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Master`s Thesis

**Evaluating SDG Indicators 6.1.1 and 6.2.1 taking into
Consideration the Importance of
Gender Equality**

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Abstract

Indicators are essential to measure progress and to provide information on the existing situation. This is important to guide policy and decision-makers. The present thesis examines the selected indicators to monitor the Sustainable Development Goal (SDG) targets 6.1 and 6.2 of the 2030 Agenda adopted at the United Nations in 2015. It gives an overview of the most important theoretical concepts of indicator development. To evaluate the indicators, further research was done on the interrelation of gender and Water Sanitation and Hygiene (WASH), and the concrete challenges women and girls must face. This includes an overall look at the human right principle of equality and the requirements for the human right to water and sanitation.

A Joint Monitoring Programme (JMP) comprising World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) is recently responsible for monitoring SDGs 6.1 and 6.2. The programme developed so-called service ladders for monitoring the achievements of the targets. This work continued with the idea of these service ladders and advanced those through the inclusion of all elements of the human right criteria to water and sanitation. Thereby the indicator covers a broader range of aspects stated by the target. Including the target statement, to pay special attention to the needs of women and girls. Still, not all issues women and girls face in regard to WASH could be addressed by the advanced service ladder, but a higher coverage is achieved.

Furthermore, the application of these service ladders is part of this work. This was possible in the course of a case study in Peru. In order to close existing data gaps and to support the application of the advanced service ladders, a Transect Walk has been conducted in San Andrés de Tupicocha/ Huarochirí. The Transect Walk proved to be a valuable instrument in collecting treasured information which goes beyond survey data from national censuses. Nevertheless, the possibility to gather data with a Transect Walk is limited, and uncertainty of the validation of the data remains. The use of the indicators in San Andrés de Tupicocha has shown that it is possible with simple means to monitor other aspects of the target, in the awareness of the urgency to leave no one behind to achieve equality and sustainability.

In addition to the Transect Walk, the case study included interviews of different institutions like research institutions, public entities, and NGOs. These interviews were conducted in Lima. The interviews showed that the motto of the 2030 Agenda "to leave no one behind" and the problem of inequality expressed in this way, especially for marginal groups, is well known. However, the focus remains on access to water and sanitation and safe water quality.

Keywords: Indicator development; SDG 6.1; SDG 6.2; Gender equality in WASH, Human right to water, Transect Walk

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List of Abbreviations

GDP	Gross Domestic Product
GII	The Gender Inequality Index
GNI	Gross National Income
GWSI	Global Water Security Index
HDI	Human Development Index
HR	Human Rights
JMP	Joint Monitoring Programme
MDG	Millennium Development Goal
NGO	Non-Governmental Organization
OECD	Organization for Economic Co-operation and Development
PAHO	Pan American Health Organization
SDG	Sustainable Development Goal
SISAR	Rural Water Supply and Sanitation Information System
SL	Service ladder
UN	United Nations
UNHRC	United Nations Human Rights Council
UNICEF	United Nations International Children's Emergency Fund
WASSI	Water and Sanitation Sustainability Index
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WPM	Water Point Mapping

1 Introduction

1.1 Background to the Topic

"To leave no one behind" is the challenging and ambitious statement of the Agenda 2030. This powerful statement contains in its fundamentals the principle of equal conditions and prerequisites for all. The 2030 Agenda includes seventeen political objectives of the United Nations with the primary goal of combating poverty. These are the so-called Sustainable Development Goals (SDGs). Significant progress has been made throughout the transition from Millennium Development Goals (MDGs) to SDGs. In contrast to the MDGs the SDGs include a single goal on water which covers the whole water cycle from domestic use to treatment to the protection of water-related ecosystems. **SDG 6 'Ensure availability and sustainable management of water and sanitation for all'** also includes the call to guarantee sustainable water management for all.

The global focus on Water and Sanitation increases not least because of wide-ranging negative health and economic consequences culminating in life and existence threat. In 2010 the United Nations General Assembly and the Human Rights Council reaffirmed the explicit recognition of water and sanitation as human rights. Furthermore, the United Nations Special Rapporteur states that water and sanitation should be treated as two distinctive human rights with equal status to avoid downscaling the importance of sanitation, not at least because safe and hygienic sanitation will have an impact also on the sounding communities and environments. The human right principles of non-discrimination and equality, access to information, participation, and accountability are fundamental also in the context of water and sanitation. The legal content of the human rights to water and sanitation includes the dimensions of availability, accessibility, quality and safety, acceptability and affordability (UN-HABITAT 2014).

The right to water and sanitation contributes significantly to the fulfillment of other rights such as the right to life, the right to adequate housing and the right to the highest achievable standard of health. It particularly affects women and girls who suffer the most from inappropriate water and sanitation conditions. Obviously, there are differences, yet among most social groups, especially within socially marginalized groups particularly women and girls are the most affected and disadvantaged. This includes restrictions for women and girls considering health and safety issues, their dignity and economically disadvantage among other issues. As water often plays a key role in culture and traditions, there are currently some initiatives that seek to enforce Sustainable Development **Goal 5: 'Achieve gender equality and empower all women and girls'** in the water sector. A statement from Das, Hatzfeldt (2017) illustrates this: "Water is so intricately linked to social, economic, spiritual, and cultural systems that it almost becomes a theatre for the play of social and gender relations".

In order to meet all these ideas, goals and requirements, the progress, as well as the achievement of the goals, must be monitored. For this purpose, indicators are required.

There are high demands on indicators, and big challenges have to be bridged, especially with regard to data availability. Nevertheless, indicators are necessary to discern the progress made. Knowing the progress is critical to influence policy and decision making. Measuring and evaluating the progress are key elements for a successful implementation and further development of targets and indicators. In February 2016, the United Nations (UN) issued a set of indicators to evaluate and measure the progress of each target of the Sustainable Development Goals. The indicators were worked out by the Inter-Agency and Expert Groups which includes representatives from national statistical offices as well as from regional and international organizations and agencies (UN ECOSOC 2016). How adequately the indicators measure the monitored phenomena as well as the practical use, and implementation has to be seen. Hák et al. (2016) stress the need to operationalize the Sustainable Development Goals and targets and to evaluate the indicators relevance.

This work concentrates on the selected indicators for the Sustainable Development Target 6.1: 'By 2030, achieve universal and equitable access to safe and affordable drinking water for all' and Target 6.2: 'By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations' (UN 2015b) with the corresponding indicators for the targets, namely indicator 6.1.1: 'Proportion of population using safely managed drinking water services' and indicator 6.2.1: 'Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water' (UN 2017).

1.2 Approach of the Thesis

The first approach of this work is an intensive literature research on UN-reports and academic publications to summarize the ongoing discussion and highlight the main requirements and attributes an indicator should have. The literature review is intended to collect information on sustainability, indicators and recent practices in WASH monitoring. Furthermore, the link between gender and water as well as the human right to water and the principle of equality it will be assessed.

The respect and assertion of human rights is a precondition for sustainable development (UNAC 2013). The human right to water and sanitation and the human right principle of equality play a crucial role for the implementation of the Sustainable Development Goal 6. With the knowledge gained through the literature review a comparison of the relationship between target, indicator and the human right to water follows. Along with a subsequent assessment on shortcomings including the question to what extent gender equality is considered.

As already mentioned the intention is to develop suggestions and methods to apply indicators which monitor the human right to water and include gender aspects. Therefore, one used method are interviews of different stakeholders, including the state-owned water company SEDAPAL, the drinking water regulator SUNASS in Peru, Agua Fondo

a nongovernmental organization, a UN agency and Academic Institutes in Lima are part of this work. To have an inside view on the existing consciousness about SDG 6 actual efforts and aims in the water sector, the shortcomings of the indicators and on the relevance of gender equality in WASH. For the interviews comprise a questionnaire with mostly closed questions to the named topics.

Furthermore, for the qualitative collection of data in the form of a Transect Walk in San Andrés de Tupicocha (Tupicocha) a village in de Lurín valley in the Peruvian Andes is part of the case study. To contribute to the possible application of the indicator and to counteract the current problem of data availability. As the case study is developed within the scope of the TRUST Project (Drinking water supply in prospering water shortage regions sustainable, fair and ecologically sound - development of solutions and planning tools to achieve Sustainable Development Goals, Lima / Peru), a Transect Walk was the chosen method by the institute. Therefore, no other alternative methods will be discussed in this work. The method will be applied in cooperation with the ZIRIUS (Center of Interdisciplinary Risk and Innovation Studies) Institute of the University of Stuttgart. A Transect Walk is a method where participants document observations made during a walk along a pre-defined path. The collected data during the Transect Walk is intended to accomplish national census data.

The Final aim is to apply the indicators in Tupicocha. The Joint Monitoring Programme (JMP) is recently responsible for monitoring SDG targets 6.1 and 6.2, developed a so-called service ladders (SL) to reach the requirements of the indicators. This work demonstrates the application of these service ladders in Tupicocha. Integral part was the advancement of the existing service ladders and implementation of both as well as the comparison. The workflow of the thesis is schematically illustrated in Figure 1.

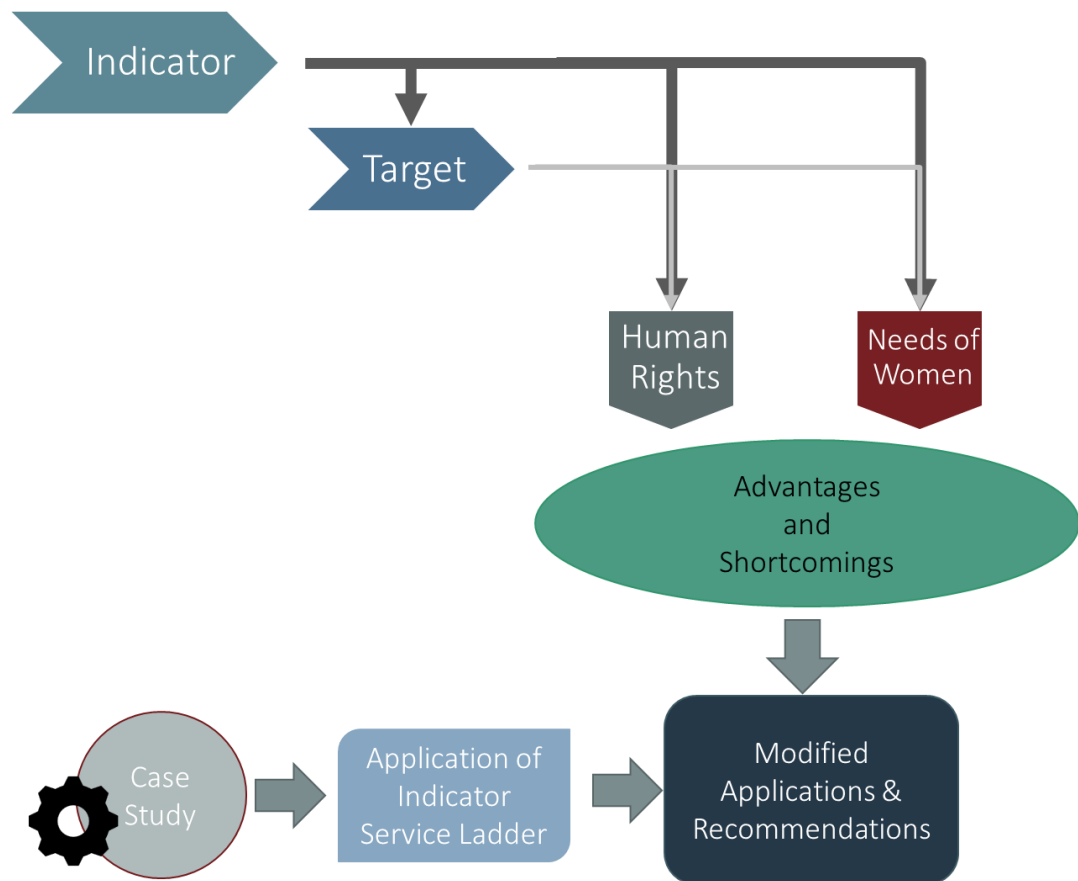


Figure 1: Overview - Approach of Master Thesis

1.3 Thesis Structure

The present work begins with the requirements for indicators. As the named indicators are intended to measure the SDGs and thus goals for sustainable development, the first part of this chapter includes topics on demands for sustainable development and sustainability indicators. Furthermore, it deals with the currently used indicators and recent practices in monitoring the water and sanitation sector. The second part focusses on the human right to water and sanitation and on efforts to achieve the targets of Sustainable Development Goal 5 in the water and sanitation sector. With the strong interlinkage to the human right principle of equality and non-discrimination focus is on the needs of women and girls along with the realization of gender equality in Water Sanitation and Hygiene (WASH). Which is a precondition to achieve the ambitious statement to leave no one behind, as women and girls are more affected by inappropriate water and sanitation conditions.

Chapter 3 aims to identify the extent to which the indicators meet the requirements contained in literature. Including the question how far human rights for water and sanitation have been taken into account and are addressed through goals and indicators. And to identify aspects where the indicator addresses issues women and girls face in WASH and to determine possible missing aspects.

Further on the intention of Chapter 4 is to develop suggestions and methods as well as to advance the existing indicators with the aim to reduce possible missing aspects. The focus, therefore, is on the human right to water and the needs of women and girls, in order to come closer to meet the claim to leave no one behind.

Chapter 5 of this thesis deals with the application of the developed methods in the course of a case study. To work out benefits and disadvantages, of the methods and the advanced indicators, in an applied context. The case study is developed within a subproject of the University of Stuttgart called TRUST *'Drinking water supply in prospering water shortage regions sustainable, fair and ecologically sound - development of solutions and planning tools to achieve Sustainable Development Goals'* in the catchment area of the river Lurín in Lima, Peru.

The last two chapters 6 and 7 conclude this thesis with a discussion about the results of the case study in the context of the theoretical framework and provide an outlook for the future.

2 State of the Art

2.1 Measuring Sustainable Development

Characterizing and measuring of sustainable development serves a variety of purposes such as decision making, advocacy, participation, research, and analysis. Each has its particular objectives which have to be defined and stated to improve the interchanges between salience, credibility, and legitimacy (Parris, Kates 2003). To move the concept from a theoretical level to a decision making level the problem of its measurability arises. It seems continuously objective within changing agendas and concerns. Hence methods are needed how to measure the achievements and progress of sustainable development (Ciegis et al. 2009).

The ideas of what should be developed are quite distinct. The early focus was more on economic development providing employment and wealth. Recently there is a shift towards human development including goals and values such as education, equity, and opportunity. However, the emphasis on the question of what is to be sustained, what is to be developed, and how to link environment and development has often differed (Kates et al. 2005; Parris, Kates 2003).

Principles for Sustainable Development

Ciegis et al. (2009) claim the following precepts, which should be taken into account when developing sustainability indicators:

- a) social justice
- b) local government, public participation, democracy
- c) sustainable balance between local and imported resources consumption
- d) use of local economic potential
- e) environmental protection
- f) protection of cultural ecologic and social heritage, protection, and regeneration of a new environment quality increase in functionality and attraction of areas and buildings maintained.

To cover all the desired aims to secure completeness, a framework and methodology is needed to identify the linkages between the indicators. The framework should not only define what to measure but also how to measure (Hák et al. 2016).

2.1.1 Determination of Sustainable Development

To understand the intention behind the Sustainable Development Goals and the previous Millennium Development Goals, it is necessary to have a closer look at the generally accepted definition of sustainable development. It arose during the World Commission on Environment and Development in 1982. It is described in the document referred to as 'Brundtland Report' as the following:

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:

- the concept of 'needs,' in particular the essential needs of the world's poor, to which overriding priority should be given;
- and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs” (UN 1987).

What stands out is the emphasis on human needs taking into consideration all areas necessary to meet those needs for now and in future. The aspect of time is challenging, as most attempts to define sustainable development are still not explicit about a time frame. Considering efforts for a short period or even for one generation can seem sustainable, but looking at the infinite, even the smallest growth extended infinitely cannot be sustainable (Parris, Kates 2003; Kates et al. 2005).

A standard model for sustainable development is the three-pillar model. The 2005 World Summit on Social Development identified the three pillars of sustainable development: environmental protection, social development, and economic development. The three-pillar model seeks to balance these areas.

Despite the vast acceptance and popularity of the three-pillar model, critics and suggestion from other definitions and models are quite common. The Earth Charter calls for a “shared vision of basic values to provide an ethical foundation” for sustainability (UNESCO 2000). Holden et al. (2016) argue that there has been ‘an ethical turn’ on defining sustainable development and suggest a model based on moral imperatives to guide policy-making. Satisfying human needs, ensuring social equity, and respecting environmental limits are the proposed key constraints in human behavior. Other voices claim a missing fourth pillar containing cultural-aesthetic, religious-spiritual, and political and institutional subjects. Human values are the main drive for the named missing aspects. All aspects have in common the concern how human values are lived in personal and professional life. Burford et al. (2013) refer in their work to a concept concerning “ethical values” for the development of sustainability and indicators. Ethical values are defined as “principles or standards of behavior” in line with the definition of the Oxford dictionary. Ethical values should be at the base of the three pillars, this concept is illustrated in Figure 2 and 3.

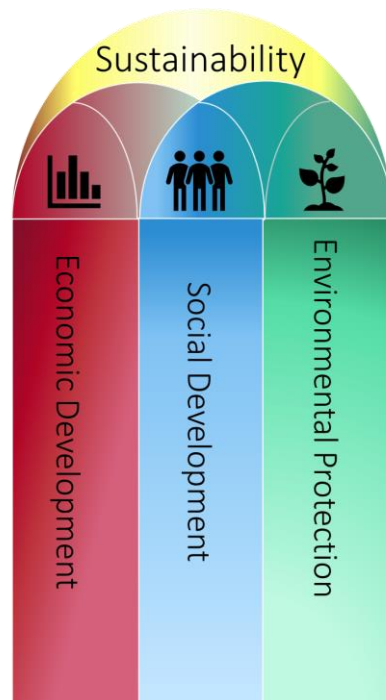


Figure 2: Three-Pillar Model

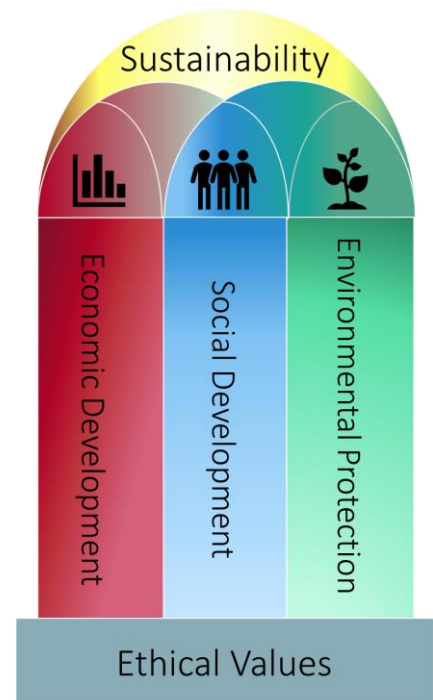


Figure 3: Modified Three-Pillar Model

Sustainable development is a term widely used but lacking a clear and constant definition. Going as far, that it is already called an oxymoron and it is claimed that a new term is needed for example a “Worth-living Development” (Kates et al. 2005; Koroneos, Rokos 2012). This emphasizes the recent shift from in the past neglected aspects of and towards human development. As various voices demand, the prior focus on economic growth cannot be any longer a key goal of sustainable development (Holden et al. 2016).

Further concerns regarding the impact of the economic growth agenda are the powerful vested interests by global superpowers. Which ignore, or are unable to develop an alternative paradigm of development which is rooted in ethics and human needs (Koroneos, Rokos 2012). These concerns demonstrate the need and the necessity, as well as the attempts to develop value-based goals, targets, and indicators to reach sustainable development.

A steadfast meaning remains exclusive to the statement that the term sustainable development is meaningless. Nevertheless, Kates et al. (2005) claim that "each definitional attempt is an important part of an ongoing dialogue [...] the concrete challenges of sustainable development are at least as heterogeneous and complex as the diversity of human societies and natural ecosystems around the world." At the end sustainability still depends on the behavior and actions and possibilities of every individual human being, the choices we make on lifestyle and consumption (Dahl 2012).

2.1.2 Sustainable Development Goals

The United Nations have defined a set of 17 global goals with 169 targets and 232 listed indicators in total. In September 2015 the final document was adopted at the UN

Sustainable Development Summit, officially known as '**Transforming our world: the 2030 Agenda for Sustainable Development**' (UN 2015b; UNESCO 2016).

The overall aim is to end all forms of poverty. Different to the MDG's, the SDG's now refer to all countries from low to high-income countries, to promote prosperity while protecting the environment. They are not legally binding, but each nation has the responsibility to establish frameworks, implement the goals, review, and report on the progress (UN - Millennium Summit n.d.).

A sharp critic against the SDG's is that they have ended up vague, weak and meaningless, because of the attempt to reach all that is good and desirable in society at once (Holden et al. 2016).

SDG 6

Sustainable Development Goal 6: **Ensure availability and sustainable management of water and sanitation for all** includes six targets which try to cover the entire water cycle. And two additional targets 6A and 6B on international cooperation, strengthening and participation of locals. For this work targets 6.1 and 6.2 which cover the WASH sector are relevant. Table 1 names all targets of SDG 6. Detailed definitions of the terms used to describe the target 6.1 and 6.2, can be found in Appendix A.

6.1	By 2030, achieve universal and equitable access to safe and affordable drinking water for all
6.2	By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
6.4	By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
6.5	By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
6.6	By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
6.A	By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
6.B	Support and strengthen the participation of local communities in improving water and sanitation management

Table 1: SDG 6 Targets; (Source: UN (2015b) - Transforming Our World)

History of Origins

The first United Nations conference on Human Environment held in 1972 pointed out the importance of international environmental law. This recognition of the relevance of environment was a first step towards an outcome which sets environmental protection equal to social development and economic development.

The history behind the SDG's goes back to 1982. The United Nations decided to establish the World Commission on Environment and Development which was headed by Gro Harlem Brundtland (UN 1987). The outcome document 'Our Common Future' published in 1987 is known owing to the included definition of sustainable development.

Ten years later in 1992, the "Earth Summit" a United Nations Conference on Environment and Development was held in Rio de Janeiro. The conference brought out an action plan, the "Agenda 21", a non-binding agreement between the United Nations. The Agenda 21 considered the necessity for sustainable development and recognized the need to formulate indicators to monitor and raise sustainable development (UN 1992).

With the transition to the 21st century, the Millennium Assembly of the United Nations adopted eight international development goals for the year 2015. At that time all 191 member states agreed and committed themselves to reach the goals in regards towards peace, poverty eradication, environmental protection, human rights, and protection of the vulnerable (UN - Millennium Summit n.d.).

Two years later the World Summit on Sustainable Development took place in Johannesburg. The primary outcome was the mission to sustainable development through targets and implementation programs. The Millennium Goals established in 2000, during the Millennium Summit of the United Nations, were included in the action plan (UN 2002).

2012 the United Nations Conference on Sustainable Development, also known as Earth Summit was held in Rio de Janeiro, amid to reconcile the economic and environmental goals of the community (UN 2012b). The Earth Summit was called as the main forerunner for the development of the SDGs in 2015, which replaced the MDGs.

Agenda 21 - Achieved Progress until 2015

The MDGs already comprised a goal relevant to the WASH sector. The MDG 7 'Ensure Environmental Sustainability' (UN 2015a). Looking back, the MDG 7c '**Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation**' seems like a great success. Specially halving the population without safe drinking water was already reached in 2010, five years ahead of the agenda. In 2015, 58% of the global population used piped drinking water on premises. Looking at the population with access to improved water sources, (which includes standpipes, boreholes, protected dug wells and springs, and rainwater collection), 96% of the urban population and 84% of the rural population have already access, leaving behind 663

million people still using unimproved water sources. This number will increase if the human right aspects of safe drinking water and sanitation are taken into consideration (UN 2015a).

In contrast to the successful MDG target on drinking water, the MDG target on sanitation is considered as the most lagging MDG. Open defecation is still practiced by 1.1 Billion people, and in total, 2.5 Billion people live without an improved sanitation facility (for example a flushed toilet connected to a piped sewer, septic tank or pit latrine) (UNW-DPC 2015).

In 2015, globally 147 countries met the drinking water goal, 95 met the sanitation goal and just 77 met both. The progress varies strongly between countries, and some nations have to face rapid growth in population, which makes it more difficult to reach the target, to halve the population without access to improved drinking water source and sanitation facility (UNW-DPC 2015).

