because they said, "if you cannot build from the wood, don't build". Cause they really believe that wood from the traditional house, it save their life. Because most Acehnese house there, they survived. Brick house is ruined."	Hasan, 2016,p.10/417-422	Most traditional houses in Aceh and Simeulue survived the earthquake in 2004.	
"They didn't want a brick house they still asked for a traditional house. Because most of the traditional houses survived. The brick houses were ruined, destroyed. But we still build with the bricks. Because you cannot buy wood."	Hasan, 2016,p.9/§427-429		
"I mean that time two type of building is quite famous for being survive, one is the traditional house and one is the mosque. I don't know if you heard about that. That two things keeping repeating among architects, how to learn from that."	Adamy, 2016,p.15/§644-647	A mosque and a traditional house survived the tsunami in 2004 and architects were discussing how to learn from it.	
"Most of the traditional houses, we survived from the earthquake and flood because we use what we call it 'lift-up construction'. And then to protect them from the wild life.	Irwansyah, 2016,p.6/§257-262	Most of the traditional houses survived earthquakes and floods since they are built on stilts. This	

Don't imagine Aceh, before like today. If you go to the village. to the remote area, there's still traditional Acehese housing. So, they can graze cows underneath their house, and chicken, for example. But one thing, during the flood it will survive in the flood, because it's about two meters high."		also functions as a protection from wildlife.	
"We [ADB] looked at traditional building too and we looked at the resistance too. Because we want the people really fear they feel safe. If the earthquake done they feel safe and they still have their house."	Meutia, 2016,p.2/§63-65	To develop their building and construction guidelines, the ADB looked at traditional buildings concerning earthquake resistance.	
"But if you go to Aceh Besar it's still there. There is a lot of traditional building there. So, if there a earthquake is very save to live inside, it's ok. It just move, let's say ten centimetres, it's ok it's no problem. But here in the city with the concrete building is – even after tsunami there is an idea there to make a steel the main structure of the building but again still it's not a good promise. If they use a bad labour and they didn't follow the procedure, the guideline they also have a problem to crack also."	Bahagia, 2016,p.7/§299-304	Traditional buildings are earthquake resistant.	
"About this, of course the awareness of disaster risk reduction should be there. If we build a new building a new house you should be aware of the risk of earthquake. I think it resonance to some people in awareness but it might not be as much as we want. Well, it is for me. I mean I am trying to go back and try to get a traditional Acehese house instead of building a concrete building. But even for my mother she would say until now why would you build a traditional house everybody build modern house. I told her because the traditional Acehese house is earthquake proof, flood proof, and other thing and I would like to have one. I think you can see around including in the city of Banda Aceh that some people like to live by traditional houses. Made of wood, tilted and if there is an earthquake you can just wait in your house."	Mahdi, 2016,p.4/§166-174	Traditional Acehese houses are earthquake proof and flood proof. But they are hardly built anymore.	
"Well I don't know about the scientific assessments but definitely quality is [?] because it's connected by certain ways, it's not going to break by the swinging of the earthquake for example, and it's also a fact to most if not all the traditional houses in the area that affected by the tsunami – I mean this picture that I remember this traditional house because of the massive wave it's been tipped but I would imagine it survived the earthquake that caused the tsunami."	Mahdi, 2016,p.7/§292-296	During the earthquake that caused the tsunami, and also during the tsunami, the traditional houses performed well.	
"Tipped over but still in the structure completely."	Mahdi, 2016,p.7/§302		
"And the knowledge about how good they perform with the natural hazards here is this from assessments or would you say you know it from your mother or someone?"	Interviewer, 2016,p.7/§284f		
"From experience, from knowledge from people talking about that, from the pictures and the facts that we learned during the tsunami, when the tsunami happened."	Mahdi, 2016,p.7/287f		
"There are so many house that where safe during the tsunami and earthquake. On stilts many many building, exceptionally in the area of pantai, beach. Maybe about two kilometre from the beach almost no rest building there. Just one or two but not in good situation. Some of the part of the building is destroyed. Still there but seriously destroyed."	Mardhatillah, 2016,p.11/§470-474	Some stilt houses about two kilometres from the coast survived the earthquake and the tsunami. However they were very damaged and required repair.	
"Traditional construction, Acehese house have the good prevent from the earthquake disaster. Why? [Indonesian] Because from the wood, one, second the joint from the wood is not rigid, we have the good flexibility. And when the earthquake happen you can dance in house, the houses dance because of flexibility."	Indra, 2016,p.8/§325-328	The traditional Acehese house is earthquake resistant. It is made from wood and has flexible joints. Therefore, the house moves with the land.	
"So, this is the tsunami, only one house still stands. The house with the second floor, on stilts. It's the head of the village's office."	Permakope, 2016,p.9/§393f	In Lambung village, only one house was still standing after the tsunami. This was a house on stilts with a second floor.	