The MDG target for water and sanitation called for improvements in urban and rural areas, but the reduction of inequalities is not directly specified. Progress is noticeable but unfortunately no significant decrease in reducing disparities. Compared to urban areas, eight out of ten people with no access to an improved drinking water source live in rural areas. Seven out of ten people with an unimproved sanitation facility live in rural areas (UNICEF and WHO 2015).

The SDGs adopted lessons learned during the MDG period. Therefore SDG 6 calls explicit for universal and equitable access for all and addresses for the first-time hygiene, and names explicit: to pay attention to the needs of women and girls. This statement was not included in the MDGs. It also specifies that drinking water should be affordable and safe and sanitation facilities should be adequate. The following Table 2 summarizes the estimated numbers for the new categories for the year 2015 (UNICEF and WHO 2017).

Drinking Water		Sanitation		Hygiene	
Safely managed	71%	Safely managed	39%	Handwashing facilities with soap & water	
Living in rural areas	1/3	Living in rural areas	2/5	<i>No sufficient data for global estimates</i>	
Improved sources	1/3	Improved sources	1/3	Least developed countries	
- Located on premises	3/4	- Private facilities connected to a sewer with wastewater treatment	27%	Handwashing facilities with soap and water	27%
- Available when needed	8/10	- In situ deposition of excreta	13%	Lacking soap or water	26%
- Free from contamination	3/4	- Off-site treatment (septic tanks /latrines)	-		
Basic service	89%	Basic service	68%		
Improved source within 30 min. round trip to collect water					
No basic drinking water service	844 m	No basic sanitation service	2.3 bn	No handwash facility	47 %
Over 30 min. round trip to collect water	263 m	Shared improved facilities	600 m		
Surface water collection	159 m	Open defecation	892 m		
<i>Estimates were available for 96 countries (35% of the global population)</i>		<i>Estimates were available for 84 countries (48% of the global population)</i>		<i>Estimates were available for 70 countries (30% of the global population)</i>	

Table 2: 2015 Estimates on SDG 6.1 and 6.2 (Source: UNICEF and WHO 2017)

2.1.3 Summarized Findings

Sustainable development is a concept still moving and in discussion. The baseline of sustainable development is a development, which is able to meet the needs of the present and allows future generation to do also. The three-pillar model is a widely used model and pursues to balance the three pillars of sustainable development: Environmental protection, social development, and economic development. Past and present attempts emphasize the need of ethical values or a model based on moral imperatives as they are key constraints in human behavior.

The United Nations adopted eight international development goals (MDGs) with the transition to the 21st century, for the year 2015. The Goal 7c halving the proportion without sustainable access to safe drinking water and basic sanitation seemed to be reached, but most progress was made in urban areas leaving the rural population behind. Learned from the MDGs, the SDGs include the attempt to leave no one behind. Additionally, SDG 6 defines the condition for access to water and sanitation; universal, equitable, adequate, and for all. Taking into account the aforementioned aspects, the supposedly reached progress, under the MDGs falls far back.

2.2 Sustainability Indicators

„Only proper conceptualization and operationalization of the targets will transform them from vague and mostly theoretical concepts to tools, which are understandable regarding empirical observations measurable or describable by appropriate indicators. No matter how relevant, measurable or applicable, the development or selection of indicators does not necessarily contribute to designing the right concepts beyond the targets” (Hák et al. 2016).

This work will focus on the indicators chosen for the already established SDG targets. It is essential to recognize that indicator development depends to a certain degree on the success of target establishment.

2.2.1 Why Sustainability Indicators

Overall sustainability indicators are developed to help political decision making for seeking sustainability. Sustainability indicators are used to measure the level at which the SDGs are implemented. For demonstrating trends and values of ecologic, economic and social development, definable and measurable parameters might be used (Ciegis et al. 2009). Ciegis et al. (2009) describe indicators as tools, which summarize enormous flows of information, which give feedback about success and failure, to reduce complex information and simplify assessment. For example, the Gross Domestic Product (GDP) is one popular indicator. Still, policy-making is influenced by many other factors. An indicator can make a problem visible (Dahl 2012) and far beyond the instrumental use indicators can also have symbolic use in demonstrating what is perceived as valuable and necessary and may lead to the creation of new political norms (Burford et al. 2013). To be mentioned that there are no universally accepted or perfect indicators.

2.2.2 Indicator Characteristics

Principal determinants for indicator criteria are **credibility, legitimacy, and relevance**. These attributes reflect the effectiveness of science and policy (Heink et al. 2015; Ciegis et al. 2009; Parris, Kates 2003). To give thought to the effectiveness of the interface between science and policy those criteria are helpful, but the different science-policy interfaces give the attributes of credibility, relevance, and legitimacy different meanings, which may lead to contractionary findings of the fulfillment of these requirements. In evaluating those interfaces, a definition for the particular context is needed (Heink et al. 2015).

Credibility is defined by Parris, Kates (2003) by the scientific and technical adequacy of the measurement system, Hák et al. (2016) emphasize that credibility is ensured by well-structured frameworks and methodologies or as Burford et al. (2013) state the quality or power of inspiring belief.

Legitimacy refers to the fair and respectful assessment of different or even opposing views, values and beliefs and to the conformity to recognized principles or accepted rules and standards (Hák et al. 2007; Heink et al. 2015).

Relevance often also called **salience**, refers to the relevance of the indicator for decision-makers (Parris, Kates 2003). Relevance is mostly looked for at policy level, the degree the indicator has a relation to the existing circumstances.

A big discussion about the criterion “relevance,” and a lot of weight to ensure the indicator’s relevance is found in literature. However, the concept of relevance comprises different aspects, and consequently, it is difficult to define. The concept describes how applicable an indicator is. For national monitoring, an indicator should apply to national policies, and regarding global monitoring, an indicator should be applicable for all countries. Another aspect is that an indicator should be connected and clearly linked to the target. The indicator should answer pertinent questions and is therefore relevant to policy formulation and should provide enough information for policy-making. Furthermore, literature defines two questions. First, the relevance of the theme of an indicator should be ensured by the policy framework. The indicator should be useful for policy-making and meaningful to a broad audience. Second the relevance of the indicator itself for the theme (indicator relevance). This should be warranted by the conceptual framework; for this, a so-called clear “indicator-indicated fact” is needed. (Hák et al. 2012; Hák et al. 2016).

Methodological Requirements

Relevance

As already emphasized, indicators should be relevant and therefore capture the essence of the problem and should have a clear and accepted normative interpretation (Hák et al. 2012). Indicators should point out the progress towards the goal, to not underperform with respect to one goal. The indicator should not refer to more than one goal (Holden et al. 2016). They should be context-relevant and consider local needs, priorities, and values (Burford et al. 2013). To point out is the policy relevance and utility for users. The most efficient indicators are integrated or strongly linked to a national strategy or concept of sustainability (Dahl 2012).

Analytical Soundness and Measurability

The indicators should be robust and statistically validated, logical, practical, reliable, based on accessible data, and be measurable in a sufficiently comparable way across the member states. The indicators should as well be comparable with the standards applied internationally by the UN and the OECD (Organisation for Economic Co-operation and Development) (Hák et al. 2012).

Headline Indicators or Key Indicators

To be informative, easy to understand, and compute as well as manageable in size and summarizing. Holden et al. (2016) suppose headline indicators which are easy to understand also for a non-expert audience. They emphasize that for thresholds an explicit maximum or minimum is needed. A relative change for example just a positive rate of change is not satisfactory.

Multidimensional Indicators

Ciegis et al. (2009) address the need for multidimensional indicators, which report not just separate parts of the system rather than also addressing the relationships between different components of the system. They emphasized that one aggregated indicator is not enough, even such indicators are quite popular.

Therefore, quantitative as well as qualitative indicators are needed. Whereby quantitative indicators express numbers and ratios, they can be seen as corresponding to statistics and capture for example enrolment rates of schoolchildren, or proportion of seats in a parliament held by women. Qualitative indicators are seen as a narrative or categorical form. This can be checklists or questions to complement or elaborate information. Here the use of the indicator goes beyond statistics and is qualitative in nature. Quantitative and qualitative indicators should not be seen as opposed approaches, rather than helpful to complement each other (OHCHR 2012).

Although the criteria are well defined regarding theory, but the practical use and the implementation is still a challenge. Methodological compromise among technical feasibility, public availability to use, and systemic consistency are generally involved (Hák et al. 2007).

2.2.3 Ethical Value Based Indicators

"We acknowledge the importance of ethics for sustainable development and, therefore, emphasize the need to consider ethics in the implementation of Agenda 21" (UN 2002). A statement of the World Summit on Sustainable Development in Johannesburg in 2002. As discussed in chapter 2.1, ethics such as cultural-aesthetic, religious-spiritual, and political and institutional subjects have the concern with human values in common.

Values are the base of standards, the behaviors of individuals or societies are judged against. They are an expression of beliefs, invoke feelings, and frame our attitudes. Values define and direct us towards our goals. In the end, underlying values represent and support sustainable development (Kates et al. 2005). Despite many critics that values can be negotiated, transitory, and contradictory, still value-based indicators matter. An important aspect is the potential to contribute to a policy, which does not put their primary focus to enhance GDP about all other concerns. This potential can lead to a creation of new political norms that tend to prioritize values such as equity, tolerance, justice, and respect for nature (Burford et al. 2013). McCool, Stankey (2004) point out that the recent development of new indicators is "guided more by what can be measured

(a technical issue) than by what should be measured (a normative issue)". Adding to this, concerns about data availability leading to less effort in investigating, if something might be measurable at all (Burford et al. 2013).

However, the fact that indicators are in harmony with the values of the target audience is crucial for efficient indicators. The predominance of economic indicators in today's society demonstrates materialistic and self-centered values of a capitalistic culture. To strengthen for environmental and social sustainability, it is essential to consider values. People are as much motivated by emotions and personal values as they are by information. Therefore, sustainability is also called an "ethical challenge" to move society towards sustainability values such as justice, solidarity, moderation and respect for environmental limits. This aims not just at people's values but also to institutions of society (Dahl 2012).

The challenges are widely spread. Considerations are that values are often implicit and inconsistent, as well as contractionary and they are taken as already set within a cultural context, so that people may be not aware of their values and how they influence them. In this case, indicators can be an important tool to build awareness about own values (Dahl 2012). Burford et al. (2013) illustrate that values can be operationalized and conceptualized within a clearly defined context and refute the immeasurability argument of values: it's not possible to measure something which can neither be unambiguously conceptualized nor adequately operationalized.

First, it is stated by Burford et al. (2013), that it is difficult to define an objective definition of values enactment, and an objective definition is required to operationalize. The reason why no objective definition is possible is the influence of cultural contexts and individual life experiences. Nevertheless, an objective definition is not a requirement for a useful indicator. Relevant is the intersubjective definition in a specific and bounded context. Another relevant attribute is the acceptance by the individuals. Dialogic processes of devising appropriate data collection, analysis strategies, and establishing benchmarks can be necessary to measure ethical and spiritual values in a useful and valid way (Burford et al. 2013).

2.2.4 Current Situation and Necessary Development

The enormous efforts of multiple initiatives, to define indicators on global, national and local levels, cause "indicator explosions". Dahl (2012) claim that at present we are still far to have adequate indicators to measure sustainability. In addition, the desired impact to reverse environmental destruction is missing. Present indicators are measurements of economic, social or environmental unsustainability and measure the trends in those areas, like pollution levels or poverty, but miss to address decision making to reveal if sustainability is realized.

Furthermore, Dahl (2012) addresses four areas where indicator development is needed. First, he calls for indicators, which can measure the change in dynamic systems, emphasizing to capture also the dynamic between environmental, social, and economic

processes. He argues that interventions will be more effective if aimed at the process rather than the result. Second, global level indicators to measure planetary sustainability are needed, especially under the consideration of the rapid growth in human population and its impact. Third, indicators are necessary which reflect the individual progress, to manage our behavior and to give feedback on even small efforts achieving personal goals and motivate for further actions. Fourth, value-based indicators to measure the implementation of ethical principles are required to guide towards sustainability. He stresses the needed development of the "three-pillar model" to include the institutional and cultural or ethical dimension.

As already mentioned, perfect indicators are uncommon, and compromises are usually involved. No indicator set is universally accepted, influential in policy and at the same time backed by thorough data collection and analysis. Indicator sets should face the problem of data availability and meet all theoretical necessities. Furthermore, they should be understandable to experts and non-experts. This is because of the various definitions of sustainable development, the pluralities of purpose, and intentions of different stakeholders as well as the confusion of terminology, data, and methods of measurement (Parris, Kates 2003).

Measurement seems a quite problematic topic. The overall approach appears to look for data availability using current methods and thereby defining indicators under the aspect of what could be measured instead of asking what should be measured. Burford et al. (2013) state if something is not currently measured there may be less interest whether it might be measurable, no matter how important it is for the public. The reason for this could be that almost all indicators are derived from existing data sources (Parris, Kates 2003).

The concept of sustainable development has created an environment for advocacy groups with a particular political appeal to produce indicators, which would advance their political agendas. This is leading to big debates among advocacy groups regarding indicator efforts. The critique on the implicit economic growth agenda and the powerful interests of the corporate sector is strong. The economic growth agenda has outlined an alternative paradigm of development rooted in ethics and human wellbeing. National governments and companies organized and recognized under national legislation determine the structure, framework, and rules of national economies. The dominance of national economics is one reason for the missing set of multilevel sustainable indicator systems which capture key factors such as individual behavior and respect for environmental limits (Dahl 2012; Burford et al. 2013; Parris, Kates 2003).

2.2.5 Summarized Findings

Indicators are important and useful as they summarize enormous flows of information and help herewith political decision making. Furthermore, they can have a symbolical use in demonstrating what is perceived as valuable and necessary. The principal elements are credibility, legitimacy, and relevance. These attributes reflect the interface between science and policy. Indicators should fulfill a long list of requirements; therefore,

perfect indicators do not exist. Main requirements are the clear link to the target, applicability, useful for policy-making and still meaningful to a broad audience. Adding to this comes the need for value-based indicators. They matter to create policy-norms which prioritize values such as equity, tolerance, justice, and respect for nature. Burford et al. (2013) illustrate that values can be operationalized and conceptualized refuting the immeasurability argument. In general, measurement seems quite a problematic topic. The overall approach appears to look for data availability using current methods and thereby defining indicators under the aspect of what could be measured instead of asking what should be measured. One reason for the missing set of multilevel sustainable indicator systems which capture key factors, such as individual behavior and respect for environmental limits, may be the dominance of national economics.

2.3 Indicator Monitoring in WASH

The achievements of the Millennium Development Goals reveal that the proportion of people with access to water and sanitation was rated high. However, taking quality, quantity, reliability, and accessibility into account a different picture emerges. Concerns like this push towards service delivery indicators and going further than just counting what is and what is not (Adank et al. 2016). At present, there is still a coherent framework missing. Globally different initiatives exist, which monitor various aspects of the water sector (Giné-Garriga et al. 2017). In the following, a brief referencing to some actual proceedings is done.

Successful WASH Strategies under Sociological Perspective

The SDG 6 has an additional focus on sustainable outcomes and not just on technical access like the previous MDGs. Constant functionality of supply systems, acceptable levels of quality and quantity, and the social dimension of sustainability are now partly covered by SDG 6. The social dimension of sustainability includes the focus on people, motivation, and behavior, which is necessary for successful implementation and sustainable outcomes.

A study by Tyndale-Biscoe et al. (2013) describes that success rates reach 90% when functional technology is considered, but drop down to 8% when behavior change metrics like hand washing, are included.

A theory by Maslow's (1943) on human motivation states that five basic needs are in common by all humans. Those comprise physiological needs, safety, love and belonging, self-esteem, and self-actualization. A first approach to use Maslow's theory in the WASH sector is made by Marshall, Kaminsky (2016). The theory is already applied in industries such as nursing, business and technology and provides a framework how rural water solutions align or do not align with people's motivations. The research was conducted by interviewing decision-makers and practitioners in the WASH sector. The result showed four main characteristics of successful strategies. They did not focus on physiological motivations (for example to avoid arsenic in drinking water). Instead, concentrate on

motives such as self-esteem, love and belonging, safety, and self-actualization. Their focus was on multiple motivations and addressed motivations of all stakeholders. According to this, unsuccessful strategies concentrated extensively on outside actualization and failed in addressing motivations such as self-esteem, love and belonging, safety and self-actualization (Marshall, Kaminsky 2016).

2.3.1 Organization and WASH Monitoring by the UN

Coming from top to bottom, on a broader level the UN Development Group provides support, how to implement SDGs into national strategies including monitoring and reporting, for UN Country Teams. It is the responsibility of each country to provide national reporting on SDGs. Therefore, they are responsible for up-to-date data sets including the collection of data, managing, and analyzing. Monitoring frameworks and appropriate indicators are needed. This is challenging concerning costs and efforts (Borden et al. 2017). But especially in the water sector, where large investments are typical, and the monitoring costs are marginal, monitoring will have a substantial impact on finding best practices and productive integration and thus allow efficient use of financial resources (UN-Water 2016).

A Joint Monitoring Programme (JMP) by World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) has carried out the international monitoring for water and sanitation since 1990. In 2000 the JMP received a formal mandate to monitor the MDG drinking water and sanitation target. Their focus is on access to improved sources of drinking water and improved sanitation facilities. The JMP provides representative and internationally comparable insight into water supply and sanitation, being of considerable use for stakeholders and policy. Nevertheless, many voices claim that the MDG estimates for the water targets are overestimated especially when aspects like quality and equity are considered. Addressing the key areas under the human right to water and sanitation the MDG period has fallen short in measuring those areas (Giné-Garriga et al. 2015). In the past used indicators to monitor access to "safe drinking water" are questioned. The main reason for this is the term "safe" and the lack of data available to monitor water quality (Bain et al. 2012).

The Inter-Agency and Expert Group on Sustainable Development Goal Indicators is responsible for the development and implementation of a framework for SDG monitoring. In 2016 the expert group published a list of global indicators for monitoring. Indicators for WASH were recommended by JMP. Starting in 2016, draft monitoring methodologies were tested in five countries (among others Peru was selected). A need for more comprehensive instructions, better-defined methodology, more clarity on process and frequency of reporting, as well as capacity building for decision-makers, was received as feedback (Borden et al. 2017).

The programme works with household surveys and national census data. The preference hereby is on the monitoring via raw household data. Often this data is unavailable, and surveys or census reports are therefore considered. Census data is usually generated in 10-year intervals and include fewer questions than household surveys also they do not

address many issues of drinking water or sanitation directly. The current data and limited resources make it difficult to address water safety issues. Improving data availability and to address water safety aspects as well as equity may need decades, since household surveys are time-consuming and expensive. This also places higher demands on national and international monitoring systems and data collection methods. The tension between the continued monitoring over decades and the need for new indicators with short intervals to match policy cycles is strong. Other critics are the differences between national estimates and JMP estimates. A reason for this might be the linear regression method used by JMP. Another problem is that informal settlements may not be considered or underrepresented in censuses (Bartram et al. 2014).

To address the new focus on a sustainable outcome of the SDG 6, JMP established new databases on inequalities and hygiene. Also, starting in 2015, WASH in schools and healthcare facilities is to be monitored. Therefore, JMP gathered an expert group to define indicators based on global norms and standards and works currently to compile national sources of data. In 2018, baseline estimates on WASH in schools and healthcare facilities will be published (UNICEF and WHO 2017). A reason for this is the high potential of disease transmission between students or patients and the urgent need to address privacy and dignity, predominantly for girls. The term universal access used for the target formulation requires access to safe drinking water and sanitation also in workplaces, schools, and healthcare facilities.

2.3.2 The JMP Service Ladder

The JMP service ladder defines different levels on the way to reach total fulfillment of the indicator, like the steps of a ladder. For the indicator 6.1.1: 'Proportion of population using safely managed drinking water services' a drinking water service ladder was developed. And for indicator 6.2.1: 'Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water' (UN 2017) service ladders for sanitation and hygiene were developed.

The ladder starts with the first rung, surface water or open defecation, to unimproved, to limited, to basic and finally the top of the ladder a safely managed drinking water source or sanitation service. The ladder gives the opportunity to measure progress and does not just show if the indicator is fulfilled or not.

In Table 3 below the JMP service ladders for drinking water, sanitation and hygiene are described.

Service Ladder Definitions	Drinking Water	Sanitation	Hygiene
Safely Managed	Drinking water from an improved water source which is located on premises, available when needed and free from fecal and priority chemical contamination	Use of improved facilities which are not shared with other households and where excreta are safely disposed in situ or transported and treated off-site	
Basic	Drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing	Use of improved facilities which are not shared with other households	Availability of a handwashing facility on premises with soap and water
Limited	Drinking water from an improved source for which collection time exceeds 30 minutes for a roundtrip including queuing	Use of improved facilities shared between two or more households	Availability of a handwashing facility on premises without soap and water
Unimproved	Drinking water from an unprotected dug well or unprotected spring	Use of pit latrines without a slab or platform, hanging latrines or bucket latrine	No handwashing facility on premises
Surface water / Open defecation	Drinking water directly from a river, dam, lake, pond, stream, canal or irrigation canal	Disposal of human feces in fields, forests, bushes, open bodies of water, beaches and other open spaces or with solid waste	

Table 3: JMP Service Ladders (Source: WHO 2017b)

JMP defines improved drinking water sources as "those that have the potential to deliver safe water by nature of their design and construction, and include: piped water, boreholes or tubewells, protected dug wells, protected springs, rainwater, and packaged or delivered water" and improved sanitation facilities as "those designed to hygienically separate excreta from human contact, and include: flush/pour flush to piped sewer system, septic tanks or pit latrines; ventilated improved pit latrines, composting toilets or pit latrines with slabs" (UNICEF and WHO 2017).

Service Ladder for Schools and Healthcare Facilities

The JMP established an own service ladder for schools and healthcare facilities. For schools, classifying an improved drinking water source with available water at survey time as basic and if not available at survey time as limited. Improved single-sex sanitation facilities are classified as basic, and improved facilities, but not single sex, are classified as limited. In terms of hygiene; the existence of a handwashing facility with water and soap is classified as basic and if soap is not available than it is classified as limited. The service ladder for healthcare facilities is similarly structured, containing more aspects regarding the situation in healthcare facilities. The aspects include, for example, suitability of sanitation facilities for people with limited mobility, separate toilets for staff

and patients and provision for menstrual hygiene needs. What is different is the inclusion of waste management (UNICEF and WHO 2017).

Accessibility, Availability, Quality

Accessibility, availability, and quality are elements that are directly addressed in the target for drinking water but are not included in the SL. The following three paragraphs show how JMP works to monitor these criteria and what are the main hindrances to overcome are.

To address accessibility JMP uses a travel time indicator, collected through household surveys. Included is the time to travel to the source, wait, fill the container and to travel back. To evaluate accessibility is of special importance for women. In most households, women are responsible for collecting water. Availability data with a focus on just the primary person in charge may not reflect the full extent of the time burden, and its gender dimensions. Critical is the one-sided focus on the main water source since many households use different sources of water. Reasons for this could be that at certain times of the year the main source may not work, or the service level varies, and it becomes a matter of confidence (WHO 2017a).

Looking at the criterion of availability, the best outcome would be a 24/7 drinking water supply. However, this is unlikely to reach for all countries in the short term. Therefore, households store water to overcome short passages of water scarcity. Because different questions are used in the surveys, the comparison between countries based on the available data becomes a challenge. Often the survey focuses only on households with piped water to identify interruptions of the service (WHO 2017a).

The quality criteria is important so that drinking water can be considered as safe. It has to be free of pathogens and other harmful substances. A common assessment is to measure E.coli level. Most countries have their own national standard, which corresponds in most instances with WHO guidelines. The water should be tested directly at the source and before use, for example at the glass of drinking water. There is a big data gap especially for non-piped water and rural areas. So that JMP is working with assumptions or will not estimate these areas (WHO 2017a).

Access was already evaluated during the MDG period. But evaluating the new aspect of availability in the SDG 6 is difficult, because of missing and incomplete data. As well to assess quality seems difficult, because of a lack of data especially for rural areas.

Critic on the Method

A main critic is that the JMP uses a linear regression method, whereby Fuller et al. (2016) claim the use of non-linear regression methods to have a more flexible method and to capture short-term changes in coverage and progress. They mention, the data may have a pattern of deceleration, this might be a result of more resource intensive investments or a mismanagement of resources and that in such a case, countries most probably will not benefit from further investments rather than by support to strengthen institutional

capacity. In order to use non-linear methods, the quality of the data as well as sufficient data and data points is important. They suggest, that non-linear methods could be used for data-rich countries.

Heterogeneity in the analysis of the trends across and within countries is expected to continue if there will be no shift towards non-linear patterns. Bain et al. (2012) state that "a country's trajectory is not conclusive evidence of previous failure or future success". But non-linearity will help to see if a country will benefit from financial investments or structural support (Bain et al. 2012).

For non-linear patterns the quantity of data is essential, and some countries still have insufficient data points. In case of a shift from linear methods towards non-linearity more data points will be needed (Fuller et al. 2016).

2.3.3 Further Approaches to Measure WASH

To ensure transparency and eliminate arbitrariness a degree of consensus is needed among policy-makers and other relevant actors on the methods used for assessment (Iribarnegaray et al. 2015). Schwemlein et al. (2016) propose six methodology stages for selecting indicators for WASH to answer the need for coordination, meaningful as well as credible WASH monitoring. With the intention to be a foundation of future efforts for indicator selection. The six methodology stages are: "define the purpose and scope; select a conceptual framework; search for candidate indicators; determine selection criteria; score indicators against criteria and select a final suite of indicators".

Iribarnegaray et al. (2015) propose a sustainability assessment called Water and Sanitation Sustainability Index (WASSI) to assist decisions-makers and improve sustainability and transparency. It is based on a five-dimensional sustainability concept by Seghezzeo (2009) the three dimensions of space, the dimension of time and the human dimension. To calculate the indicators, quantitative as well as qualitative values are assigned to different variables. He also points out and contradicts thereby other voices, that it "seems easier to assess the un-sustainability of a system" so-called limiting factors, to identify areas where improvement is needed. The index is not built on average. The results may be lower but may better reflect sustainability.

Monitoring structures at the local level are still weak, even though new technology enables an increase in volume and type of data available and creates new possibilities to inform decision-makers. A cheap and simple design for monitoring is required. A proposed methodology is a collection from two different data sources. One source water intakes in the following called water points and the other source household data, to produce representative local estimates. Water Point Mapping (WPM) enables to demonstrate who is and who is not served. The mapping does not refer to a fixed set of indicators. For WPM the location of improved water points is collected and then presented in a spatial context. In addition, also management and technical data are gathered. The link to demographic information allows the assessment, who is served with water and who is not served (Giné-Garriga et al. 2015). Water point mapping is

recently more and more adopted by Non-Governmental Organizations (NGOs) in Africa and combined with household surveys. Giné-Garriga et al. (2017) state that multidimensional monitoring systems are adequate to capture a complete picture and therefore are useful to monitor and inform about the SDG progress.

In Latin America, a different monitoring system is currently adopted by several NGOs the Rural Water Supply and Sanitation Information System (SISAR). Information is gathered by local service providers, municipal employees and at the community level. The system aims to monitor and assess rural water and sanitation services with updated information on functionality and status. According to Giné-Garriga et al. (2017), it is an adequate monitoring system. It addresses drinking water targets but leaves behind essential attributes, which are not addressed concerning the sanitation and hygiene indicators. They state, "the pledge that 'no one will be left behind' requires a specific focus on the poorest and most vulnerable people". Issues like equality and non-discrimination are just in a few monitoring systems integrated (Giné-Garriga et al. 2017).

2.3.4 Summarized Findings

A comprehensible framework to monitor WASH is still missing. Globally exist different efforts to monitor various aspects of the water cycle. Monitor structures at local level are weak, as most of the time cheap and simple monitor systems are required. It has been observed that different monitor systems have prevailed. With this, WPM is more and more adopted in Africa and SISAR is currently adopted in South America.

A study by Tyndale-Biscoe et al. (2013) describes that success rates of WASH strategies drop down to 8% when including behavior change metrics, like hand washing. Therefore, a focus on multiple motivations and to address motivations of all stakeholders is important.

For monitoring of the SDGs, the Joint JMP is responsible. To monitor the SDGs the JMP established new databases on inequalities and hygiene. Since 2015, WASH is to be monitored in schools and healthcare facilities. A reason for this is the high potential of disease transmission between students or patients and the urgent need to address privacy and dignity, predominantly for girls. The joint monitoring programme works with household surveys and national census data.

The service ladder is a worldwide established monitoring system of JMP. Therefore, this work will continue with the idea of the service ladder as it is the official monitoring method as a basis for further development and other alternative monitoring frameworks for WASH are not considered further on.

2.4 Sustainable Development Goals 5 & 6

Considering aspects like poverty, participation in decision making, and income, differences between women and men are still strong. Women are likely to be disadvantaged. The final report on the MDG's states "To achieve universal realization of

gender equality and empowerment of women, it is critical to address the key areas of gender inequality [...] Gender perspectives should be integrated fully into all goals of the post-2015 development agenda.” (UN 2015a).

SDG 5 addresses directly Gender Equality: ‘Achieve gender equality and empower all women and girls’. The targets 5.2: ‘**Eliminate all forms of violence** against all women and girls in public and private spheres, including trafficking and sexual and other types of exploitation’ and 5.4: ‘Recognize and value **unpaid care and domestic work** through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate’ can be directly linked to SDG 6 targets 6.1: ‘By 2030, achieve universal and equitable access to safe and affordable drinking water for all’ and 6.2: ‘By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations’. Furthermore, the target 5.5: ‘Ensure women’s full and effective **participation and equal opportunities for leadership at all levels of decision making** in political, economic and public life’ also plays a role in the Water and Sanitation Sector.

2.4.1 The Interrelation between Gender Equality and Water

A recent report by the World Bank Group ‘A rising Tide – A new look on Water and Gender’ states that “Water is so intricately linked with social, economic, spiritual, and cultural systems that it becomes almost a theatre for the play of social and gender relations.” (Das, Hatzfeldt 2017). Practices and rules often derive from norms, values and religious beliefs and rituals, which reinforce inequality. Therefore, a careful understanding of origins of behaviors and norms is crucial. There is a trend of recognizing social inclusion and the role of water in achieving it. Gender inequality in water is complex. It is important to remember that privilege always depends on the social and cultural context that means that not all men are privileged, or all women are disadvantaged. Nevertheless, women are more likely to suffer the negative consequences of inequality.

The water and gender relationship mirrors inequality in various realms, for example in community and household dynamics they often impede the ability and opportunity for those who may need the intervention the most. Therefore, it is crucial that interventions pay attention also to power dynamics and inequalities, to reach historically excluded groups. Overall the equalization of gender relations in water-related fields is influential in achieving gender equality overall (Das, Hatzfeldt 2017).

Because of the reason that WASH issues are often closely related to women’s traditional roles. WASH programmes give a good platform to improve not only women’s material needs around water, which will not necessarily lead to higher gender equality, but it also provides a platform to strengthen women’s voices and participation. There is evidence that projects are more sustainable if they are gender sensitive and socially inclusive. With a benefit of serving multiple SDG targets simultaneously (Grant et al. 2016). A case study conducted in Fiji with a gender sensitive approach, confirmed, that the outcome

was not just material and practical improvements, but moreover influenced women's confidence and voice positively and affected their power and status in the community (Willett et al. 2009).

Less Successful Interventions

So far, the water sector is dominated by technical perspectives and seen as a biophysical field. Gender and social experts are generally not included in policy level. Water experts are separated from colleagues who work on social analyses. This gap is wide, and only now efforts are made to overcome this gap (Seager 2015).

The following example may demonstrate how an isolated perspective, only paying attention on technical improvement, can oversee social relations. A private toilet can lead to the improvement of women's situation, provide protection from sexual harassment and assault and eliminate the necessity to leave the house. Depending on the cultural background, this can have a drawback, by eliminating the chance for women to leave the house. This is especially the case for women in their reproductive years. Households try to control female's mobility and sexuality and enhance family's social status. Another case is reported that adult women were three times less likely to use household toilets than men, the main reason for this is the fear of contracting diseases. Demonstrating that owning a toilet does not automatically lead to stop open defecation (Das, Hatzfeldt 2017).

Even there is an effort to capture the inequalities between men and women, a wide range of dimension on gender aspects in WASH cannot be captured quantitatively. The dimension of empowerment, for example, cannot just be reduced to quantitative indicators. An often-used approach is to count the number of females and males. This data will not reflect on participation and will not show if it is listened to what people said. Often women are reduced to their perceived lack of expertise. Counting participants based on gender may be a first step, but it does not reflect if women are empowered (Seager 2015). This qualitative aspect of life cannot be captured by statistical information, empowerment is context-specific and non-linear, it depends largely on personal experience to exercise rights. *Measuring empowerment? Ask Them* (2010) presents an approach where qualitative information generated by people themselves is quantified and sufficient for a result-based management. Therefore, a self-assessment exercise is carried out at the community level. This is followed by weighting and aggregating the data to show trends, correlations, and distributions. This shows how reliable and statistical data can be generated through participatory assessments (Jupp, Ibn Ali 2010).

2.4.2 Disadvantages for Women

There is evidence that access to water and sanitation directly weakens health, education, employment, income and empowerment for a female different than for a male (Sommer 2010; UNDESA 2014; UNICEF n.d.). The situation of females is very diverse depending

on the point in the lifecycle a woman (marriage, pregnancy, motherhood, starting a job, etc.) as well as class, ethnicity, religion, status, and earnings among other issues give a composite picture about the different conditions for females. To address the particular situation in the given context Grant et al. (2016) refer, that the best way to do so is the integration of women and other disadvantaged groups into decision making for an outcome which will work against social exclusion. Fisher (2008) also states the positive impact of various aspects on a women's life, when her interests, perspectives, and needs are placed at the center of decisions in WASH. The following lists the different areas regarding the influence of WASH conditions and respective circumstances on women's lives.

Health Issues – Water Born Diseases

First of all, pregnant women face during their pregnancy higher risks of sickness through water born diseases. Especially unsafe water conditions and poor infection control in a hospital, during delivery and stay, mainly lead to puerperal infections, which lead to higher risk of death for mother and newborn. It is estimated that 15% of all maternal deaths are the cause of puerperal infections. To address WASH services in a hospital would not only provide a safe and dignified place to give birth, but it would also benefit the health workers who are mostly women and herewith contributing to gender equality. The effect on clean water and better hygiene will not only benefit a women's own health, but it will also lower the burden of the women in their traditional caregiving role. Because of the risk decreases, that family members get sick due to water-borne diseases. Another beneficial point is that sickness due to water born diseases will not any more prevent children from attending school (Fisher 2008). Furthermore, women are more likely responsible for water purification and cleaning practice in the domestic realm, which exposes them more, to contaminated water (UNHRC 2016).

Water Collection – Fetching time

Mostly women are responsible for collecting water for domestic use and spent a lot of time fetching water. An analysis of 45 developing countries was conducted and found out that in general 72% of domestic water-related tasks are done by women and girls. An equal distribution of this unpaid work and improved water access conditions, would lead to more time for women and girls (Grant et al. 2016).

Easy access to clean water would give more time to attend school especially to girls, which have the primary responsibility to collect water for their families, like their mothers. There is evidence the school attendance of girls increased since the introduction of water points in four communities in India (Fisher 2008).

A direct impact of a local water source could contribute to an income generation, like an own water vending point or other activities which require clean water such as laundering clothes, running a teashop or brewing. If this is not the case, women face disadvantages with their micro businesses. Those businesses rely strongly on water. Therefore, the

availability and regular water supply influences the possibility for women to the local economy and has a direct impact on poverty (Das, Hatzfeldt 2017; Grant et al. 2016). It will also give women more time for housework and farming, agricultural work is more beneficial for women regarding income and reduces their dependence on men (Fisher 2008).

In general, time savings give the opportunity to earn an income. This would not just be a change of the nature of the task, but there is evidence that quality of life may also be improved. The other effect of a local water supply is the reduction of back and neck problems, carrying heavy loads for long distances can lead to problems, especially carrying water pitches on the hips can lead to problems during pregnancy (Fisher 2008).

Sanitation Issues

Availability of water, cleanliness, privacy, and safety play an important role concerning toilet use for women. There is evidence that a lack of appropriate toilet facilities affects the participation of girls and women in schools and employment. One main reason for this is the different needs of women and girls considering their menstrual cycle. Menstrual hygiene is referred to as a key element of meeting the needs of women and girls. Information, access as well as affordability of menstrual products, privacy to manage menstruation, and proper facilities matter (Grant et al. 2016). Therefore, soap and clean water, clean materials are needed, to absorb and collect menstrual fluids as well as the ability to change them regularly. Service providers must ensure that facilities adapt to the biological and sociocultural needs. To achieve these requirements, attention has to be paid at all levels of implementation from design to monitoring (UNHRC 2016). Women's dignity is often compromised when toilet facilities face the streets especially during menstruation, pregnancy, and post-natal period (Fisher 2008). Another issue is physical or sexual assault, especially without sanitation facilities, women may be forced to wait until nightfall to find enough privacy to relieve themselves. This also increases the likelihood of urinary tract infections and psychological stress (Fisher 2008). Women who hold their liquids over a long period have a higher risk of bladder and kidney infection also avoiding the consumption of liquids to avoid the need to use a toilet, can lead to dehydration (UNHRC 2016). Sexual violence could be reduced by 30% with improving public sanitation, this was found in a study in South Africa's townships (Gonsalves et al. 2015). Gender-based violence can also occur at places where people bath or wash their cloth. Abuse of boys is reported as a common and unrecognized phenomenon, which receives even less attention, the fear and shame concerning homosexuality exposed by cultural restrictions and taboos frighten boys from reporting such abuse (UNHRC 2016).

Women's Role & Status

Better water and sanitation conditions do not just improve the status at home and in the community, it also can lead to a higher income generation and further to new projects, which can give the possibility for women to occupy positions with responsibility and influence in the private and public sector. This involvement of women improves their

status and has an additional effect in acting as role models for other women. A challenge and at the same time an opportunity to act is the need of skills and technical knowledge for certain tasks in operation and management of water and sanitation systems. This challenges traditional perceptions about women's status (Fisher 2008). A stereotype is defined as "a generalized view or preconception about attributes or characteristics that are ought to be possessed by, or the roles that are or should be performed by women and men" (OHCHR 2013). States have to actively act against harmful stereotypes of men and women. Therefore, approaches are needed which go beyond formal protection in laws especially when stereotypes intersect with stigmas or taboos like those linked to menstruation (UNHRC 2016).

To influence a women's role and status, participation and empowerment are crucial. Participation and empowerment cover the influence in decision making, the ability to voice needs and to make individual choices. It is necessary that participation takes place at all levels. From community levels to regional and national up to international levels. So far it is mostly men who control and manage the water services at all levels. The integration of women can help to overcome the lack of water and sanitation facilities which meet women's and girl's needs. Additionally, the integration of women can help to contribute the gender mainstreaming throughout the sector and to other services being managed from the perspective of women. To achieve this, states have to actively identify and remove barriers to reach meaningful participation of women (UNHRC 2016).

2.4.3 Sex-Disaggregated Data and Sex-Specific Indicators

The report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators defines "Indicators should be disaggregated, where relevant, by income, sex, age, race, ethnicity, migratory status, disability and geographic location or other characteristics." (UNESCO 2016).

To foster equity and non-discrimination, appropriate statistics and consequently a certain level of data disaggregation is needed. Indicators are useless unless the user data is adequate and disaggregated to capture the enjoyment or violation of human rights between different population groups. Still, there is potential usefulness, at best it will delay their use until relevant data is available (OHCHR 2012).

Especially the support of gender-sensitive indicators should be a priority. Consequently, to fill the existing data gaps and to improve data collection for disaggregated data by sex, new systems have to be developed. These systems should also assess the impact of policies and programmes which aim to promote gender equality and enhance women's enjoyment of their human rights (OHCHR 2016).

To identify, validate, and test sex-disaggregated data is an ambitious and complex task. UN agencies, government, NGOs and water experts demanded sex-disaggregated data. Sadly, this call was mainly ignored for decades. A key barrier is the lack of comparable especially international data on gender-sensitive water indicators. So far, global sex-disaggregated data on access to WASH is not collected and reported constantly and

inclusively. To monitor the achievements of SDG 6 data disaggregated by sex and disability status as well as sex-specific indicators are required. To validate the impact, and to see if improvements benefit women and girls and lead to an equal situation for disadvantaged groups (Grant et al. 2016).

Politics are always driven by data, without it is not possible to have an adequate analytical assessment. If data is not available on a topic, no policy formulation will take place, and if there is no manifestation in standardized databases, there is a high risk that it will be assumed to be unimportant. Without sex-disaggregated data it is not possible to compare the situation of women and men in different cultural backgrounds and the progress towards the SDGs is not possible to be fully measured (Seager 2015).

It is crucial that water data is not "gender blind". Sex-disaggregated data can already influence policy formulation leading to a gender-inclusive formulation. Data about inequalities and why exclusion occurs is central. This includes data on economic and social consequences for women and girls, as well as data on the lack of access to improved sanitation, including menstrual hygiene facilities. Investments are needed in these areas (Grant et al. 2016).

Sex-disaggregated data would benefit different user groups. Water industries and businesses could use sex-disaggregated data to validate their impact on local communities or how economic return can be improved. It would help UN agencies for appropriate target funding and investments as well as the media would be able to give a more diverse picture and include a socially inclusive perspective (Grant et al. 2016).

The United Nations World Water Assessment Program has developed a gender disaggregated data methodology to collect essential gender disaggregated water data. Urgent steps are needed to improve quality, coverage, and availability of disaggregated data. Especially, to monitor the implementation of the SDGs.

Sex-Specific Indicators

The UN working group on sex-disaggregated indicators developed principles how prioritized indicators should be:

- “be applicable and relevant across all (or at least most) regions;
- be feasible to collect – i.e. within reasonable resource limits and congruent with current data-collecting capacity;
- support goals of enhancing women’s empowerment, promoting gender equality and advancing women’s empowerment in policy-making;
- reflect diverse sectoral and thematic concerns, among them: governance, decision making, and policy-making; water use, consumption and priorities in agriculture; household water use, consumption, and priorities;
- be thematically aligned with, and positioned, to contribute to the post-2015 development agenda; and
- transform gender relations towards a more equitable state, and not just to account for current inequities. A crucial way to do this is to develop data priorities

that reveal the ways in which masculinity(ies) and femininity(ies) are constructed and the ways in which these normative forces operate in everyday life” (Seager 2015).

As a result, the following indicators were classified as priority indicators for the field Safe drinking water, sanitation, and hygiene by members of the WWAP (World Water Assessment Program) Working Group on Sex-disaggregated Water Indicators, as priority indicators for the field Safe drinking water, sanitation, and hygiene, see Table 4.

Safe Drinking Water, Sanitation, and Hygiene	
1	Percentage of households without water on premises, by sex of main person responsible for collecting drinking water and by type of household (using rural/urban sample)
2	Unpaid time spent by individual household members in supplying water, making it safe for use, and managing it (M/F informants)
3	M/F perceptions of the adequacy of current water supply/availability in both quality and quantity in the household. Percent households with access to “improved” sanitation facility, by household structure and by nature of “improved” facility
4	Intra-household M/F use of /access to improved sanitation facilities
5	M/F prioritization of gaining access to improved sanitation facilities; willingness to allocate household budgets for such access
6	M/F perception of the safety of sanitation facilities that are located outside the house; identified particular safety concerns

Table 4: Priority Indicators (Source: Pangare 2015)

So far there is not much data available on intra-household inequalities. To track inequalities for disadvantaged groups is challenging, as JMP states: “through these surveys (household surveys) it is infeasible to accurately measure intra-household inequalities such as sex, age, or disability” (WHO 2017b). This is a long-term prospect until newly developed instruments, which are most probably more complex and costly, are adopted by national governments (WHO 2017b). UN-Women emphasize to avoid the failure of the MDG framework and to address the structural causes of gender inequality in the SDG framework and for example, suggest the indicator for the time spent to collect water to aggregate by sex (Un Women 2013). Finding ways to monitor intra-household inequalities may be a decisive way to reveal gender inequalities. The response to a survey may differ depending a woman or man is asked (UNHRC 2016).

2.4.4 Summarized Findings

Gender perspectives are essential and should always be integrated to achieve the universal realization of equality. Especially in the WASH sector because many water and sanitation issues for women are related to their traditional roles. Therefore, WASH programmes provide a good platform. Practices and rules often come from norms, values and religious beliefs and rituals, which reinforce inequality.

There is evidence that access to water and sanitation directly weakens health, education, employment, income and empowerment for a female different than for a male (Sommer 2010; UNDESA 2014; UNICEF n.d.). To overcome these inequalities, sex-disaggregated data is essential. Politics are always driven by data, without it is not possible to have an adequate analytical assessment. If data is not available on a topic, no policy formulation will take place. The United Nations World Water Assessment Program has developed a gender disaggregated data methodology to collect essential gender disaggregated water data and the UN working group on sex-disaggregated indicators developed principles how prioritized indicators should be.

2.5 Discrimination and Inequalities

Targets can be seen as fulfilled when they are met for all subgroups within the population. This is clearly implied with the statement to “leave no one behind” of the Agenda 2030.

A clear lesson learned from the MDGs, which do not address discrimination and inequalities with a clear outcome, is that the framework for the Agenda 2030 including goals, targets, and indicators must be designed to reduce inequalities (UN 2012a). Furthermore, equality is a fundamental principle of the human rights.

In the target formulations for water and sanitation, the reduction of inequalities plays a crucial role. Therefore, the JMP has formulated short-term and long-term approaches how to measure this important aspect. For the short-term perspective, the follow up to track inequalities for the urban and rural population will continue. It is planned to collect and analyze information on inequalities in wealth and for subnational distributions. For the long-term perspective, the characterization of informal settlements is also planned. So far, the household surveys and censuses do not include informal urban settlements or slums (WHO 2017b).

2.5.1 The Human Rights

Article one of the universal human rights declares that all human beings are born free and equal in dignity and rights. Followed by article two which emphasizes that everyone is entitled to all the rights without distinctions of any matter such as race, sex, religion, origin or status (UN 1948). In 1981 the convention on the elimination of all forms of discrimination against women entered into force. Recalling that discrimination contradicts the principles of equality and noting that state parties to the covenants on

Human Rights (HR) have an obligation to ensure equal rights for men and women (UN 1981).

Article 25 (1) of the universal human right declaration states that “Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services ...” (UN 1948). To achieve these rights, water plays an essential role, but the right to water is not specifically mentioned. After several important events, like the resolution on the right to development in 1999 and the international decade for Action “Water for Life” 2005-2015, finally, in 2010 the resolution 64/292 - the human right to water and sanitation was adopted by the United Nation General Assembly. The resolution recognizes **“the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights”** (UN 2010).

2.5.2 Equality

In contrast to equity (a moral imperative), equality is a legally defined term and a binding principle of human rights. To reach equality, a specific focus on individuals who do not enjoy their rights fully is needed to close the existing gaps (Neumeyer, van de Lande 2014). As explained by the human rights committee, equality is a concept that includes formal and substantive equality. Formal equality is the treatment of men and women by laws in an equal manner. Substantive equality considers the effect of the law, ensuring the mitigation of disadvantage, leading to an equal enjoyment of the rights. Therefore, the consideration of existing inequalities between men and women have to be taken into account by state parties (UN 2008). It is important to recognize that the enjoyment of equal rights does not necessarily mean identical treatment (UN 2008). As well as equal does not mean the same, but equality implies that everyone benefits from adequate services. As in the resolution by the UN Human Rights Council 2013 stated: **“Recognizing that the human right to safe drinking water and sanitation entitles everyone, without discrimination, to have access to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use and to have physical and affordable access to sanitation, in all spheres of life, that is safe, hygienic, secure and acceptable, and that provides privacy and ensures dignity”** (UN 2013).

A comment by the United Nations Human Rights Council (UNHRC) states that the denial of equal rights for women is often based on social structures, tradition, and customs. That is why equality of men and women in law does not automatically lead to a reduction of inequalities on the ground. However, still many laws are in practice which hinders the equal enjoyment of rights. For example, land ownership is often denied to women and a precondition to gain access to water (UNHRC 2016).

States, including donor states and international agencies as duty bearers of human rights, must plan their interventions and try to eliminate inequalities progressively and find out who lacks access to water and sanitation as defined by human rights to water and sanitation. The principle of equality is fundamental to achieve the human rights, and

it is crucial that states understand what it implies and that right holder demand government to target currently overseen or neglected groups (Neumeyer, van de Lande 2014).

To realize if goals and targets are met, and existing gender-based inequalities are targeted, monitoring is essential, at decision making level and implementation. Another important aspect is the awareness of the human right to water and sanitation. Women should be able to take states accountable to provide adequate water and sanitation facilities (UNHRC 2016).