<p>"Banda Aceh from a long time ago we already familiar with earthquake. So, in my experience, if we compare the structure of the building in Banda Aceh or in Aceh we can say it's better than the other place. Why I said that - because when we have tsunami, before tsunami we have an earthquake, it's the big earthquake. But at that time, it's only one or two building collapsed. So, the other house is destroyed because of the tsunami not because of the earthquake."</p>	<p>Zulfisni Meutia, 2016,p.4/§137-141</p>	<p>Banda Aceh is familiar with earthquakes. Therefore, the houses in Aceh have a good structure compared to other places. In the earthquake that triggered the tsunami only two houses collapsed. All the other houses were destroyed in the tsunami.</p>	
<p>"But when we had the earthquake in Yogyakarta, the scale Richter is below Banda Aceh earthquake but there were so many buildings, so many house collapsed because I think they are not familiar. The place, the region is not attacked by earthquakes regularly. But in Aceh I see that we build a stronger structure of building and house. Because after tsunami I then have time to go around after earthquake before tsunami, it's about half an hour at that time. And in Banda Aceh I only just saw one building collapsed and I heard, I didn't see the other, just two house collapsed."</p>	<p>Zulfisni Meutia, 2016,p.4/§141-147</p>		
<p>"So, I think it's - and from the story from my mother, my grandfather, we already build strong house because we are familiar with the earthquake. So, I think the structure is already good, we just follow the old how we build the house or the building, I think like that. But after tsunami we have to think about - because you know, I read about the plate, Banda Aceh or Aceh plate always move and then we will have many earthquake happen. So, we have to think about build better structure because from after tsunami in 2004 the plate is already always move so we have to watch out about the earthquake."</p>	<p>Zulfisni Meutia, 2016,p.4/§149-155</p>		
<p>"Aceh traditional house is built regarding to the experience with the natural disaster just like flood, earthquake. So, it's because we construct from the wood and simple materials so it could be appropriate to adapt with the earthquake and flood. And maybe from tsunami in the low tide it could be. They have local wisdoms to reconstruct regarding to how they try to survive. So, the traditional house is constructed regarding to adapt with the worst impact of the disaster as possible earthquake and flood."</p>	<p>Haiqual, 2016,p.10/§413-418</p>	<p>The traditional Acehnese house was designed to withstand the most common natural hazards which are flood and earthquakes.</p>	
<p>"Sometimes the brick houses were destroyed because of the earthquake. The wooden houses who are actually poor didn't destroy because of it's wooden."</p>	<p>Sabandar, 2016,p.3/§94-96</p>	<p>While the brick houses got destroyed in the earthquake in Nias, the wooden houses of the poor survived.</p>	

Appendix C - Observations

C1 Banda Aceh

Category 1) Reconstructed villages after the tsunami 2004



Figure 66a-b. Lambung village, Banda Aceh. Source: Lucas, 2016.



Figure 67a-d. Lambuuk village, Turkish village, Banda Aceh. Source: Lucas, 2016.





Figure 68a-h. Gampung Pande, Banda Aceh. Source: Lucas, 2016.





Figure 69a-f. Syiah Kuala village, Banda Aceh, knock-down houses with asbestos sheets. Source: Lucas, 2016.



Figure 70a-d. Ulee Lheue village, Banda Aceh, UPLINK stilt houses. Source: Lucas, 2016.

Category II) Rumah Aceh, traditional Acehnese houses



Figure 71a-f. Rumah Aceh, traditional Acehnese houses. Source: Lucas, 2016.

Category III) Disaster risk mitigation - Tsunami preparedness



Figure 72a-f. Escape buildings Banda Aceh. Source: Lucas, 2016.



Figure 73a-d. Tsunami signage Banda Aceh. Source: Lucas, 2016.





Figure 74a-d. Resettlement, Chackie Chan village
Aceh. Source: Lucas, 2016.





Figure 75a-h. Aceh coast, mangrove replanting.
Source: Lucas, 2016.

Category IV) Traces of devastation - Tsunami 2004 memorial sites



Figure 76a-b. Stranded ship in Lampulo village, Banda Aceh. Source: Lucas, 2016.



Figure 77a-b. Tsunami museum Banda Aceh. Source: Lucas, 2016.



Figure 78a-b. Mass grave Ulee Lheue. Source: Lucas, 2016.



Figure 79a-c. PLTD Apung 1, an electricity-generating vessel weighing 2600 tonnes, carried about 3 km inland by the tsunami 2004, Banda Aceh. Source: Lucas, 2016.

C2 Nias

Category I) Reconstructed villages after the tsunami 2004



Figure 80a-d. Dahana Tabaloho, Nias. Source: Lucas, 2016.





Figure 81a-d. Sondregeasi houses and school, Nias.
Source: Lucas, 2016.



Figure 82a-d. Tumöri, Nias. Source: Lucas, 2016.



Figure 83a-b. Abandoned houses. Source: Lucas, 2016.

Category II) Rumah Nias, traditional Nias houses



Figure 84a-b. Bowögasali, Nias. Source: Lucas, 2016.





Figure 85a-f. Bawomataluo, king's village, Nias.
Source: Lucas, 2016.



Figure 86a-b. Hiliamaetaniha, Nias. Source: Lucas, 2016.



Figure 87a-h. Tumöri, Nias. Source: Lucas, 2016.

Cover: House in Banda Aceh
Picture by Sabrina Lucas

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