A report by the special rapporteur on the human right to safe drinking water and sanitation points out the importance of gender equality in the water sector. Gender inequalities affect a wide range of human rights; socioeconomic differences, sociocultural relationships, and stereotypes are mentioned as reasons, which intensify differences and create inequalities. Especially transgender and non-conforming gender, face often harassment and a lower ability to enjoy their rights to basic water and sanitation services, not overlooking women and girls with disabilities which face additional challenges in accessing sanitation facilities. For progress towards equality women's material needs have to be met as well as strategical needs like addressing harmful stereotypes that affect access to safe water and sanitation. Meeting the material needs of women can make it easier to perform their daily work. Often this work consists out of roles assigned to their gender and does not of itself lead to greater gender equality. To address practical equality the specific gendered circumstances, have to be considered. Women cannot be seen as a homogeneous group, depending on the situation women face different challenges and have to overcome different barriers with regard to water and sanitation. Therefore, states should use an intersectionality lens to ensure that attention is given to the most disadvantaged (UNHRC 2016).

The special rapporteur on human rights to water and sanitation emphasizes the importance to monitor the SDGs in a **rights and gender-sensitive manner** to realize the rights to water and sanitation and gender equality. Hence, human rights-based indicators should monitor the commitments made by states and the ongoing efforts to reach the targets. For example, indicators on menstrual hygiene facilities could help to identify gender equality and help to brake related taboos (UNHRC 2016).

2.5.3 Human Right Elements for Indicator Assessment

A central approach is to include the elements of human rights related to WASH in the indicator framework. Looking at the indicator used during the MDG process: *access to improved sources of drinking water and access to improved sanitation facilities*, the indicators have fallen short under the human rights perspective (Giné-Garriga et al. 2017).

The commonly used criteria for human rights are **availability, accessibility, quality, affordability, and acceptability** (UN-HABITAT 2014). Additionally, it is important to not avoid or lose out of sight the cross-cutting criteria of *non-discrimination, participation,*

accountability, impact, and sustainability what should also be considered in an indicator framework (Giné-Garriga et al. 2017). It is evident that under consideration of these criteria the up to now reported progress may be overestimated. In the case of sanitation provision so far, the MDG classified just in improved/unimproved, compared to the proposed SDG indicator which classifies using the term “safely managed” (UN ECOSOC 2016). It is questionable when determining the level of the service for the lowest, for example, if a shared toilet will be monitored against the criteria of accessibility, safety affordability, and acceptability (Giné-Garriga et al. 2017).

The service ladder approach used by JMP is increasingly adopting in the sector. Considering this (Giné-Garriga et al. 2017) proposed a multidimensional monitoring framework with indicator outcomes from a human right perspective and using the SL as a reference point for sanitation. The Figure 4 below shows the principle schematically. In the next chapter SDG targets and indicators are evaluated against human right criteria.

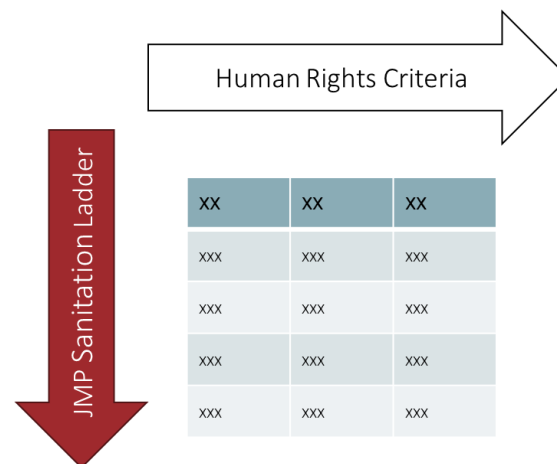


Figure 4: Schematically Procedure to Include Human Rights in Monitoring

2.5.4 Summarized Findings

The human rights make clear that equality is a fundamental principle. All human beings are equal in dignity and rights. The enjoyment of equal rights does not necessarily mean identical treatment and equal does not mean the same. But equality implies that everyone benefits from adequate services. Nevertheless, still, laws hinder the equal enjoyment of rights. For example, land ownership is often denied to women, and it is a precondition to gain access to water (UNHRC 2016). Equality is a legally defined term and a binding principle of human rights. To reach it, a specific focus on individuals who do not enjoy their rights fully is needed to close the existing gaps. For progress towards gender equality, women’s material needs have to be met as well as strategical needs, like addressing harmful stereotypes.

In 2010 the right to safe and clean drinking water and sanitation was adopted by the general assembly as a human right that is essential for the full enjoyment of life. The

commonly used criteria for the human right to water are **availability, accessibility, quality, affordability, and acceptability** (UN-HABITAT 2014). Additionally, it is important not to avoid or lose out of sight the cross-cutting criteria of *non-discrimination, participation, accountability, impact, and sustainability*. A central approach is to include the elements of human rights related to WASH in the indicator framework.

3 State of the Art – Application of Relevant Findings

3.1 Analyzing Targets and Indicators 6.1 & 6.2

In this chapter, a closer look is taken at the targets and indicators for drinking water, sanitation, and hygiene. What they address and aim for, as well as approaches, and challenges. It includes an evaluation of the targets against human right elements, and how the indicator addresses those elements. JMP uses the established service ladder for monitoring, to have a comparison, and to recognize progress within and between countries.

3.1.1 Targets and the Human Right Elements

Target 6.1: ***‘By 2030, achieve universal and equitable access to safe and affordable drinking water for all.’***

This target defines the access and states the condition drinking water should have. For the definition of each term of the target as well as for the definition of the human right to water, see Appendix A.

The drinking water target states clearly the aspect of **affordability** and **accessibility** and **safety** (quality) of the human rights elements (See Table 5). Whereby **available** (sufficiency) is not directly addressed. Considering how the UN describes the term access: *‘sufficient water to meet domestic needs is reliably available close to home’* it includes the request for sufficiency. Also **acceptable** is not addressed. The definition by the UN on human rights to water for acceptability is: *‘Water should be of an acceptable color, odor, and taste for each personal or domestic use. All water facilities and services must be culturally appropriate and sensitive to gender, lifecycle and privacy requirements’* (UN n.d.). Some aspects of this requirement are covered under the term equitable which is defined like this: *‘progressive reduction and elimination of inequalities among population subgroups’*. To accomplish the reduction and elimination of inequalities a culturally appropriate and gender-sensitive approach is needed to reduce inequalities between genders and local demographics. But the approach to reduce inequalities does not necessarily increase appropriateness or sensitivity of water facilities and services.

Target 6.1	Human Right Elements				
	Available	Safety	Acceptable	Accessible	Affordable
By 2030, achieve universal					
and equitable	-	-	-	-	-
access	X	-	-	X	-
to safe	-	X	-	-	-
and affordable	-	-	-	-	X
drinking water for all.					
X	HR element is addressed	x	HR element is sparsely addressed	-	HR element is not addressed

Table 5: Target 6.1 / Human Rights Matrix

Target 6.2: ‘**By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations**’.

The picture looks different for the sanitation target. In the formulation of the target 6.2, **affordability** is not addressed at all. As for the drinking water target, **availability** is contained in the definition of access ‘*facilities close to home that can be easily reached and used when needed*’. Especially the term used when needed implies the denotation of availability. With this definition, the human right element of physical **accessibility** is also addressed. **Safety** and quality are partly addressed. The interpretation of ‘adequate’ is defined by hygienic separation of excreta from human contact and safe reuse and treatment. With this formulation, not all aspects of safety and quality are addressed. For example, hygienic conditions, the appearance of insects, odor and the structure of the facility, etc. With the stated term *equitable* and the addition to *pay special attention to the needs of women and girls and those in vulnerable situations*, the human rights criteria **acceptability** is to some extent fulfilled. Still missing is the attention that it has to be culturally acceptable with adequate conditions for privacy requirements, in all states of a lifecycle for men and women. The aim to *end open defecation*, includes safety aspects, in terms of reduced infection risks and violence (see in Table 6).

Target 6.2	Human Right Elements				
	Available	Safety	Acceptable	Accessible	Affordable
By 2030, achieve					
access	X	-	-	X	-
to adequate	-	X	-	-	-
and equitable	-	-	x	-	-
sanitation and hygiene for all					
and end open defecation	-	X	-	-	-
paying special attention to the needs of women and girls and those in vulnerable situations.					
X	HR element is addressed	x	HR element is sparsely addressed	-	HR element is not addressed

Table 6: Target 6.2 / Human Rights Matrix

Overall, the targets address accessibility, availability, and quality, and a strong emphasis is on reducing inequalities which partly affects the requirement for acceptance. Affordability is only addressed by the drinking water target.

3.1.2 Indicators and the Human Rights Elements

Indicator 6.1.1: ‘**Proportion of population using safely managed drinking water services**’.

The indicator addresses fewer aspects of the human rights compared to the target. The Joint Monitoring Programme which is commissioned to monitor the SDGs 6.1 and 6.2 defined safely managed by an improved drinking water source located on premises, available when needed, and compliant with fecal and priority chemical standards. An improved source includes piped water, boreholes or tube wells, protected dug wells, protected springs, and rainwater (WHO 2017b). This definition addresses the criteria of **availability** by the term *available when needed*. It addresses the criteria of **safety** by requiring that it is at least *free of feces and consistent with priority chemical standards*. *Located on premises* refers to the location of the water source, *on premises* is achieved when the water source is within the building or in the immediate vicinity of the building, which matches with the definition of **accessible** of the human right to water. The elements **acceptable** and **affordable** are not addressed (see Table 7).

Indicator 6.1.1	Human Right Elements				
	Available	Safety	Acceptable	Accessible	Affordable
Proportion of population using safely managed drinking water services					
JMP Definition on Safely Managed - A improved Source which is:					
- <i>located on premises</i>	-	-	-	X	-
- <i>available when needed</i>	X	-	-	-	-
- <i>compliant with fecal and priority chemical standards</i>	-	X	-	-	-
X	HR element is addressed	x	HR element is sparsely addressed	-	HR element is not addressed

Table 7: Indicator 6.1.1 and Human Rights Matrix

Indicator 6.2.1: ‘**Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water**’.

As for drinking water, the requirements for sanitation are summarized in the term safely managed as follows: an improved sanitation facility which is not shared with other households, and where excreta are safely disposed in situ or transported and treated offsite. An improved facility is a facility, which is likely to ensure hygienic separation of human excreta from human contact. Improved sanitation facilities include flush or pour/flush toilets connected to sewers or septic tanks; protected latrines such as Single Ventilated Improved Pit (VIP) latrines or latrines with slabs; and composting toilets.

The indicator 6.2.1 does not address the criteria of **affordability**, and the criteria of **acceptability** is just partly addressed. A sanitation facility, which is *not shared with other households*, will most probably lead to a higher acceptance in most cultures. But the term **acceptability** contains more than more than the question of shared or unshared sanitation facilities. It includes issues of comfort and privacy amongst others. The fact that the sanitation unit is not shared with other households allows the assumption that the facility is in the housing unit or in the vicinity of the building. With this assumption, the criteria of **accessibility** are fulfilled. The requirement of an *improved facility* and the *existence of a handwash facility* partly satisfies the criteria of **availability** it does not specify about the sufficiency. That excreta are safely disposed and treated and the requirement of the *existence of water and soap*, address safety issues and reduce infection risks and thereby the HR element of **safety**. Nevertheless, infection may occur also because of unhygienic and unclean conditions (see Table 8)

Indicator 6.2.1	Human Right Elements				
	Available	Safety	Acceptable	Accessible	Affordable
Proportion of population using safely managed sanitation services;					
JMP Definition on Safely Managed - A improved Sanitation facility which is:					
- which is not shared with other households	-	-	x	X	-
- where excreta are safely disposed in situ or transported and treated offsite	-	X	-	-	-
Proportion of population with					
- handwashing facilities	X	-	-	-	-
- with soap and water	-	X	-	-	-
X	HR element is addressed		x	HR element is sparsely addressed	
			-	HR element is not addressed	

Table 8: Indicator 6.2.1 and Human Rights Matrix

3.1.3 The Indicator – Target Relation

The indicator measures progress and the state of the target achieved. Therefore, an indicator should address the target fully. During an expert group meeting on indicator framework, five main requirements for SDG indicators were selected: relevant, methodologically sound, measurable, easy to communicate and access, limited in number and outcome, and focused at the global level (UNSD 2015). Relevant is defined with relevance for policy formulation and policy-making and relevant to all countries and national priorities. The other denotation of relevant is the clear link to the target, which is evaluated below.

The Indicator for Drinking Water

Indicator 6.1.1: ‘**proportion of population using safely managed drinking water services**’.

The selected indicator to evaluate the target ought to be comparable by assessing proportions of the population. Assuming the indicator addresses the complete target, all named aspects should be included in the term safely managed.

The indicator with its definition of safely managed addresses only the aspects of access and safety (quality). The direct addressing of affordability and the requirements for equitable access are missing.

For indicator use, JMP established a service ladder approach, classifying the different conditions on drinking water. Safely managed is used for the highest achievable condition, followed by basic (drinking water from an improved source provided collection time is not more than 30 minutes for a round trip including queuing), limited (Drinking water from an improved source where collection time exceeds 30 minutes for a roundtrip, including queuing), unimproved (drinking water from an unprotected dug well or unprotected spring) and surface water (drinking water directly from a river, dam, lake, pond, stream, canal or irrigation channel) (WHO 2017b).

Table 9 shows, how indicator and target correspond. The terms *equitable* and *affordable* of the target are not addressed by the indicator. Therefore, the terms *access* and *safe* are addressed.

Target 6.1	Indicator 6.1.1 - JMP Definition on Safely Managed		
	located on premises	available when needed	compliant with fecal and priority chemical standards
By 2030, achieve universal			
and equitable	-	-	-
access	X	X	-
to safe	-	-	X
and affordable	-	-	-
drinking water for all.			
X	HR element is addressed	x	HR element is sparsely addressed
-	HR element is not addressed		

Table 9: Drinking Water Indicator - Target Relation

The Indicator for Sanitation and Hygiene

Indicator 6.1.2: ‘**Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water.**’

This indicator can be split into two indicators, the first ‘*population using safely managed sanitation services*’ and the second ‘*proportion of the population with hand washing facilities with soap and water at home.*’ The JMP service ladder classifies the different conditions of safely managed. Those which are safely managed, basic (use of improved facilities which are not shared with other households), limited (use of improved facilities

shared between two or more households), unimproved (use of pit latrines without a slab or platform, hanging latrines and bucket latrines), and last open defecation (disposal of human feces in fields, forest, bushes, open bodies of water, beaches or other open spaces or with solid waste) (WHO 2017b).

As for the relationship between target 6.1 and indicator 6.1.1 *equitable* sanitation is not addressed by the indicator. As well as the statement *to end open defecation* and to *pay special attention to women and girls and those in vulnerable situation* is not included in the indicator. The indicator is weak in its formulation for meeting the target. It meets the conditions for adequate sanitation. *Adequate* is defined by a system that hygienically separates excreta from human contact as well as safe reuse/ treatment of excreta in situ or safe transport and treatment off-site. *Access* implies the distance of facilities to a homeplace, which can be used when needed. The indicator which calls for facilities which are not shared with other households does not directly monitor access. Nevertheless, not shared facilities are most probably inside a housing unit and available when needed (see Table 10).

Target 6.2	Indicator 6.2.1 - JMP Definition on Safely Managed				
	not shared with other households	excreta are safely disposed in situ or transported and treated offsite			
By 2030, achieve					
access	X	-			
to adequate	-	X			
and equitable	-	-			
sanitation and hygiene for all					
and end open defecation	-	-			
paying special attention to the needs of women and girls and those in vulnerable situations.					
X	HR element is addressed	x	HR element is sparsely addressed	-	HR element is not addressed

Table 10: Sanitation Indicator - Target Relation

Hygiene

Hygiene covers various aspects of personal habits if the preconditions are given. The main effort is to maintain health and to avoid the spread of pathogens. Hand-washing hygiene is seen as a top priority. The indicator assesses the presence of a device to contain, transport or regulate the flow of water for hand washing practices with soap. The service ladder approach classifies three categories, basic (hand-washing facility with soap and water in the household), limited (hand washing facility, without soap or water) and no hand-washing facility (WHO 2017b).

3.2 Analysis of Indicators on Equality between the Genders

In the previous chapter the targets, as well as the selected indicators, were assessed against human right elements, and a closer look was taken on the target–indicator

relationship. Outstanding was the totally missing aspect to pay special attention to the need of women and girls and those in vulnerable situation. This thematic is relevant at all levels of WASH. The selected indicators and the service ladder implemented by the JMP address certain aspects of current needs and disadvantages for women and girls in an indirect way. For example, does the service ladder classify the achievements of the drinking water target 6.1 in categories on how much time is spent to collect water. As in most countries, this work is typically done by women and girls, this classification is addressing a current burden women have to face. But it does not reveal the inequalities in the water sector between the genders. It is missing that special attention is paid to the needs of women and girls. The indicator is not directly addressing that these issues are mostly faced by women. Missing is a disaggregation between the sexes. This is important to guide policy formulation and decision making, to reveal stagnation and progress in achieving equality indicators which clearly and directly reflect the situation of women and girls are necessary.

The graph below outlines the applied procedure. Out of the three service ladders for drinking water, sanitation and hygiene it is worked out which aspects concerning the needs of women and girls are addressed in an indirect way, which aspects are addressed directly, and which aspects are not addressed at all. Figure 5 schematically present the concept.

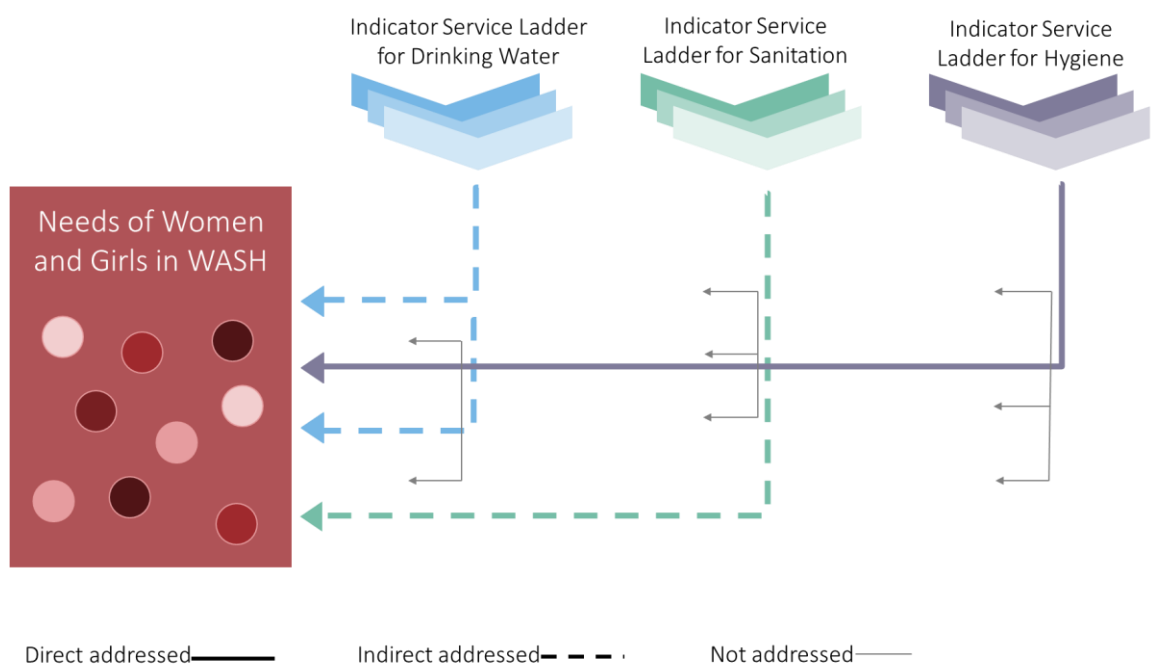


Figure 5: Overview - Service Ladder Addressing the Needs of Women and Girls

The most repeated concerns in literature including UN reports, women and girls must face are collected and are listed in Table 11 below. The service ladder as described in chapter 3.1.3 deals with some aspects out of the collected issues, but any disaggregation and specific or direct addressing of the situation for women is missing.

The indicator for target 6.1.1 does address the time spent to collect water and claims for water quality consistent with national water standards, as well as the indicator for target 6.1.2 addresses that excreta should be safely disposed, which has a major impact to reduce infection, caused because of unhygienic conditions. The second part of the indicator estimated if hand wash facilities and soap are present, what is a prerequisite to manage menstruation.

Other aspects like privacy, which is an important topic for women and girls specially to manage menstruation is not addressed by the indicator, but it must be recognized that sanitation facilities which are not shared increase privacy. Nevertheless, the indicator does not reflect the conditions of public places or if facilities are separated by sex, and easily accessible and acceptable. Likewise, violence is not addressed, but also here the same argument is valid, sanitation facilities, which are not shared, minimize the risk of sexual harassment on the way or at public places for everyone. Occurring sexual harassment at open places where people go to bath, wash clothes or collect water can be reduced if these needs can be met at home.

Additional aspects, like time spend to access sanitation facilities or time spend for cleaning them and for handling with the excreta are not considered. Health impacts, because to unhygienic conditions or bad water quality and unsafe conditions for menstruation management, are not included. Considering menstruation, the assessment of access to disposal facilities and to menstrual products as well as their affordability is missing. Stigmas, taboos, and stereotypes and intra-household dynamics are not addressed as well as the important aspect of participation. The mentioned aspects, and if the indicators address them, is shown in Table 11 below. As the mentioned aspects are deeply interlinked with other social and development aspects they may be in general designated in other SDGs.

Indicator		6.1.1	6.1.2	6.1.2
Service Ladder		Safely managed	Safely managed	Basic
Selected Issues of Women and Girls in WASH				
1 Time spent				
	- for water collection	✓		
	- to access sanitation facilities	-		
	- for cleaning sanitation facilities and handling excreta	-		
2 Sickness and death related to water born diseases				
	- because of bad water quality	✓		
	- because of unhygienic conditions (e.g. unsafe disposal of excreta)	×		
	- during pregnancy (unsafe water conditions in hospitals)	×		
	- infection because of caregiving activity of other sick people	×		
3 Management of Menstruation (at home, schools and work)				
	- privacy for changing materials and body washing	×		
	- access to water and soap	✓		
	- access to disposal facilities	-		
	- affordability and accessibility of menstrual products	-		
	- sickness because of unsafe conditions to manage menstruation	-		
4 Violence				
	- if no sanitation facilities are available sexual harassment may occur practicing open defecation especially during night	×		
	- or at public sanitation facilities	×		
	- or on the way to reach a place where to relieve themselves	×		
	- at public places to bath, wash cloth and collect water	×		
5 Stigma and Taboos				
	- stereotypes of women and men's role at work or home	-		
	- taboo topics like menstruation	-		
6 Participation				
	- lack of women in policy and decision making position	-		
	- lack of involvement of women during project implementations	-		
✓	Aspect is fully included in the SL	×	SL includes demands which address the Aspect	×
			Aspect is partly addressed	-
				Aspect is not addressed

Table 11: Service Ladder Addressing Selected Needs of Women and Girls

3.3 Findings

The target formulation is ambitious and tries to cover the human right elements for water and sanitation. The targets do not comprise the human right element to 100% but cover aspects of them. Having a closer look at the target 6.2, the term affordability is not included in the target formulation. By assessing the indicators, a different picture arises. The indicators seem weak in addressing the target and towards human rights criteria for water and sanitation. The service ladder approach with its classification of the term 'safely managed' improves the picture, but still, not all aspects are addressed. Missing is the resume of the target statement: 'to pay attention to the needs of women and girls and those in vulnerable situations'. To mention is that finding indicators which address all aspects of the human rights is a challenge. But having them in mind and working towards the achievement to meet the human rights criteria in water and sanitation is decisive.

Through the process of evaluating the indicators against gender equality, some aspects stand out. Those aspects seem feasible and could be a first step to close the gap between the selected indicator and the big need to address the problems, which women and girls face in the water sector:

- disaggregated data, for example time spend to collect water by men and women
- time spend to reach sanitation facilities by men and women (GDP decreases by a substantial proportion in developing countries because of shortage on sanitation and hygiene, including the aspect of time spent seeking for places to defecate (Abubakar 2017))
- access and availability as well as affordability to gender-segregated toilets
- availability of disposal facilities.

4 Materials and Methods

This chapter introduces and describes the three used methods (see Figure 6). The methods are interconnected and dependent on each other. First method is to work out an indicator which addresses the human right to water and includes gender aspects in WASH. In order to use the indicator, data is needed. Therefore, the second method is a Transect Walk to collect data. In order to be able to apply the indicator locally, with the aim to monitor the SDG targets 6.1 and 6.2, interviews were conducted, to receive background information on the given situation and current efforts in the WASH sector.

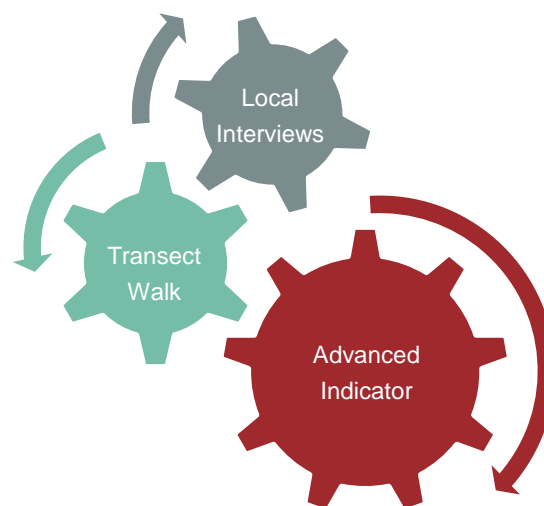


Figure 6: Linking of Methods

4.1 Indicator Advancement

The previous chapter took a closer look at the indicators for monitoring and achieving Sustainable Development Goals. Weaknesses regarding the examination of whether the human right to water is complied with and shortcomings of the indicator towards the target have been worked out. Also, weak points with respect to the right of equality and conditions and prerequisites to be able to ensure adequate water and sanitation for women and girls were considered.

The bigger challenge seems not only to address the goal but to fulfill each criterion of the human right to water. In order to be able to further reduce and close the mentioned gaps with regard to the human right to water, further indicators could be helpful. Possible indicators to cover the human right to water for drinking water, sanitation and hygiene can be found in, Table 12, Table 13, and Table 14. All of this was done with awareness of the challenges women and girls face and solutions included as much as possible.

4.1.1 Advanced Service Ladders

The service ladders of the JMP are already established and used. To build on existing work, these service ladders are taken as the basis. This leads to better comparability and to facilitate in the event of the application of the advanced service ladder.

The procedure to advance the JMP service ladders includes the integration of the results from the previous chapter (chapter 3). With the aim to address the elements mentioned in the target and to cover all human right elements for water with the service ladder. The main focus of the advancement is on the human right to water. Thus, it is in comparison to the SDGs a legally binding right. For the most part, targets are contained in the human right to water. For example, the target requires drinking water which is affordable for all and affordability is one element of the human right to water.

For this purpose, a matrix is set up, which lists the elements for the human right to water in the columns and the levels of the service ladder in the rows. The indicators included in the JMP service ladders are assigned to the respective human rights elements. To close the gaps, new indicators are developed to cover all elements of human rights to water. When developing the indicators, special consideration is given to integrating gender aspects.

The results of the extended service ladders can be found in the tables below. The first table (*Table 12: Advanced Drinking Water Service Ladder*) covers the aspects of the drinking water target 6.1 and is an extension of the JMP drinking water service ladder. the aspects already included in the drinking water service ladder are highlighted in blue. The new criteria are not highlighted. The same applies for *Table 12: Advanced Drinking Water Service Ladder* and for *Table 14: Advanced Hygiene Service Ladder*. The aspects already included in the sanitation SL are highlighted in green and the aspects included in the SL for hygiene are highlighted in purple.

The advanced indicator covers now all five elements of the human right to water. And special attention to the needs of women and girls is paid as the proposed indicator now specifically asks for the presence of bins or for adequate privacy. Additionally, some of the before not addressed aspects from *Table 11: Service Ladder Addressing Selected Needs of Women and Girls* are now addressed. Including:

- Access to sanitation facilities
- Access to disposal facilities
- Affordability and accessibility of menstrual products
- Sickness because of unsafe conditions to manage menstruation
- Violence because of no gender separated toilets.

Advanced Service Ladders

HUMAN RIGHT CRITERIA		Availability	Accessibility	Quality and Safety	Acceptability	Affordability
ADVANCED SERVICE LADDER - PRIVAT HOMES		Requirement	Requirement	Requirement	Requirement	Requirement
Safely managed	Drinking water from an improved water source which is located on premises, available when needed and free from fecal and priority chemical contamination	improved source	on premises	free of fecal contaminations	adequate color	adequate share of income
		available when needed		free of chemical contaminations	adequate odor	
				free of radiological hazards	adequate taste	
Basic	Drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing	improved source	collection time < 30 min	free fecal contaminations	acceptable color	acceptable share of income
		acceptable availability		acceptable chemical conditions	acceptable odor	
					acceptable taste	
Limited	Drinking water from an improved source for which collection time exceeds 30 minutes for a roundtrip including queuing	improved source	collection time > 30 min	unjustifiable fecal contaminations	unsatisfactory color	unjustifiable share of income
		unsatisfactory availability		unjustifiable chemical conditions	unsatisfactory odor	
					unsatisfactory taste	
Unimproved	Drinking water from an unprotected dug well or unprotected spring	unprotected dug well or spring				
Surface water	Drinking water directly from a river, dam, lake, pond, stream, canal or irrigation canal	river, lake, dam, pond, stream, canal				

Table 12: Advanced Drinking Water Service Ladder

HUMAN RIGHT CRITERIA		Availability	Accessibility	Quality and Safety	Acceptability	Affordability
ADVANCED SERVICE LADDER - PRIVAT HOMES		Requirement	Requirement	Requirement	Requirement	Requirement
Safely managed	Use of improved facilities which are not shared with other households and where excreta are safely disposed in situ or transported and treated off-site	improved facilities	on premises	excreta safely disposed	not shared with other households	adequate share of income
			adequate sufficiency	adequate clean facility	adequate privacy	
Basic	Use of improved facilities which are not shared with other households	improved facilities	acceptable access time	excreta partly safely disposed	not shared with other households	acceptable share of income
			acceptable sufficiency	acceptable clean facility	acceptable privacy	
Limited	Use of improved facilities shared between two or more households	improved facilities	unsatisfactory access time	excreta not safely disposed	shared with other households	unjustifiable share of income
			insufficient	unsatisfactory clean facility	unsatisfactory privacy	
Unimproved	Use of pit latrines without a slab or platform, hanging latrines or bucket latrines	pit latrines without slab or platform		excreta not disposed		
					unsatisfactory illumination	
Open defecation	Disposal of human feces in fields, forests, bushes, open bodies of water, beaches and other open spaces or with solid waste	no facilities				

Table 13: Advanced Sanitation Service Ladder

HUMAN RIGHT CRITERIA		Availability	Accessibility	Quality and Safety	Acceptability	Affordability
ADVANCED SERVICE LADDER - PRIVAT HOMES		Requirement	Requirement	Requirement	Requirement	Requirement
Safely managed		handwashing facility	on premises	adequate clean facility	adequate privacy	adequate share of income
		water and soap	adequate sufficiency		adequate illumination	
		adequate supplies				
Basic	Availability of a handwashing facility on premises without soap and water	handwashing facility	on premises	acceptable clean facilities	acceptable privacy	acceptable share of income
		water and soap	acceptable sufficiency		acceptable illumination	
		acceptable supplies				
Limited	Availability of a handwashing facility on premises without soap and water	handwashing facility	on premises	unsatisfactory clean	unsatisfactory privacy	unjustifiable share of income
		insufficient supplies	insufficient		unsatisfactory illumination	
No facility	No handwashing facility on premises	no handwashing facility				

Table 14: Advanced Hygiene Service Ladder

4.1.2 Operationalization of Advanced Service Ladders

As the SDGs are still new and the MDGs were not as specific as the SDGs, new data sets must be collected and evaluated. For this new measurement systems, and monitoring systems have to be implemented. Special difficulties arise for example by using quantitative data to capture gender relations and socioeconomic processes, which may create inequalities. An example for this is that if women attend meetings, this does not necessarily mean that they participate, or it is listened to what they say. Therefore, a challenge is to integrate qualitative methods with quantitative data (UNHRC 2016).

In order to apply the indicators, limit values have to be set. Limits or recommendations were not found in the literature for all indicators. These must be defined at the local level and adapted to the given context. In the following selected limit values are discussed. Specifications found in literature and common sense is applied for this. The means of the human right to sanitation at the local level must be further investigated using social science methods to include the cultural and social context.

These indicators are an addition to the JMP service ladder and therefore do not include the aspect already contained in the service ladder.

Indicators for Drinking Water - Definitions and Limit Values	
Available when needed	24 hours a day
Acceptable availability	Informed water outage and < 24 h a week
Unsatisfactory availability	Water outage > 24 h a week
Free of fecal and chemical contaminations	WHO guidelines or national standards
Free of fecal and Hardly acceptable chemical contaminations	WHO guideline exceeds some d/a without danger to health
Unjustifiable fecal and chemical contaminations	Health-endangering
Adequate color, odor, and taste	"very good"
Acceptable color, odor, and taste	"good"
Unsatisfactory color, odor, and taste	"more or less"
Adequate share of income	3% - 5%
Acceptable share of income	Above 3 - 5 % but without restricting other basic needs.
Unjustifiable share of income	Water is not affordable without restricting other basic needs.

Table 15: Advanced Drinking Water Indicator - Selected Limit Values

Table 15 shows the chosen limit values for additional indicators added to the JMP drinking water service ladder. The term available when needed is already included in the SL and stands for a twenty-four hours access to drinking water. An informed interruption is defined as acceptable availability. This allows to prepare for the water outfall. To keep the status of acceptable availability, outfalls should not exceed 24 hours per week. In a worst case, this would require safe water for the next twenty-four hours, knowing the day after water is again accessible. Classified as *unsatisfactory availability* are uninformed outages and outages that exceed twenty-four hours per week.

Water should be always free of fecal contamination, if not the conditions are health-endangering and therefore *unjustifiable*. This applies also if chemical contaminations are health endangering. Classified as ‘free of fecal and chemical contaminations’ is water that is according to WHO guidelines or National Standards. As ‘acceptable chemical conditions’ are conditions defined which exceed limit values set in WHO guidelines or national standards for some days a year which is because of the limited number still not health endangering. A similar principle is applied to particulate limit values. The daily limit value for particulate matter in the European Union is $50 \mu\text{g} / \text{m}^3$ and must not be exceeded more than 35 times a year (Umweltbundesamt 2016).

The Transect Walk as part of this case study was conducted with pupils from Tupicocha. They were asked for their personal opinion about color odor and taste. To keep the questions simple categories like *very good*, *good*, and *more or less* were chosen. Alternative the WHO guidelines for drinking water quality contain taste and odor thresholds for chemically derived contaminants. The guidelines state also that turbidity should not be more than 1 NTU (nephelometric turbidity units) to ensure effective disinfection (WHO 2011).

A common criterion for affordability for water is in the range between 3 to 5% of the income. Nevertheless, in some countries, the index may vary for poor households and range from 3 to 7 %. To achieve benchmarks of 3 to 5 %, social measures need to be founded and implemented (Smets et al. 2009). An OECD report on managing water for all states that affordability needs to be defined locally. If households rely on vendors the 3 to 5 % criterion does not reflect the share of income, and a share of income for water and sanitation above national standards but below actual expenses would be an improvement. Willingness and ability are also not reflected with these criteria (OECD 2009). To guaranty affordability of sanitation, Giné-Garriga et al. define an adequate share of income as follows: “Sanitation service is available at a price that is affordable, without limiting the capacity to acquire other basic goods and services guaranteed by other human rights. It refers to the affordability of infrastructure, as well as affordability of ongoing operation and maintenance” (Giné-Garriga et al. 2017). Therefore, *Acceptable share of income* would be above the 3 to 5 % threshold but without the need to restrict other basic needs. And an *unjustifiable share of income* is if the restriction of other basic needs is required to afford water services.

Indicators for Sanitation - Definitions and Limit Values	
On-premises	Inside the housing unit, building or plot, full access 24 h
Acceptable access time	> 18 h per day
Unsatisfactory access time	< 18 h per day
Adequate sufficiency	No waiting time
Acceptable sufficiency	> 2 minutes
Insufficient	< 2 minutes
Excreta safely disposed	No direct contact to humans
Excreta partly safely disposed	Contact to humans with no infection risks
Excreta not safely disposed	Contact to humans and existing risk for infection
Excreta not disposed	No disposal
Adequate clean facility	No insects, no smell, no dirt
Acceptable clean facility	Few insects, some dirt, slightly unpleasant smell
Unsatisfactory clean facility	Insects, urine or feces on the floor, smelly
Adequate privacy	Doors with working locks, toilets gender separated.
Acceptable privacy	Doors, toilets gender separated
Unsatisfactory privacy	Damaged doors; observation is possible
Adequate illumination	Illumination is reliably working and no dark corners
Acceptable illumination	Illumination is partly working
Unsatisfactory illumination	No illumination
Adequate share of income	3% -5 %
Acceptable share of income	Above 3 - 5 % but without restricting other basic needs.
Unjustifiable share of income	Sanitation is not affordable without restricting other basic needs.

Table 16: Advanced Sanitation Indicator - Selected Limit Values

Sanitation facilities on premises are included in the JMP service ladder. For further grading, *acceptable access time* is defined with more than eighteen hours access per day. *Unsatisfactory access time* would be less than eighteen hours access per day. Values are suggested by (Giné-Garriga et al. 2017).

A sufficient number of improved facilities is required to meet the criteria of availability. Giné-Garriga et al. warn, that setting specific numbers of toilets as limit values may be counterproductive, as the criteria could be complied with shared or public facilities. Therefore, the requirement of sufficiency is assessed with time. No waiting time implies an *adequate sufficiency*. Waiting time less than two minutes is *acceptable* and more than two minutes is *insufficient*.

Safely disposed excreta implies hygienically separated excreta from human contact (WHO 2017b). This means no direct contract to humans also during the treatment process, until it is safe. As *partly safe* is contact to humans with no infection risk, for example, because of proper clothing and other preventative measures. *Not safely disposed* excreta is classified as contact of humans with excreta and existing infection risk. Infection risk includes also possible infections during the treatment or composting processes. The last category is reached in case there is no disposal at all.

Giné-Garriga et al. (2017) suggest that cleanness of a facility can be assessed by the occurrence of insects, dirt, smell, and feces on the floor or on the facility. For the exact categorization see Table 16.

To reach acceptability, adequate privacy is a prerequisite and has to be ensured considering social and cultural context and practices (Giné-Garriga et al. 2017). Facilities with *adequate privacy* are those where doors exist and are equipped with a working lock. In case of public toilets, the toilet must be separated by gender. Acceptable privacy is classified by toilets separated by gender with existing doors. *Unsatisfactory privacy* are for example damaged doors and as soon as observation becomes possible.

Illumination is another issue concerning acceptability and comfort. For a detailed classification for adequate to *unsatisfactory illumination* see Table 16.

The share of income for water services includes sanitation and all related expenses, for example, purchase, treatment, maintenance and operation, entrance, etc. The common definition of affordability for water services is already discussed earlier in this chapter.

Indicators for Hygiene Management - Definitions and Limit Values	
adequate supplies	Hand drying towels, toilet paper, menstrual products, bins
acceptable supplies	Toilet paper, bins
insufficient supplies	No bins or toilet paper
Adequate sufficiency	No waiting time
Acceptable sufficiency	< 2 minutes
Insufficient	> 2 minutes
Adequate clean facility	No insects, no smell, no dirt
Acceptable clean facility	Few insects, some dirt, slightly unpleasant smell
Unsatisfactory clean facility	Insects, urine or feces on the floor, smelly
Adequate privacy	Handwash facility is inside the bin is inside
Acceptable privacy	Bin is inside
Unsatisfactory privacy	Bin is outside
Adequate illumination	Illumination is reliably working and no dark corners
Acceptable illumination	Illumination is partly working
Unsatisfactory illumination	No illumination
Adequate share of income	3% - 5%
Acceptable share of income	Above 3 - 5 % but without restricting other basic needs.
Unjustifiable share of income	Hygiene is not affordable without restricting other basic needs.

Table 17: Advanced Hygiene Indicator - Selected Limit Values

The selected indicators for hygiene management are similar or identical with those selected for sanitation. The indicators for sanitation do not include the question about *adequate supplies* like toilet paper, hand drying towels, menstrual product and occurrence of bins. *Acceptable supplies* is classified by the occurrence of bins and toilet paper. And *insufficient supplies* is if toilet paper or bins are missing. Similar categories are applied by Giné-Garriga et al. (2017) with his indicator on "hygiene practices".

Another differentiation between the indicators on sanitation and hygiene management is privacy. In case of hygiene management, the location of bins is important especially for women. Women may be confronted with menstruation management in a cultural context, where the notice of others can lead to shame or social exclusion. A detailed classification provides Table 17.

4.2 Transect Walk

As already mentioned the existing data gap is one of the main obstacles. To fill this gap should be a priority and data collection systems need to be developed, to improve the collection of data. New technology has made it easier to access new sources and to develop innovative ways of data collection. As the special rapporteur states: “civil society also brings qualitative value in analyzing and interpreting results to make sure that gaps in monitoring are detected, and that gender-specific needs are taken into account” (UNHRC 2016).

As part of the TRUST project, a Transect Walk as additional data gathering method is planned. To collect data about public and private sanitation facilities and to provide additional information on access to water and sanitation. Furthermore, the walk is intended to understand some of the culture related issues and viewpoints (Kramer et al. 2018).

4.2.1 A Transect Walk for SDG 6 Evaluation

A Transect Walk - a walk along a predefined path together with locals to observe the given situation concerning a certain topic. A Transect Walk is mostly conducted in rural areas. These are the main components of a Transect Walk. The idea is to gather missing or additional data to evaluate the SDG indicators 6.1 and 6.2 through a Transect Walk. As the new indicators go partly in great detail, for example, the availability of soap. To the authors knowledge, till today no official data sets are published on this topic. A Transect Walk could be an alternative to gather this data. Knowing that the gathered data is not statistically valid, but nevertheless, it will give an overview of the given situation. With this, it is possible to categorize the chosen village in a level of the service ladder as the weakest result is decisive. The fact that the Transect Walk is conducted together with locals gives additional stabilization to the results as there is always the possibility to ask whether there are areas in which other conditions can be found. This may lead to an adoption of the selected route of the Transect Walk, or it ensures that the selected route cuts all different areas of the Location.

The method has been adopted, with the additional aim to use the method, to collect specific information to evaluate the SDG 6.1 and 6.2. The main element is the inclusion of questionnaires. The questionnaire included specific questions about given conditions which are relevant to evaluate the indicator. Some questions asked about given circumstances, for example, the presence of soap or if water connections are working. But other questions were about personal impressions, about hygiene conditions, and

given privacy or comfort. Another questionnaire is prepared, asking about water and sanitation conditions at home places. This gives the opportunity to collect a lot of information in a relatively short time.

The method is applied in Tupicocha a village in the Peruvian Andes. In this particular case, the procedure involved contacting the mayor of Tupicocha to discuss the project. The contact with the school principal is also part of the preparation, as the walk is carried out with pupils of the school in Tupicocha from the fourth and fifth grade. As it is the only school in Tupicocha, the pupils are from the whole village. Covering old as well as newer developed parts of the village.

After having agreed with the participants on time frame and required materials, an advance inspection of the planned route of the Transect Walk is necessary, in order to be able to comply with the specified timeframe. This pre-inspection helps to decide key points or important inspection points that should not be missed under any circumstances. In this case, it is important to visit the sanitary facilities, such as drinking water tank and waste water outlet. To obtain data for the evaluation of the advanced service ladder.

Another major job is the planning of how data is recorded after the walk. In this case, the completed questionnaires are collected, and with the help of a map of Tupicocha the found observations are recorded and summarized together with the pupils.

Table 18 below indicates the fragments of the advanced service ladder where new information can be collected. It is expected to collect additional information on all elements of the human right to water except for affordability. Because the Transect Walk is conducted with pupils and no questions will be asked about the income of their parents. Concrete data on drinking water quality including the compliance of limit values cannot be collected.

	Availability	Accessibility	Quality&Safety	Acceptability	Affordability
Drinking Water	Data collection	Data collection	No data collection	Data collection	No data collection
Sanitation	Data collection	Data collection	Data collection	Data collection	No data collection
Hygiene	Data collection	Data collection	Data collection	Data collection	No data collection

Table 18: Areas where Additional Information was Gathered

4.3 Interviews of Different Stakeholders in WASH

As UN-Women pointed out: “it is critical that the future development agenda be fully consistent with international human right law and focus on overcoming inequalities” (Un Women 2013). Fundamental to human rights is the principle that, individuals are right holders, and states are duty bearers. Realizing human rights for all without discrimination involves all actors, and all carry obligations and responsibilities. Considering the human right to water and sanitation, states are obligated to guaranty access to WASH for everyone (Un Women 2013).

For any successful implementation process participation of different stakeholders and the inclusion of personal motivations play a crucial role. Adding to this is the fact that values aim us towards our targets. If defined targets are imposed externally and are not in line with our values or what we consider as important, it is questionable whether they can be reached at all and if how successful.

Another aspect is the knowledge and awareness of certain situations. Just after the realization and acknowledgment of the conditions and circumstances, a given situation can be transformed into something we may be proud of, we want to protect, or we want to change. Recognition can enable us to connect, what we have acknowledged, to existing values. The named relationships are visualized in *Figure 7*.

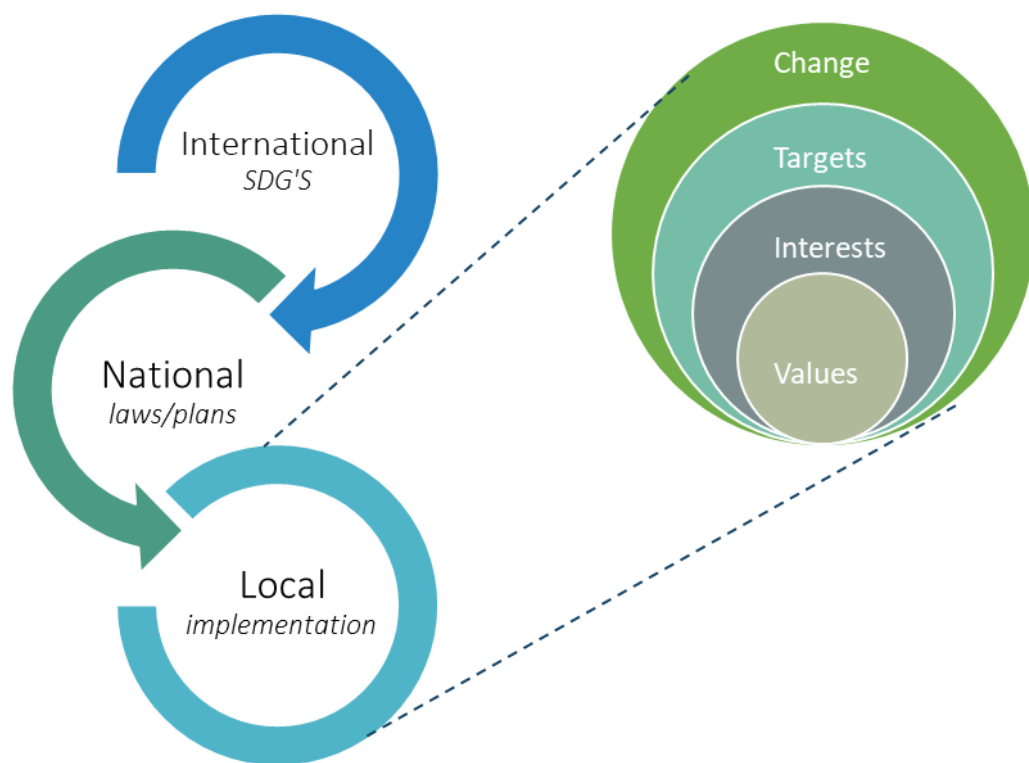


Figure 7: Overview of Interrelations - SDG Process

Having this in mind, the conducted interviews shall give a picture to what extent SDG 6 is acknowledged and in line with local aims and targets. Are the defined targets also seen as important? What are existing or planned efforts to develop the current drinking water and sanitation situation? Exist aspects which are ignored or where no attention is paid too? What about the means of equality especially gender equality in WASH?

To answer these questions, among others, the interview consists of various questions of which most are closed questions. The Interview is divided into four parts, about the actual situation, SDG 6.1 and SDG 6.2, equality and indicator development (see Appendix B - English version and Appendix C – Spanish version). The interview is conducted with different stakeholders from Peru to gain different perspectives on the given situation. The

interviewed people are from different work areas all related to water and include a non-governmental organization, an academic institution and a university, a private company, a governmental institution, and an agency of the United Nations. The interviews are taken anonymous and do not always represent the official statement of the organization or institution, for the interviewed person was encouraged to state their personal opinion about the given situation. five females and one male person were interviewed. The interview lasted about 45 - 60 minutes including the conversation around the questions and other valuable site information related to the given topic.

5 Application of Methods - The Case Study in Peru

To find out if the developed ideas and possible improvements are feasible and applicable in the local context, a case study is part of this work. The case study is conducted in Peru. First part of the case study are interviews to create a deeper inside on the aims and local perspectives on SDG 6 and indicator development. Second part of the case study is a Transect Walk in Tupicocha a village in the Peruvian Andes, to see if this would be a possible tool to gather missing information. And the last part is the application and evaluation of the indicators in Tupicocha.

Peru was selected as pilot test country for SDG 6 monitoring, and the given circumstances of the TRUST Project, a subproject of the University Stuttgart, made Peru a good opportunity to conduct the case study.

5.1 Background Information about Peru and it's SDG Status

Peru has three climatic regions, including the eastern amazon region, the highlands, and the coastal region. In total, Peru has 31.4 million inhabitants, 78.6 percent of them live in urban areas. The Gross National Income (GNI) per capita for Peru is 11,295 (2011 PPP\$)¹. The estimated gross national income per capita, female is 8,939 (2011 PPP\$) and for male 13,655 (2011 PPP\$). The Human Development Index (HDI) for Peru is 0.740 and therewith Peru is on rank 87 out of 188 countries. The HDI value adjusted for inequalities in the three basic dimensions of human development (a long and healthy life, knowledge and a decent standard of living) is 0.580 (IHDI)². The Gender Inequality Index (GII)² for Peru is 0.385. It is a composite measure reflecting inequality in three dimensions (reproductive health, empowerment, and the labor market) between women and men. The numbers show who has been left behind. Even human development has been striking. Still there is a huge imbalance between gender, ethics, socioeconomic and urban and rural areas (UNDP 2017). Peru has improved its economic governance and social integration. Still poverty and inequality among poorest communities are strong. To analyze the economic policy, success on poverty reduction, and social inclusion, has to be monitored to guarantee a stable development in Peru. Today the Peruvian economy the seven largest economy in Latin America. Under former president Pedro Pablo Kuczynski, public investment in infrastructure and has been announced (Focus Economics 2018).

Having a look at the infrastructure situation in the water sector, 2015 the estimation to access to water (MDG 7c) was 95,2% for urban and 92,8% for rural areas. With the SDGs a more advanced version of the MDGs including safe management of water and wastewater, the challenge to estimation and monitoring increased. In Peru, a Regional Technical Team for Water and Sanitation (ETRAS) was conceived through an

¹ Aggregate income of an economy generated by its production and its ownership of factors of production, less the incomes paid for the use of factors of production owned by the rest of the world, converted to international dollars using PPP rates, divided by midyear population.

² For more information see: http://hdr.undp.org/sites/default/files/hdr2016_technical_notes.pdf

"Agreement" between PAHO (Pan American Health Organization)/ WHO and the government of Peru, to contribute to the improvement of health conditions in Peru through its interventions in WASH. They are responsible for the adoption of SDG 6.1, 6.2 and 6.3 at regional and national level. ETRAS is member of the JMP global monitoring programme (ETRAS n.d.).

The estimation of the SDGs is based on the population selection method. Regarding the results of indicator 6.1, it is observed that the percentage of the population that has safe drinking water supply managed at a national level is 31.1% of the population. There is a significant difference between the urban and rural sector, in the urban sector, this percentage is 38.3%, while in the rural sector it is 0.9%. Additionally, the levels of access of the population to a service with an adequate level of continuity are significantly greater than that of the population that accesses a service with an adequate level of water (ETRAS 2017). The Figure 8 below shows the difference between MDG and SDG for drinking water.

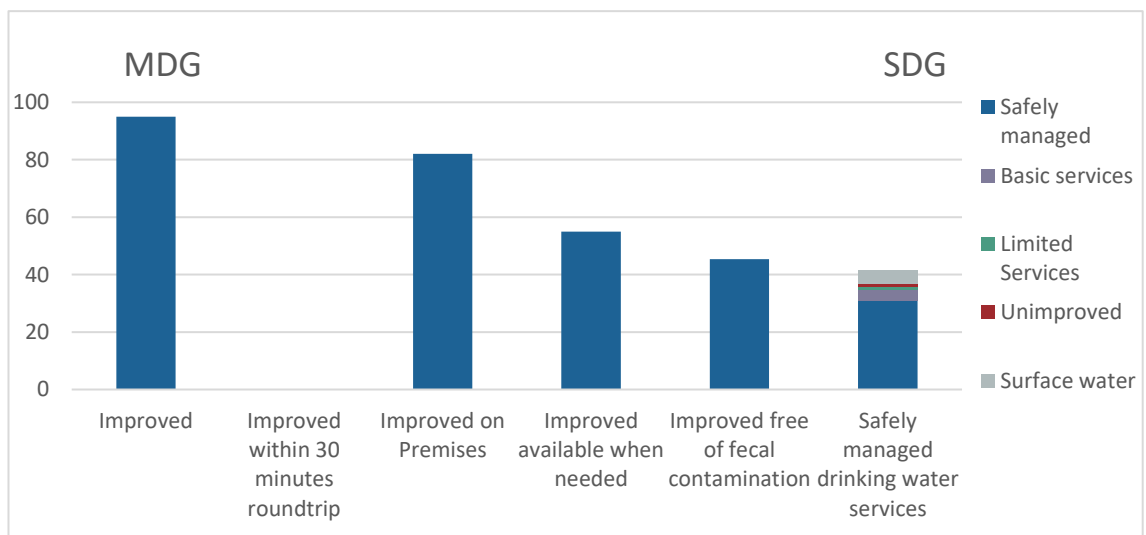


Figure 8: SDG 6.1 Estimates for 2015 (Source: ETRAS; 2017)

The estimation of the percentage of the population that uses a safely managed sanitation system is only on national level. The estimation for urban and rural information which is more detailed is required. The percentage of the population with a sanitation system managed in a safe manner is 15.8% (ETRAS 2017). Detailed results are shown in Table 19 below.

National Results (PERU)

Type of system	% of population	Of which contained	Of which safely disposed insitu	Of which emptied for transport	Of which transported & delivered to treatment plants	Of which treated at treatment plants	Safely managed												
Piped sewers	70,1	90,0			88,0	29,0	15,7												
On site sanitation (septic tanks, improved pit latrins, or composting toilets)	9,7	9,8	9,8	0,0	0,0	0,0	0,1												
Total improved	79,8						Total safely managed 15,8												
Shared or public latrines of an otherwise acceptable type	0,0				<table border="1"> <thead> <tr> <th colspan="2">SDG 6.2 Sanitation Ladder</th> </tr> </thead> <tbody> <tr> <td>Safely managed services</td> <td>15,8</td> </tr> <tr> <td>Basic services</td> <td>64,0</td> </tr> <tr> <td>Shared services</td> <td>0,0</td> </tr> <tr> <td>Unimproved services</td> <td>9,0</td> </tr> <tr> <td>No sanitation services</td> <td>11,2</td> </tr> </tbody> </table>			SDG 6.2 Sanitation Ladder		Safely managed services	15,8	Basic services	64,0	Shared services	0,0	Unimproved services	9,0	No sanitation services	11,2
SDG 6.2 Sanitation Ladder																			
Safely managed services	15,8																		
Basic services	64,0																		
Shared services	0,0																		
Unimproved services	9,0																		
No sanitation services	11,2																		
Unimproved facilities	9,0																		
Open defecation	11,2																		
Total non-basic sanitation	20,2																		
Total improved + total non basic sanitation	100,0																		

Table 19: SDG 6.2 Estimations for 2015 (Source: ETRAS; 2017)

5.2 Evaluation of the Interviews

Part 1 – Present Situation

To get an impression on the present situation in Peru, the interviewed persons were asked to sort predefined aspects of drinking water and sanitation on what they perceive as most developed. Access to water is perceived as most developed as well as for urban and rural. In contrast to the urban context water quality and access to sanitation is ranked lower in rural areas. Interestingly affordability of water and sanitation is seen higher developed in rural areas than in urban areas. A reason for this may be that access to water in rural areas is subsidized. It is believed that thereby the capacity to pay for water and sanitation is given in rural areas. During the interviews, it has repeatedly been reported as a problem that people in rural areas do not want to pay for water, as they are naturally entitled to it. The concept that the payment is not directly for the water but rather for the treatment and the transport of water is not accepted. So, the problem is not the possibility to pay for water, but much more the willingness to pay for water. Figure 9 shows the result of the first questions.

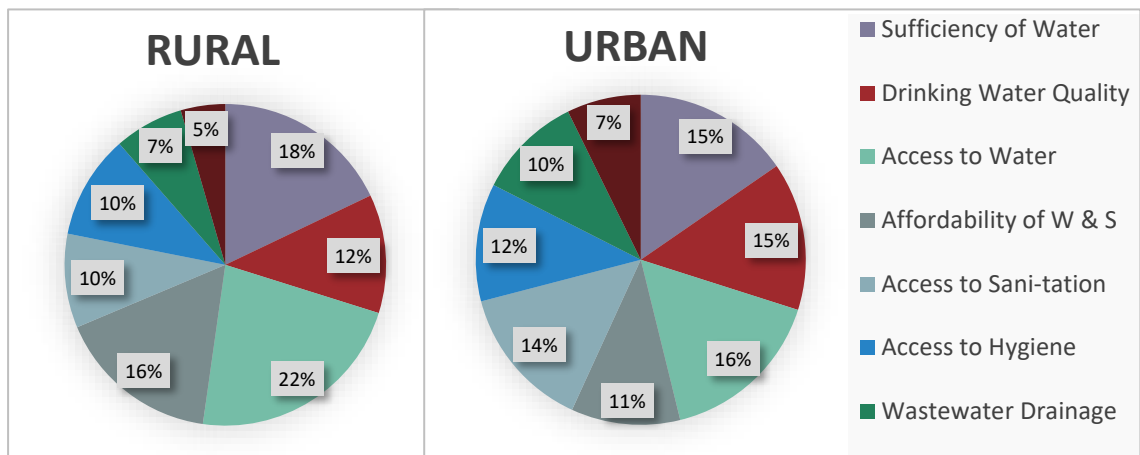


Figure 9: Most Developed Aspects - Water and Sanitation

The most urgent need for action (question 3 and 4) is seen in better water quality for rural areas and for urban areas in wastewater treatment. This was almost always in accordance with all participants. At the same time, the same aspects (water quality and wastewater treatment) are perceived as the aspects with the biggest challenges for urban or rural context (question 7 and 8). Sufficiency of water and access to water are perceived as the areas where recently the most financial resources are invested (question 5 and 6), this is valid for urban and rural context. For detailed results see Appendix D.

The last question of part 1 was about aspects, which are covered in long-term plans (5 - 10 years) of the respective institution or company. Every part of the predefined aspects is covered, but the majority still focus on water quality and access to water see Figure 10. These aspects were also rated as the most developed areas.

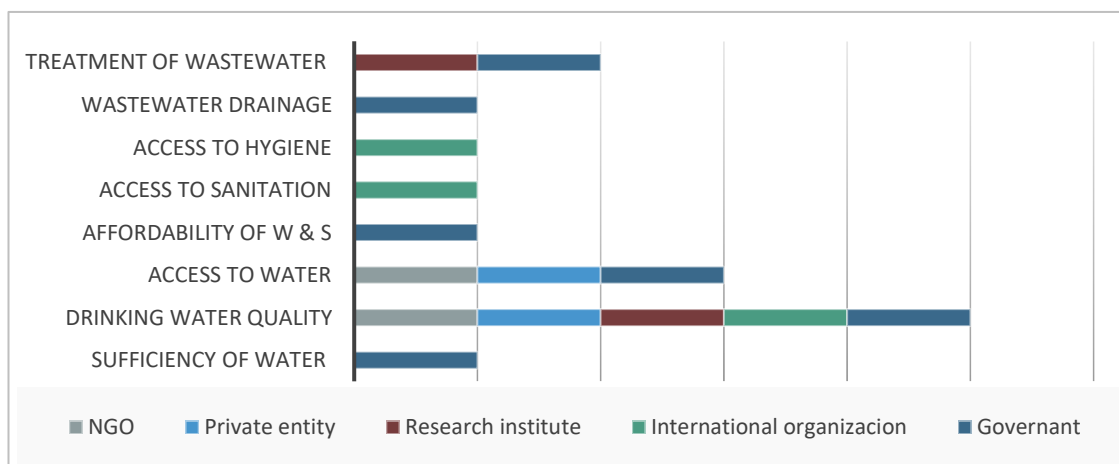


Figure 10: Results - Covered Aspects in Long-Term Plans

Part 2 – SDG 6.1 and 6.2

The SDGs seem to be a familiar term to all the participants but asking in detail which aspects are covered under SDG targets 6.1 and 6.2 the answers turn shallow and vague. Nevertheless, almost all participants can call the basic message of SDG 6; water for all with a certain quality so that it is safe for people to consume it (question 1 and 2).

The fourth and the sixth question asked about which terms of the targets are seen as most important. Since the goals contain exact word terms, which in turn have their definitions related to the context. The terms of target 6.1 UNIVERSAL access to SAFE drinking water are professed as most important. For target 6.2 the opinion about which term is most important is more spread. ADEQUATE ACCESS to sanitation FOR ALL are the highest ranked aspects of the target 6.2.

In addition, the participants were asked to rank the named terms of the targets according to their estimation of relevance in the Peruvian context. As well if they can indicate aspects included in the target where their institution or company sets their focus (question 5 and 7). Figure 11 shows the ranked aspects of the targets and the areas where the companies or organizations currently set their focus.

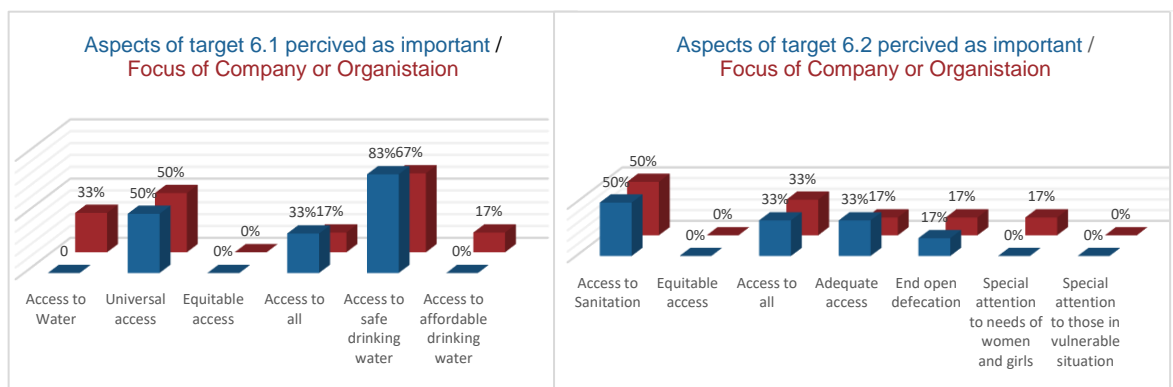


Figure 11: Comparison - Target Aspect Perceived as Important and Focus of the Company

The aspects; special attention to the needs of women and girls and those in vulnerable situations are not seen as important. The reason for seeing these aspects as less important might be that it was possible to choose only two aspects among many others. The focus of the company or institution to pay special attention to the needs of women and girls seems higher. During the interviews, it was told that gender equality plays an important role in the background of reducing violence, especially in household settings.

Part 3 – Equality

The first question of the third part was to figure out in which area the participants perceive the highest inequalities. The highest ranked was the difference between urban and rural, followed by the difference between formal and informal settlements. Disaggregated data

is seen as necessary to achieve the human right *equal enjoyment to the right to water* for all following areas (urban and rural; formal and informal settlements; men and women; disabled and not disabled persons; older and younger people). Almost all participants agreed to this (question 2).

The next question was an open question and focused on inequalities especially between men and women. The participants were asked to state existing inequalities between the genders in Peru. The strongest feedback was on the issue of violence experienced women and girls, mostly referred to in the household context. Other issues like unequal salary and the lack of female participation were also mentioned. Only a few times people referred to water and sanitation in this context. This may be due to the open question, nevertheless, during the interview, the participants were encouraged to think about the context of water and sanitation as well.

Further, the participants were asked if they agree with given statements and how they would rank them according to the relevance they would give the statement (question 4). The statements were selected on the basis of the previous literature review. Figure 12 displays the statements and the percentage according to the received relevance. In order to explain, if all participants would give all their votes to one statement, this statement would have reached 100 percent.

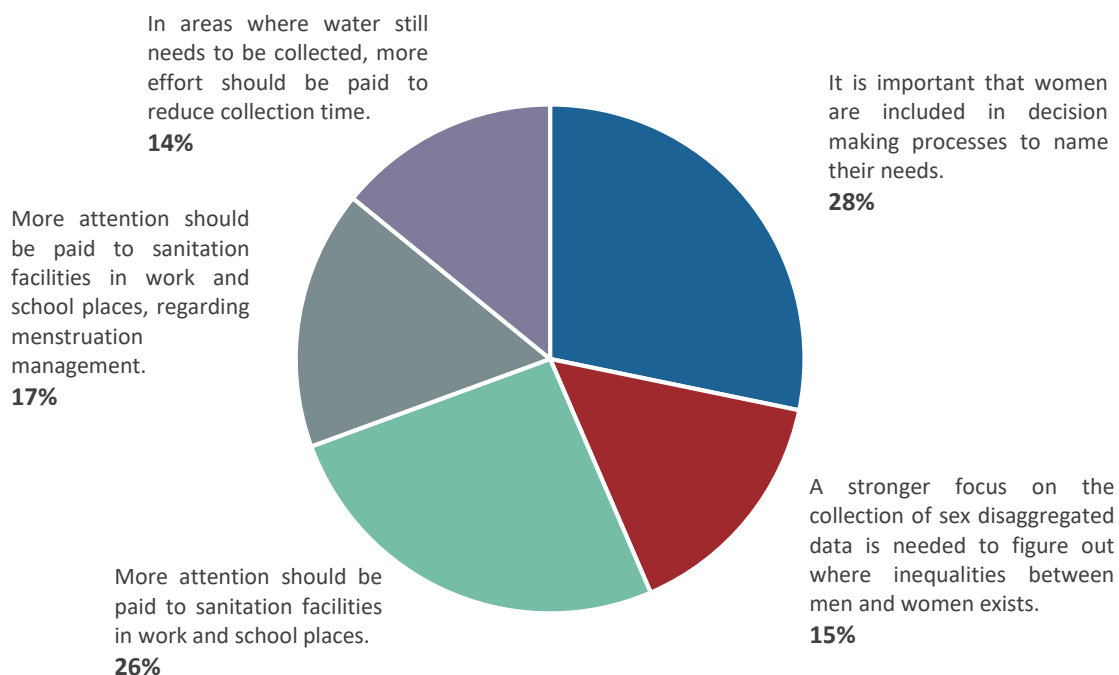


Figure 12: Relevance of Statements in the Context of Gender Equality

Part 4 – Indicator development

Figure 13 illustrates how many percents of the interviewee agree or disagree with the following statements. The results are scattered between all possibilities to answer, but still, it is visible that more often the participants agreed with the statements (question 1).

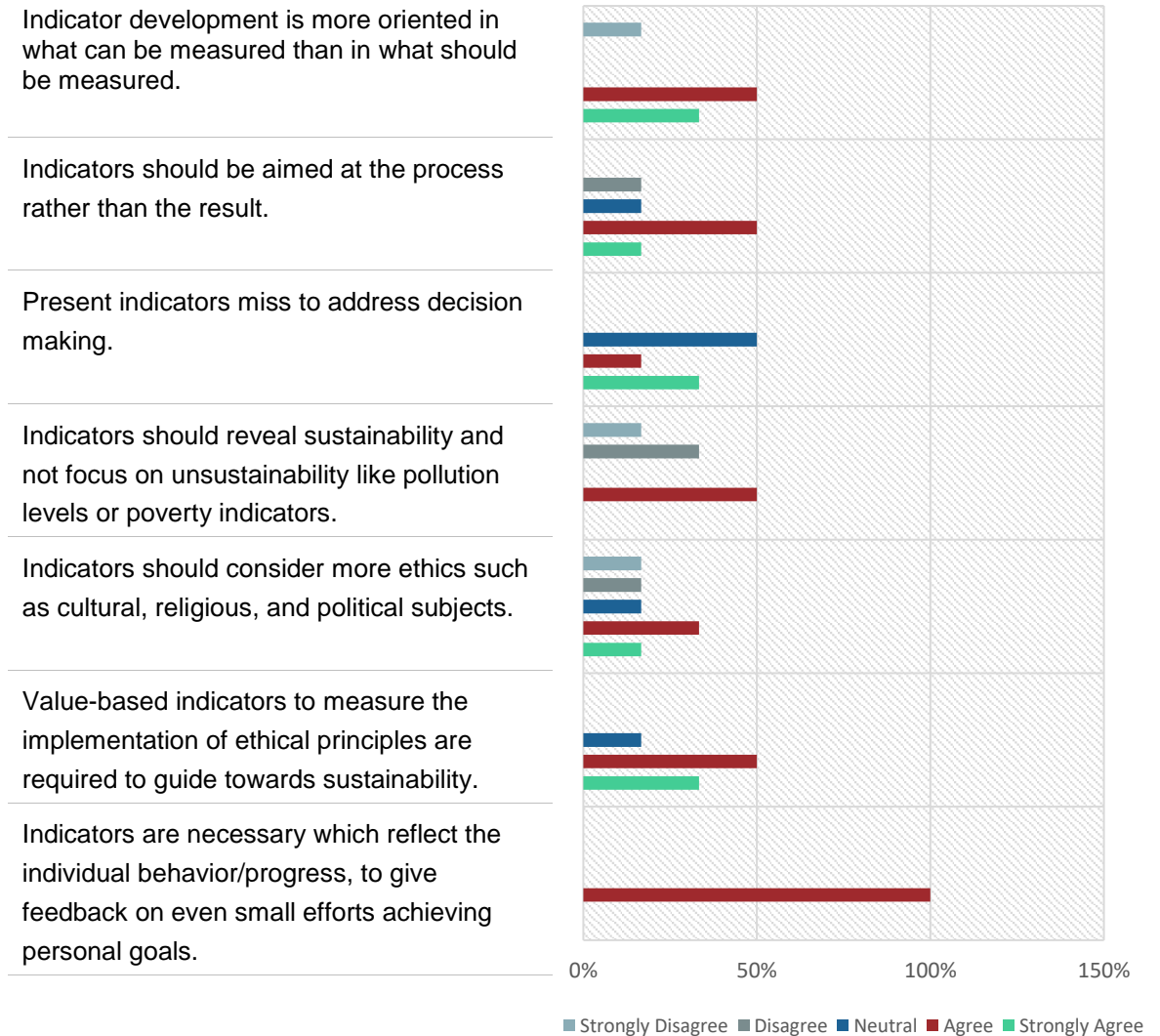


Figure 13: Evaluating of Statements

The next question was about the main challenges for monitoring SDG targets, and also here the answers were scattered. Nevertheless, data availability and the required effort to implement a monitoring system are perceived as the main challenges. The results are plotted in Figure 14.

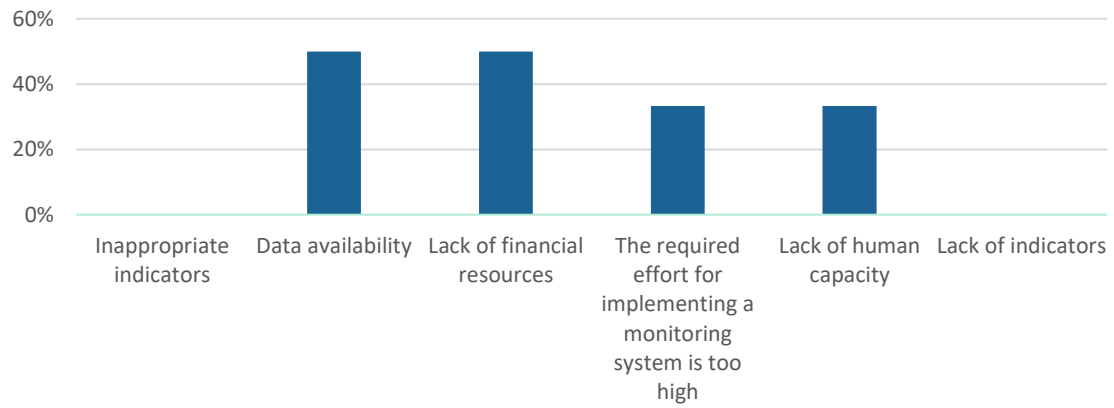


Figure 14: Main Challenges to Monitor SDG Targets

The last question of the interview was directly about indicator 6.1 and 6.2. Considering the present challenges and accepting the fact that a perfect indicator does not exist, the participants were asked how they agree with the following statements. The results and the statements are presented in Figure 15.

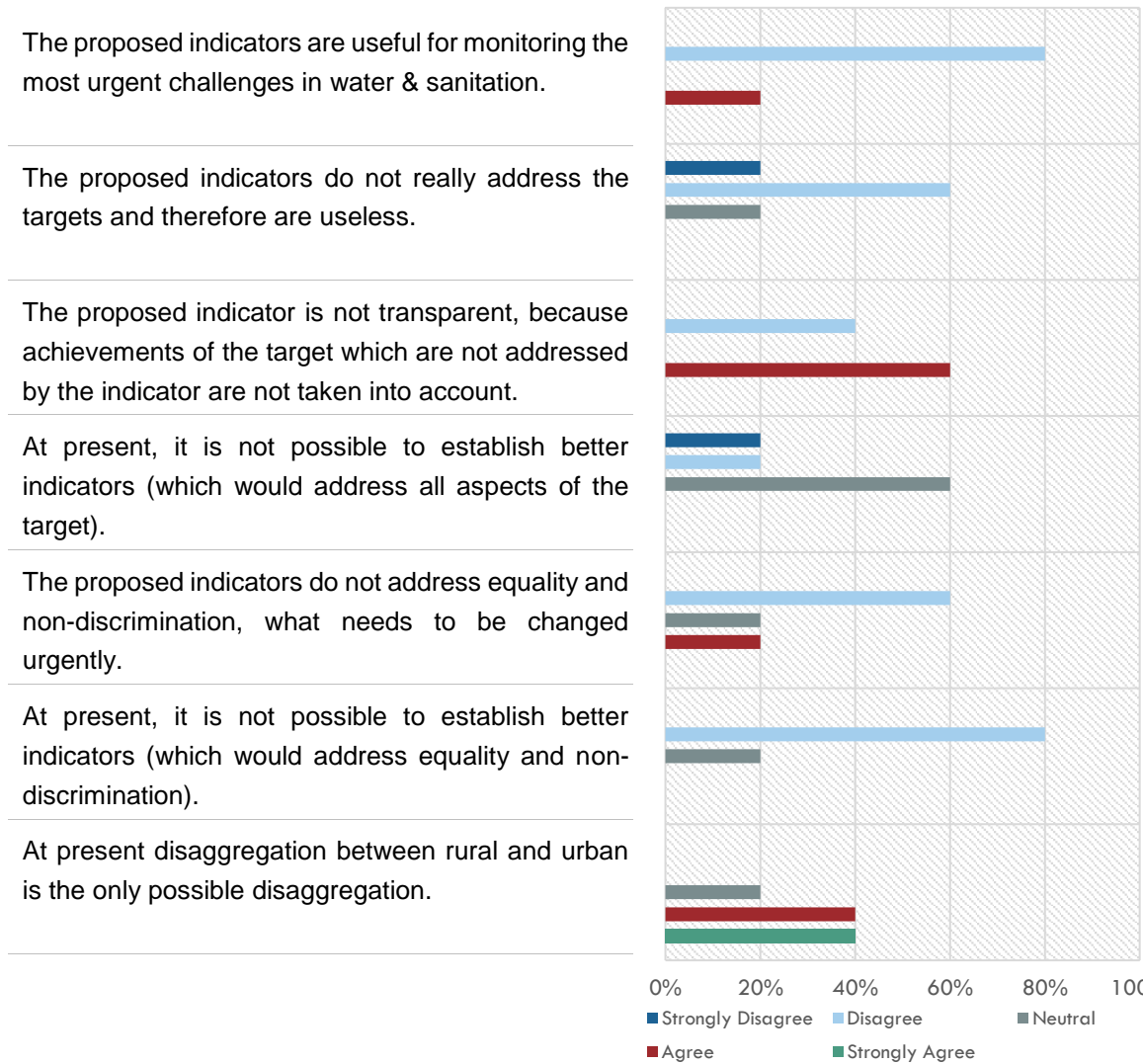


Figure 15: Evaluating of Statements

5.3 Application of the JMP Service Ladder

With the collected data, especially the official census data from the National Institute of Statistics and Information, the JMP service ladder was applied. According to the census data of 2007, Tupicocha has 1423 inhabitants, 705 out of them live in urban areas, and 718 live in rural areas. In total 427 private homes.

Application of JMP Drinking Water Service Ladder in Tupicocha

269 households use potable water (drinking water) 36 use water from wells and 115 from rivers, channels, springs or similar. The type of well or spring and if they are protected is not stated in the census data. Because no detailed information is given the 36 households cannot be classified as an improved source. It is stated that one household uses water from a neighbor and six use other sources. These seven households are not considered in the evaluation.

Out of the 269 households 112 have water on premises that means a public network within the housing and a public network outside but within the building. These households (26,7%) have water on premises and can therefore be classified as safely managed. But having a closer look at the definition of safely managed the addition; *water is available when needed* can reduce the 26,7% to 0,5% for just two households have water twenty-four hours seven days a week. 157 households get their water from public used standpipes. The time needed to collect water is not stated therefore the 157 households are classified as limited (collection time > 30 min.) to avoid glossed over results (Table 20 (2)). An alternative could be the classification of the urban population. This would be 101 households with a collection time less than 30 minutes, as Tupicocha is not a large city and a possible roundtrip from a corner of the city to the center would not exceed the 30 minutes. In that case, the rural households (56) would be categorized with a collection time over 30 minutes as it is unknown how far the distances are to a public pilon (Table 20 (1)). The census contains no data to water quality. Hence this category is not considered in the evaluation.

1) JMP SERVICE LADDER	
Safely managed	26,7%
Basic	24,0%
Limited	13,3%
Unimproved	8,6%
Surface Water	27,4%

2) JMP SERVICE LADDER	
Safely managed	0,5%
Basic	26,2%
Limited	37,4%
Unimproved	8,6%
Surface Water	27,4%

Table 20: Results of the Drinking Water SL Tupicocha; Moderate (1) and Conservative (2) Interpretation.

Application of JMP Sanitation Service Ladder in Tupicocha

Out of the 427 households 306 have no connection to hygienic service. 62 households use septic tanks, cesspits or latrines, 58 have a public drainage network from which 41 households have the network within the housing unit and 17 outside the housing unit, but within the building.

Excreta is not safely disposed in situ or treated offsite. Therefore no household reaches the category safely managed. Additionally, no information is given if the facilities are shared or not shared with other households. It can be assumed that the households with sanitation facilities within the housing unit are not shared facilities. And the households with a network outside the housing unit but within the building can be estimated as households with shared sanitation facilities. A more conservative assessment would be the categorization of all 120 households as such using common sanitary facilities, as no further information is available. One household is connected to a river or channel, but the census contains no information about the type of the facility. As well, it is unclear if and what type of facility the 306 households use which does not have a connection to hygienic service. Those households can be seen as the ones who have to practice open defecation. A more moderate alternative would be the classification of those households as unimproved. Improved sanitation facilities are defined as those, which are designed to hygienically separate excreta from human contact, and these 306 households have no connection to a hygienic service and therefore will be classified as unimproved.

Applying the before mentioned assumptions Tupicocha achieves the following results displayed in Table 21.

1) JMP SERVICE LADDER		2) JMP SERVICE LADDER	
Safely managed	0,0%	Safely managed	0,0%
Basic	9,6%	Basic	0,0%
Limited	18,5%	Limited	28,2%
Unimproved	71,8%	Unimproved	0,0%
Open Defecation	0,0%	Open Defecation	71,8%

Table 21: Results of the Sanitation SL Tupicocha; Moderate (1) and Conservative (2) Interpretation

No official data is available to estimate the Hygiene service ladder.

Appendix E gives a more detailed inside of the indicator estimation for Tupicocha as well as the difference between the urban and rural context.

5.4 Application of the Advanced Service Ladder – Utilizing the Transect Walk as Data Collection Tool

The advanced service ladder covers all aspects of the human right criteria (availability, accessibility, quality and safety, acceptability and affordability). The conducted Transect Walk gives additional information and enables to proof or disproof assumptions taken during the application of the national census data to the JMP service ladder. The available census data is from 2007, and the Transect Walk was done in 2018. With a gap of more than ten years, the Transect Walk is not applicable to supplement the census data from 2007.

Exact limit values may vary from country to country and must consider the local context. For the case study in Tupicocha, the limit values defined in chapter 4.1.2 are used.

Gathered Data during the Transect Walk

During the walk, visual information and information shared by the participants were gathered. Additionally, the pupils had to fill in a questionnaire. The questions included their drinking water and sanitation situation at home. As well the conditions of a public toilet in Tupicocha and the school toilets were evaluated by the pupils. During the given time period it wasn't possible to enter households. With this method, it was not feasible to cover all aspects of the targets for example data on affordability was not collected. But quite a lot of additional information could be gathered.

The questionnaire was anonymously and in total twelve pupils participated in the walk, not everybody answered all questions. The results and the proportions can be found in the draft report - A transect walk in San Andrés de Tupicocha Lurín River Basin / Huarochirí Peruvian Andes by Kramer et al. 2018.

All households have connections to piped drinking water, the JMP definition of an improved water source includes, piped water into the place of dwelling and protected wells or springs (UNICEF and WHO 2017). For Tupicocha it seems that all households have an improved water source. The water is *piped water* into their households or yards. But the water comes from an unprotected source, and the only existing treatment, a chlorination unit is not working. With this information, it is also possible to classify the water as not free of chemical and fecal contamination, as there is no treatment and therewith no guarantee for safe water. Additional the pupils stated that they always boil their water before using it. Even a case was reported where a dead animal was found in the water channel contaminating the water. The advanced service ladder has more categories for the quality and safety parameters. And classifies the condition of water not just in *free of* but also in *acceptable* and *health-endangering* fecal or chemical contamination. For Tupicocha the drinking water was categorized as *health-endangering* since a case of sick people was reported because of unsafe drinking water. To receive a feedback on acceptability like color, odor, and taste of the water the pupils could state their personal opinion. The Transect Walk was conducted with pupils. Therefore questions concerning affordability of water were not asked.

As already mentioned not just the situation at home but also sanitation facilities at their school place and a public toilet was inspected. The public toilets have water connection and are connected to the canalization. But private requirements are not given, because whole doors were missing, or locks didn't exist or did not work. Also, cleanness was unsatisfactory for the pupils. Hand wash facilities existed, but without water and soap. The school toilets provided adequate privacy, they were separated by gender as well as the public toilets had bins and doors with working locks. Outside of the building a handwashing facility existed with running water, but no soap was available. The exact results of the questionnaire are included in the draft report of the Transect Walk.

Evaluating the questionnaires of the pupils the results for Tupicocha are presented in Table 22. Drinking water is with 100% classified as limited. The classification as limited is because of the above mentioned circumstances, that it cannot be guaranteed that water is free from fecal contamination. Sanitation is categorized as basic, main reason for this is that excreta is not treated and therewith not safely managed. 90 % of the pupils stated that it is drained into a sewer system hence no contact with humans and no infection risk. The reduced achievements for public and school toilets are because of the found cleanliness in the facilities. The decisive factor for the hygiene condition was the presence of soap. The table below shows the highest achieved results, meaning that if for example 58% is safely managed (hygiene service ladder), 42% are below the category of safely managed. The detailed results can be seen in Appendix F.

ADVANCED SERVICE LADDER - PRIVAT HOMES		ADVANCED SERVICE LADDER - PUBLIC TOILETS		ADVANCED SERVICE LADDER - SCHOOL TOILETS	
Limited	100%				
Basic	90%	Basic	64%	Basic	83%
Safely managed	58%	Limited	100%	Limited	100%
Drinking Water		Sanitation		Hygiene	

Table 22: Results Advanced Indicator - Tupicocha

With the Transect Walk, additional information was gathered through conversations with participants and teachers. Because of that, it was found out that drinking water is piped into the households, but the source is unprotected, what changes the classification from limited to unimproved. Sanitation archives the status of 'basic' because *excreta is partly safely disposed* (this includes no infection risk). Excreta is drained into a sewer system and untreated released in the nearby ponds or streams which are then used for irrigation, which is an infection risk if later crops are consumed raw and not all pathogens have been removed by washing. Considering this, sanitation would not anymore be basic instead. The new category would be limited.

The detailed results including school and public toilets are in Appendix F.

6 Discussion

The present work was designed to investigate the selected indicators for SDG target 6.1 and 6.2. Integral part was the advancement and the application of the indicators. This included the method of a Transect Walk to gather additional data and interviews with local stakeholders to receive an inside on actual efforts regarding SDG 6.1 and 6.2.

The interviews have their limitations. Only a small group of people were interviewed, the results are not statistically relevant. A personal assessment of the respondents was requested to obtain relevant background information for this work and to gain understanding into locational challenges and assessments. Therefore, the results of the interviews are assigned to the respective topics discussed in the following, to reinforce or to look with cautions on the findings.

In the following discussion, the main elements of this work are combined. The advanced service ladder is a key element of this thesis and will be discussed in relation to the requirements for indicators. Furthermore, it will be considered to what extent the needs of women and girls relevant to the WASH sector have been integrated. As next, the application of the advanced service ladder will be addressed, including the Transect Walk for data collection and the comparison between the advanced service ladder and the service ladder established by the JMP.

Critics on the MDGs concerning water and sanitation were taken seriously and implemented in the concept of the SDGs, which led to a broader and more detailed indicator for the water sector. In the case of Peru estimations of safely managed water dropped down from 90% to 30%. Applying an even more detailed indicator or it could be also seen as a more complete indicator comprising all elements of the human right to water estimations decrease further.

Focus during the advancement of the indicator was to maintain the principle of the service ladder. This serves for better comparison and benefits the implementation since the concept of the JMP service ladder is an already used monitoring system of SDG 6.1 and 6.2.

6.1 Indicator Requirements

To advance the indicator, a first step was the analysis of the relationship between targets, the human right to water and selected indicators. As well as the consideration of the needs of women and girls in WASH. Not all elements of the human right to water are addressed by the targets and even less by the indicators. Three out of the five elements (availability, quality and safety, and accessibility) are always addressed in contrast to the elements of affordability and acceptability, which are rather sparsely addressed. Also does the indicator not reflect on all aspects contained in the target and leaves out elementary components. Hák et al. (2007) point out that a main criterion of an indicator is its relevance and the clear link to the target, which is not given. Because the indicator does not address all aspects specified by the target. The interviews may underline the in

literature required attributes, that targets and indicators should be in line with local aims and efforts. On the basis that access to water and water quality (which are recent local efforts) are part of SDG target 6.1 and wastewater treatment which is part of target 6.2. Nevertheless, the targets include much more aspects which are not all considered equally important by the stakeholders.

Legitimacy is another attribute of an indicator and is defined as a fair and respectful assessment and the conformity to recognized principles or accepted rules and standards (Hák et al. 2007; Heink et al. 2015). The human right to water is legally binding for states and can be seen as a basic standard for WASH. The recognition of standards and rules like the human right to water by the indicator is not given.

An increase in voices is found in the calling for targets and indicators, which include ethical principles and values. Evidence exists, that if strategies are aligned with personal motivations of stakeholders, they are more successful. However, concrete examples for value-based indicators in WASH were not found. Most probably it comes from the great challenge to implement new measurement strategies in order to collect and evaluate qualitative data. As mentioned above, value-based indicators are important and necessary as they may reveal the acceptance of targets by the individuals, which is crucial for success. Because of the decision made to advance the already established service ladder and to include all elements of the human right to water, value-based indicators are not in focus. Within the scope of the case study, interviews are carried out which include questions on value-based indicators. Looking at indicator development two statements of the interview seem by the majority assured: Value-based indicators to measure the implementation of ethical principles are required to guide towards sustainability and indicators are necessary which reflect the individual behavior and progress, to give feedback on even small efforts achieving personal goals. As discussed in chapter 2.2.3 value-based indicators and the inclusion of ethical principles and to take every single person into account seems not just a theoretical idea, it is perceived as important also by the interviewed persons.

Finally, it can be summed up, that the service ladder meets some of the requirements found in literature, the ladder is able to reveal progress because of the categorization in different achievable levels. Even more so the advanced service ladder because of a finer categorization. The framework also provides a headline indicator – safely managed -, and defines what is safely managed, by providing additional indicators. An indicator should be multidimensional and should include qualitative and quantitative indicators. The JMP service ladder is based on quantitative data, with the inclusion of indicators on acceptability (perceived cleanness or privacy conditions), the advanced service ladder adds qualitative indicators.

Another requirement is analytical soundness and measurability, this means statistically valid, based on accessible data, and comparable. Considering the named aspects, the advanced service ladder is weak.

The political relevance as a main attribute of an indicator is given. As the human right to water as legally binding should be relevant to all national policies. However national aims and focuses may vary from the defined goals of the SDGs.

This study is unable to encompass the entire requirements for indicators, further research, on comparability of data gathered during the Transect Walk, the validation of this data is needed. As well as supplementary investigation of the inclusion on value-based indicators also for monitoring SDGs is recommended. This is consistent with Hák et al. (2007) the criteria are well defined regarding theory, but the practical use and the implementation is still a challenge.

6.2 Inclusion of the Needs of Women and Girls

The indicator and the established service ladder do not address gender issues directly. Grant et al. (2016) argue, that for monitoring SDG 6 and to enable decision making in WASH regarding gender issues sex-specific indicators and sex-disaggregated data are a prerequisite. Seager (2015) states that the progress towards SDGs is not possible to be fully measured if the situation between men and women in different cultural backgrounds can't be measured. The interviews showed, that the opinion about the indicators to measure SDGs is wide-ranging. The interviewees agree that better indicators are possible and at the same time it is agreed that at present disaggregated data can be collected only for urban and rural areas. The problem of data availability and specifically for disaggregated data is often used as the reason for the indicator selection.

Additionally, the answers to the interviews show that the topic on gender issues in WASH is not prioritized in the local context. For example, in the case of questioning, which aspect of the goal is perceived as important, *to pay special attention to the needs of women and girls* has not received a vote. However, the statements *more attention should be paid to sanitation facilities in work and school places*, and *it is important that women are included in decision making processes to name their needs* received the highest relevance. According to this, it can be concluded that the other aspects of the target are considered important, but nevertheless, the unchecked aspect to pay attention to the needs of women and girls is therefore not unimportant. Nevertheless, it was stated that within the surveyed organizations and companies no effort is made on gender aspects.

The advanced service ladder includes more aspects to address the needs of women and girls in WASH. The Table 23 below indicates in red which aspects have been added to the service ladder.

Service Ladder		JMP Service Ladders		Advanced Service Ladders	
Selected Issues of Women and Girls in WASH					
1 Time spent					
- for water collection	✓	←	✓		
- to access sanitation facilities	-		✓	←	
- for cleaning sanitation facilities and handling excreta	-		-		
2 Sickness and death related to water born diseases					
- because of bad water quality	✓	←	✓		
- because of unhygienic conditions (e.g. unsafe disposal of excreta)	×	←	×		
- during pregnancy (unsafe water conditions in hospitals)	×	←	×		
- infection because of caregiving activity of other sick people	×	←	×		
3 Management of Menstruation					
- privacy for changing materials and body washing	×	←	✓	←	
- access to water and soap	✓	←	✓		
- access to disposal facilities	-		✓	←	
- affordability and accessibility of menstrual products	-		✓	←	
- sickness because of unsafe conditions to manage menstruation	-		×	←	
4 Violence					
- if no sanitation facilities are available sexual harassment may occur practicing open defecation especially during night	×	←	×		
- or at public sanitation facilities	×	←	×		
- or on the way to reach a place where to relieve themselves	×	←	×		
- at public places to bath, wash cloth and collect water	×	←	×		
5 Stigma and Taboos					
- stereotypes of women and men's role at work or home	-		-		
- taboo topics like menstruation	-		-		
6 Participation					
- lack of women in policy and decision making position	-		-		
- lack of involvement of women during project implementations	-		-		
✓ Aspect is fully included in the SL	×	SL includes demands which address the Aspect	×	Aspect is partly addressed	- Aspect is not addressed

Table 23: Comparison between Service Ladders - Addressing Selected Needs of Women and Girls

Many topics such as participation and the topic of stigmas and taboos are still not included. Nonetheless the advanced service ladder is a start. Not all aspects have been addressed, and still many aspects are not fully addressed. Added are access time to sanitation facilities, access to disposal facilities, affordability of menstrual products, and privacy requirements. With this more opportunity is provided to respond to the added aspects, to bring change and ultimately to provide for improvement.

6.3 Transect Walk

The Transect Walk is a qualitative data collection tool in this case intended to supplement quantitative census data. The OHCHR (2012) point out that quantitative and qualitative analyses should be seen as helpful to complement each other. The combination of this methods has a great potential, to be this complementation. With the qualitative information gathered during the walk, circumstances which are not captured by census data and would change the final result were revealed.

Nevertheless, the findings must be viewed with caution, as most data gathered through the Transect Walk are personal observations of a single day and trust-based information obtained by participants which in this case had no technical backgrounds. Another critical point is that the possibility to gather data with a Transect Walk is limited. The walk does not allow to receive data on chemical or biological contaminations except for simple measurements like turbidity. Nevertheless, it was possible to classify the water as not safe. On the basis of reported cases of illness, the non-functioning chlorination, as well as practiced precautions such as boiling the water.

The idea to use the Transect Walk as an additional tool to fill data gaps especially for local contexts and to gather information which is not included in national census data did not work out. As the actual national census data is not published so far and to mix information from the last census in 2007 with information gathered with the Transect Walk conducted in 2018 would not give accurate results. Still, the Transect Walk has proved to be a valuable instrument in collecting treasured information which goes beyond survey data from national censuses. The tension between the continued monitoring over decades and the need for new indicators with short intervals to match policy cycles is strong. From this point of view, a Transect Walk could be helpful as it is easy to perform compared to large-scale national censuses and therefore it can be used more often. In the case of Tupicocha, it would even be imaginable that the school makes a Transect Walk and records the progress and regressions once a year. The walk itself is a great opportunity to increase participation and to involve locals and different stakeholders. To invest in complementary qualitative data collection is necessary because indicators can only be as good as the data that feeds them. Which means more qualitative data would make indicators more informative.

The question of acceptance of the data remains open. Challenges here are the combination of quantitative and qualitative data. For future application, structural methods accepted and above all, unified (standardized) procedures are missing.

6.4 Comparison of the JMP and the Advanced Service Ladder

A direct comparison of the results between the service ladder from JMP and the advanced service ladder is not possible. The latest found census data is from 2007 and was used for the application of the JMP service ladder. For the application of the advanced service ladder, the data gathered during the Transect Walk in 2018 was used. The time span in between is too large to compare the numbers. Nevertheless, it can be said that it is harder to maintain higher levels of the service ladder if the advanced service ladder is applied. The advanced service ladder has more categories and indicators, and if one category is worse than the others, it will be the decisive one. Figure 16 illustrates this concept.

	HR Element 1	HR Element 2	HR Element 3	HR Element 4 New Indicator	HR Element 5 New Indicator
Safely managed	✓	✓	-	-	-
Basic	-	-	✓	-	-
Limited	-	-	-	✓	✓
Unimproved	-	-	-	-	-
Not	-	-	-	-	-

Figure 16: Illustration - Decisive Factor

With new indicators, limit values have to be determined, and additional data is required. This leads to a higher effort and work volume to apply the advanced service ladder. But the results obtained cover a wider spectrum and provided a more accurate picture of the situation encountered.

Applying the service ladder in Tupicocha (moderate estimation) results are close to the national average of 30% safely managed drinking water. Applying the advanced service ladder results drop down to 100% limited service. Because of insufficient protection of the source and therewith the potential for bad water quality. Similar are the results for sanitation. Tupicocha is classified with basic sanitation, because of no wastewater treatment. The responses during the interviews reinforce this. Access to water was identified as the most developed area. Nevertheless, it was stated that there is still a need for action on water quality, especially in the rural context. Another area in which great need for action is seen is wastewater treatment. But looking at the results of another question, one finds that in the long-term plans of the companies and organizations the aspect of wastewater treatment is not in focus. Much more they will continue on access to water and water quality.

One important and strongly influencing point on results are the chosen categories and limit values, for the advanced indicator. For this work chosen values are defined by common sense or those found in literature. This is an area where more research is

needed. What the human right to water means on a local level should be further investigated with socio-scientific methods.

Even though the advanced service ladder leads to a generally lower result, the advanced service ladder depicts the local reality better than the JMP service ladder. Since the results are vital for future policy proposals and measurement of indicators the advanced service ladder would improve the situation, especially for women and girls and the implementation of the human right to water and sanitation.

7 Conclusions and Outlook

The present thesis “Evaluating SDG indicators 6.1 and 6.2 taking into Consideration the Importance of Gender Equality” examines the selected indicators to monitor SDG 6.1 and 6.2 having regard to the needs of women and girls, as well as existing inequities in WASH.

For this purpose, first background information on sustainable development, sustainability indicators, and indicator monitoring were gathered through literature research. Recent emphasis is on a model for sustainable development which includes ethical values, or moral imperatives as they are key constraints in human behavior. This approach reaches also into indicator development, calling for indicators which capture factors such as individual behavior and respect for environmental limits. Hindrance for such approaches may be on the one hand the dominance of national economics (Dahl 2012) and on the other hand the great challenge in SDG monitoring to develop indicators which are applicable to all countries and allow comparison. This allows to comprehend an approach which is driven by data availability. Even though the larger goal should still be to develop its indicators and associated measurement systems, asking what should be measured rather than what can be measured.

For monitoring SDG 6.1 and 6.2, a joint monitoring programme (JMP) comprising WHO and UNICEF is responsible. The JMP monitors since 1990 the WASH sector. They established three so-called “service ladders” which define different levels on the way to reach total fulfillment of the selected indicator. The service ladder is a worldwide established monitoring system.

To evaluate the indicators, further research was done on the interrelation of gender and WASH and on the concrete challenge woman and girls must face. This included an overall look at the human right principle of equality and the requirements for the human right to water and sanitation. After the literature research on the named topics was done, the indicators were evaluated in respect to their relationship to the target and the human rights to water and aspects on gender equality in WASH. Targets and indicators do not address all principle to the human right to water and are weak to address in a direct way issues women and girls must face in WASH.

A next step was the advancement of the indicator. This work continued with the idea of the service ladder as it is the officially used for monitoring SDG 6.1 and 6.2. This will also serve better comparison and benefits the implementation. The advanced indicators address all aspects of the human right criteria to water. With a greater diversified indicator all aspects of the human right to water can be addressed, and a greater coverage of the target aims is possible. Including the statement to pay special attention to the needs of women and girls. Many details of the aspects are still not addressed, like stigmas and taboos as well as participation of women in decision making positions.

Last part of this thesis was a case study in Peru. The case study included interviews conducted in Lima, of different institutions from research institutions to public entities and NGOs. Which included questions to match the extent to which SDG 6 match local efforts

and aims. A first impression after conducting the interviews was that the influence of the MDGs, which were valid for decades, is still present. The effort to increase access to safe drinking water and sanitation seems to be the driving reason. Not all defined terms and aspects of the target are seen as equally important; some haven't been selected during the interview at all. The statements in the section equality, more attention should be paid to sanitation facilities in work and school places, and it is important that women are included in decision making processes to name their needs received the highest relevance. What is considered as important coincides with the focus of the respective companies and organizations. Value base indicators and the inclusion of ethical principles and to take every single person into account seems not just a theoretical idea, it is perceived as important also by the interviewed persons. Overall, the interviews were helpful to gain inside and helped to understand the given context in Peru, and how the topic of the SDG is dealt with.

Another component of the case study was a Transect Walk in Tupicocha a village in the Peruvian Andes. The Transect Walk was intended as an alternative data collection method, to supplement national censuses and other official data. As discussed in the previous chapter the Transect Walk has proved to be a valuable instrument in collecting treasured information which goes beyond survey data from national censuses. An additional benefit is the involvement of stakeholders and locals. Nevertheless, the possibility to gather data with a Transect Walk is limited, and an uncertainty of the validation of the data remains as the walk is conducted with a small group of peoples which later represent the situation of the village.

The Transect Walk which is described in this work may be transferred to other projects, background knowledge from previous projects would be an advantage. To conduct a Transect Walk with locals, already established good relationships are important. As a Transect Walk can only work out with the willingness of locals. Further on it can deepen the relationships and increase a sense of involvement and interest. To collect data, a good preparation on which data is wished to collect and how this information will be documented is essential. As this experience has shown participants showed a higher interest and asked about more information and wished to be involved further on the progress of the project (for this case study the Transect Walk was part of the TRUST project).

To conclude, perfect indicators do not exist, also is the advanced service ladder not perfect. The fact that all aspects of the human right to water are included could be a great support for the achievements of the right to water and sanitation for all. Even though the indicators are not fully developed yet, they represent a start. A benefit of the advanced service ladder is that it includes more categories and intermediate stages. Which are important for measuring progress and useful for the countries to record small successes.

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Appendices

Appendix A

Definitions - Human Right to Water and SDG 6.1 & SDG 6.2

Definitions - Human Rights to Water and Sanitation	
Sufficient	The water supply for each person must be sufficient and continuous for personal and domestic uses. These uses ordinarily include drinking, personal sanitation, washing of clothes, food preparation, personal and household hygiene.
Safe	The water required for each personal or domestic use must be safe, therefore free from micro-organisms, chemical substances and radiological hazards that constitute a threat to a person’s health. Measures of drinking-water safety are usually defined by national and/or local standards for drinking-water quality.
Acceptable	Water should be of an acceptable color, odor and taste for each personal or domestic use. All water facilities and services must be culturally appropriate and sensitive to gender, lifecycle and privacy requirements.
Physically accessible	Everyone has the right to a water and sanitation service that is physically accessible within, or in the immediate vicinity of the household, educational institution, workplace or health institution.
Affordable	Water, and water facilities and services, must be affordable for all.

Source: <http://www.unwater.org/water-facts/human-rights/> [accessed: 11.12.2017]

SDG Target 6.1	Normative Interpretation
By 2030, achieve universal	Implies all exposures and settings including households, schools, health-care facilities and the workplace
and equitable	Implies progressive reduction and elimination of inequalities among population subgroups
access	Implies that sufficient water to meet domestic needs is reliably available close to home
to safe	Safe drinking water is free from pathogens and elevated levels of toxic chemicals at all times
and affordable	Implies payment for services does not present a barrier to access or prevent people from meeting basic human needs
drinking water	Water used for drinking, cooking, food preparation and personal hygiene
for all	Suitable for use by men, women, girls and boys of all ages, including people with disabilities

Source: *Integrated Monitoring Guide for SDG 6 Targets and global indicators; UN-Water (2016)*

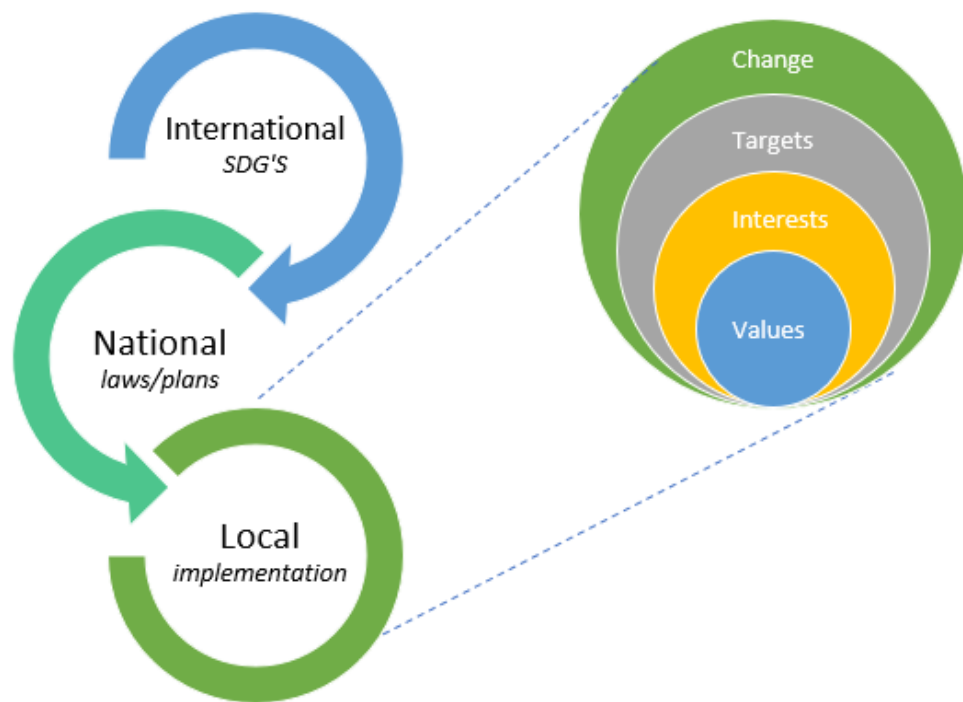
SDG Target 6.2	Normative Interpretation
By 2030, achieve access	Implies facilities close to home that can be easily reached and used when needed
to adequate	Implies a system that hygienically separates excreta from human contact as well as safe reuse/ treatment of excreta in situ, or safe transport and treatment off site
and equitable	Implies progressive reduction and elimination of inequalities among population subgroups
sanitation	The provision of facilities and services for safe management and disposal of human urine and feces
and hygiene	The conditions and practices that help maintain health and prevent spread of disease including handwashing, menstrual hygiene management and food hygiene
for all	Suitable for use by men, women, girls and boys of all ages, including people with disabilities
and end open defecation	Excreta of adults or children are: deposited (directly or after being covered by a layer of earth) in the bush, a field, on a beach or in any other open area; discharged directly into a drainage channel, river, sea or any other water body; or wrapped in temporary material and discarded
paying special attention to the needs of women and girls	Implies reducing the burden of water collection and enabling women and girls to manage sanitation and hygiene needs with dignity. Special attention should be given to the needs of women and girls in high-use settings such as schools and the workplace, and high-risk settings such as health-care facilities and detention centers
and those in vulnerable situations	Implies paying attention to specific drinking water, sanitation and hygiene (WASH) needs found in special cases including refugee camps, detention centers, mass gatherings and pilgrimages

Source: *Integrated Monitoring Guide for SDG 6 Targets and global indicators; UN-Water (2016)*

Appendix B

Interview sheets (English)

Interview on current and future perspectives, goals and targets in the drinking water and sanitation sector



Your Background information

1. Name
(*CONFIDENTIAL, only if you are willing to provide it*)

2. Name of your working institution
(*CONFIDENTIAL, only if you are willing to provide it*)

3. Gender *Male* *Female*
4. Work Area *University*
 Research institute
 Government
 Nonprofit organizations
 Private entity
 Other (please state)

5. Work focus

6. Years of experience *Between 2 and 5 years*
 Between 6 and 10 years
 More than 10 years

Current Situation

- 1) Sort the following Areas and Aspects from most developed (8) to least (1) in **urban areas** according to your opinion.

- | | |
|--|---|
| <input type="checkbox"/> Sufficiency of Water | <input type="checkbox"/> Access to Sanitation (toilets) |
| <input type="checkbox"/> Drinking Water Quality | <input type="checkbox"/> Access to Hygiene* |
| <input type="checkbox"/> Access to Water | <input type="checkbox"/> Drainage of Wastewater |
| <input type="checkbox"/> Affordability of Water & Sanitation | <input type="checkbox"/> Treatment of Wastewater |
| | <input type="checkbox"/> <i>Other (please state)</i> |
-

- 2) Sort the following Areas and Aspects from most developed (8) to least (1) in **rural areas** according to your opinion.

- | | |
|--|---|
| <input type="checkbox"/> Sufficiency of Water | <input type="checkbox"/> Access to Sanitation (toilets) |
| <input type="checkbox"/> Drinking Water Quality | <input type="checkbox"/> Access to Hygiene* |
| <input type="checkbox"/> Access to Water | <input type="checkbox"/> Drainage of Wastewater |
| <input type="checkbox"/> Affordability of Water & Sanitation | <input type="checkbox"/> Treatment of Wastewater |
| | <input type="checkbox"/> <i>Other (please state)</i> |
-

- 3) Where do you see the most urgent need for action in **urban areas** (please select **one** single answer)?

- | | |
|--|--|
| <input type="checkbox"/> Sufficiency of Water | <input type="checkbox"/> Access to Sanitation |
| <input type="checkbox"/> Drinking Water Quality | <input type="checkbox"/> Access to Hygiene* |
| <input type="checkbox"/> Access to Water | <input type="checkbox"/> Drainage of Wastewater |
| <input type="checkbox"/> Affordability of Water & Sanitation | <input type="checkbox"/> Treatment of Wastewater |
| | <input type="checkbox"/> <i>Other (please state)</i> |
-

* Access to handwashing facilities, water, soap

4) Where do you see the most urgent need for action in **rural areas** (please select **one** single answer)?

- | | |
|--|--|
| <input type="checkbox"/> Sufficiency of Water | <input type="checkbox"/> Access to Sanitation |
| <input type="checkbox"/> Drinking Water Quality | <input type="checkbox"/> Access to Hygiene* |
| <input type="checkbox"/> Access to Water | <input type="checkbox"/> Drainage of Wastewater |
| <input type="checkbox"/> Affordability of Water & Sanitation | <input type="checkbox"/> Treatment of Wastewater |
| | <input type="checkbox"/> <i>Other (please state)</i> |
-

5) In which area are recently the most financial resources invested in **urban areas** (please select **one** single answer)?

- | | |
|--|--|
| <input type="checkbox"/> Sufficiency of Water | <input type="checkbox"/> Access to Sanitation |
| <input type="checkbox"/> Drinking Water Quality | <input type="checkbox"/> Access to Hygiene* |
| <input type="checkbox"/> Access to Water | <input type="checkbox"/> Drainage of Wastewater |
| <input type="checkbox"/> Affordability of Water & Sanitation | <input type="checkbox"/> Treatment of Wastewater |
| | <input type="checkbox"/> <i>Other (please state)</i> |
-

6) In which area are recently the most financial resources invested in **rural areas** (please select **one** single answer)?

- | | |
|--|--|
| <input type="checkbox"/> Sufficiency of Water | <input type="checkbox"/> Access to Sanitation |
| <input type="checkbox"/> Drinking Water Quality | <input type="checkbox"/> Access to Hygiene* |
| <input type="checkbox"/> Access to Water | <input type="checkbox"/> Drainage of Wastewater |
| <input type="checkbox"/> Affordability of Water & Sanitation | <input type="checkbox"/> Treatment of Wastewater |
| | <input type="checkbox"/> <i>Other (please state)</i> |
-

7) In which area you see the biggest challenges (**urban area**) (please select **one** single answer)?

- | | |
|--|--|
| <input type="checkbox"/> Sufficiency of Water | <input type="checkbox"/> Access to Sanitation |
| <input type="checkbox"/> Drinking Water Quality | <input type="checkbox"/> Access to Hygiene* |
| <input type="checkbox"/> Access to Water | <input type="checkbox"/> Drainage of Wastewater |
| <input type="checkbox"/> Affordability of Water & Sanitation | <input type="checkbox"/> Treatment of Wastewater |
| | <input type="checkbox"/> <i>Other (please state)</i> |
-

8) In which area do you see the biggest challenges (**rural area**) (please select **one** single answer)?

- | | |
|--|--|
| <input type="checkbox"/> Sufficiency of Water | <input type="checkbox"/> Access to Sanitation |
| <input type="checkbox"/> Drinking Water Quality | <input type="checkbox"/> Access to Hygiene* |
| <input type="checkbox"/> Access to Water | <input type="checkbox"/> Drainage of Wastewater |
| <input type="checkbox"/> Affordability of Water & Sanitation | <input type="checkbox"/> Treatment of Wastewater |
| | <input type="checkbox"/> <i>Other (please state)</i> |
-

9) If existing, which aspects are covered in existing long-term plans (5-15 years) of your Organization/Institution/Company (you may select more answers)?

- | | |
|--|--|
| <input type="checkbox"/> Sufficiency of Water | <input type="checkbox"/> Access to Sanitation |
| <input type="checkbox"/> Drinking Water Quality | <input type="checkbox"/> Access to Hygiene* |
| <input type="checkbox"/> Access to Water | <input type="checkbox"/> Drainage of Wastewater |
| <input type="checkbox"/> Affordability of Water & Sanitation | <input type="checkbox"/> Treatment of Wastewater |
| | <input type="checkbox"/> <i>Other (please state)</i> |
-

Sustainable Development Goals

1) Have you heard of SDG 6 YES NO

2) Can you name aspects formulated in the target 6.1 about drinking water and the target 6.2 about sanitation and hygiene?

3) How would you qualify the representation of the SDGs in the existing local long-term plans of your Organization/Institution/Company?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Very good | Good | Sufficient | Poor | Very poor |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

4) SDG target 6.1 states: **By 2030, achieve universal and equitable access to safe and affordable drinking water for all.** Which aspects of the target do you see as most important (please select **two** answers)?

- | | |
|---|---|
| <input type="checkbox"/> Access to Water
(Access means: sufficient water to meet domestic needs is reliably available close to home) | <input type="checkbox"/> Access to all
(To all includes: Suitable for use by men, women, girls and boys of all ages, including people with disabilities) |
| <input type="checkbox"/> Universal access
(universal means: all exposures and settings including households, schools, health-care facilities and the workplace) | <input type="checkbox"/> Access to safe drinking water
(safe means: drinking water is free from pathogens and elevated levels of toxic chemicals at all times) |
| <input type="checkbox"/> Equitable access
(equitable means: progressive reduction and elimination of inequalities among population subgroups) | <input type="checkbox"/> Access to affordable drinking water
(Affordable means: payment for services does not present a barrier to access or prevent people from meeting basic human needs) |

5) On which aspects does the work of your Organization/Institution/Company focus on (you may select more answers)?

- | | |
|---|---|
| <input type="checkbox"/> Access to Water
(Access means: sufficient water to meet domestic needs is reliably available close to home) | <input type="checkbox"/> Access to all
(To all includes: Suitable for use by men, women, girls and boys of all ages, including people with disabilities) |
| <input type="checkbox"/> Universal access
(universal means: all exposures and settings including households, schools, health-care facilities and the workplace) | <input type="checkbox"/> Access to safe drinking water
(safe means: drinking water is free from pathogens and elevated levels of toxic chemicals at all times) |
| <input type="checkbox"/> Equitable access
(equitable means: progressive reduction and elimination of inequalities among population subgroups) | <input type="checkbox"/> Access to affordable drinking water
(Affordable means: payment for services does not present a barrier to access or prevent people from meeting basic human needs) |

- 6) SDG target 6.2 states: **By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.** Which aspects of the target do you see as most important (please select **two** answers)?

- | | |
|--|---|
| <p><input type="checkbox"/> Access to Sanitation
(access means: facilities close to home that can be easily reached and used when needed)</p> | <p><input type="checkbox"/> End open defecation
(open defecation means: deposited in the bush, a field, on a beach or in any other open area; discharged directly into a drainage channel, river, sea or any other water body; or wrapped in temporary material and discarded)</p> |
| <p><input type="checkbox"/> Equitable access
(equitable means: progressive reduction and elimination of inequalities among population subgroups)</p> | <p><input type="checkbox"/> Special attention to needs of women and girls
(special attention means: reducing the burden of water collection and enabling women and girls to manage sanitation and hygiene needs with dignity. Special attention should be given to the needs of women and girls in high-use settings such as schools and the workplace, and high-risk settings such as health-care facilities and detention centers)</p> |
| <p><input type="checkbox"/> Access to all
(to all includes: Suitable for use by men, women, girls and boys of all ages, including people with disabilities)</p> | <p><input type="checkbox"/> Special attention to those in vulnerable situation
(including: specific drinking water, sanitation and hygiene (WASH) needs found in special cases including refugee camps, detention centers, mass gatherings and pilgrimages)</p> |
| <p><input type="checkbox"/> Adequate access
(adequate means: system that hygienically separates excreta from human contact as well as safe reuse/ treatment of excreta in situ, or safe transport and treatment off site)</p> | |

- 7) On which aspects does the work of your Organization/Institution/Company focus on (you may select more answers)?

- | | |
|--|---|
| <p><input type="checkbox"/> Access to Sanitation
(access means: facilities close to home that can be easily reached and used when needed)</p> | <p><input type="checkbox"/> End open defecation
(open defecation means: deposited in the bush, a field, on a beach or in any other open area; discharged directly into a drainage channel, river, sea or any other water body; or wrapped in temporary material and discarded)</p> |
| <p><input type="checkbox"/> Equitable access
(equitable means: progressive reduction and elimination of inequalities among population subgroups)</p> | <p><input type="checkbox"/> Special attention to needs of women and girls
(special attention means: reducing the burden of water collection and enabling women and girls to manage sanitation and hygiene needs with dignity. Special attention should be given to the needs of women and girls in high-use settings such as schools and the workplace, and high-risk settings such as health-care facilities and detention centers)</p> |
| <p><input type="checkbox"/> Access to all
(to all includes: Suitable for use by men, women, girls and boys of all ages, including people with disabilities)</p> | <p><input type="checkbox"/> Special attention to those in vulnerable situation
(including: specific drinking water, sanitation and hygiene (WASH) needs found in special cases including refugee camps, detention centers, mass gatherings and pilgrimages)</p> |
| <p><input type="checkbox"/> Adequate access
(adequate means: system that hygienically separates excreta from human contact as well as safe reuse/ treatment of excreta in situ, or safe transport and treatment off site)</p> | |

Equality

1) Out of the following statements, where do you see the biggest gaps and inequalities considering the fulfillment of the human right to water. Please rank from 1 high fulfillment to 5 low fulfillments.

- Between urban and rural
 - Between formal and informal settlements
 - Between men and women
 - Between disabled and not disabled persons
 - Between older and younger people
 - Other (please state)
-

2) Do you agree or disagree with the following statements in the context of drinking water sanitation and hygiene?

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
To achieve the equal enjoyment to the right to water, it is absolutely necessary to collect disaggregated (separated) data between:					
Urban and rural	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formal and informal settlements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Men and women	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disabled and not disabled persons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Older and younger people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Other (please state)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3) Do you know concrete aspects/areas where inequality between gender exists in Peru, and can you name some?

- 4) The following considerations have been preliminarily identified as relevant to achieve the equal enjoyment of the right to water for women. Please indicate whether you agree or disagree with the parameters listed and rank them according to their relevance (1 high relevance to 5 low relevance).

Statement	Agree	Disagree	Relevance
It is important that women are included in decision making processes to name their needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A stronger focus on the collection of sex disaggregated data is needed to figure out where inequalities between men and women exists.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More attention should be paid to sanitation facilities in work and school places.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More attention should be paid to sanitation facilities in work and school places, regarding menstruation management. *	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In areas where water still needs to be collected, more effort should be paid to reduce collection time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* separate sanitation facilities including handwashing facility and bins to ensure appropriate privacy requirements

Monitoring and Indicators

1) Do you agree or disagree with the following statements in the context of **Indicator development** for SDG monitoring, please state your opinion?

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Indicator development is more oriented in what can be measured than in what should be measured.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indicators should be aimed at the process rather than the result.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Present indicators miss to address decision-making.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indicators should reveal sustainability and not focus on unsustainability like pollution levels or poverty indicators.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indicators should consider more ethics such as cultural, religious, and political subjects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value-based indicators to measure the implementation of ethical principles are required to guide towards sustainability. *	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indicators are necessary which reflect the individual behavior/progress, to give feedback on even small efforts achieving personal goals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2) In your opinion what are **main challenges** for monitoring of SDG targets?

- | | |
|--|---|
| <input type="checkbox"/> Inappropriate indicators | <input type="checkbox"/> The required effort for implementing a monitoring system is too high |
| <input type="checkbox"/> Data availability | <input type="checkbox"/> Lack of human capacity |
| <input type="checkbox"/> Lack of financial resources | <input type="checkbox"/> Others (specify): |

* Possible Indicator: Organization's environmental impact is reduced; Regardless of nationality, ethnic origin, skin color, gender, sexual orientation, creed or religion, people (a) learn freely together, (b) share information freely, (c) share their skills and abilities freely

3) Considering the present challenges and accepting the fact that a perfect indicator does not exist, how do you agree with the following statements concerning indicators for SDG 6 Monitoring (target 6.1 and 6.2)?

Proposed indicator: [6.1.1 Proportion of population using safely managed drinking water services](#)

[6.2.1 Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water](#)

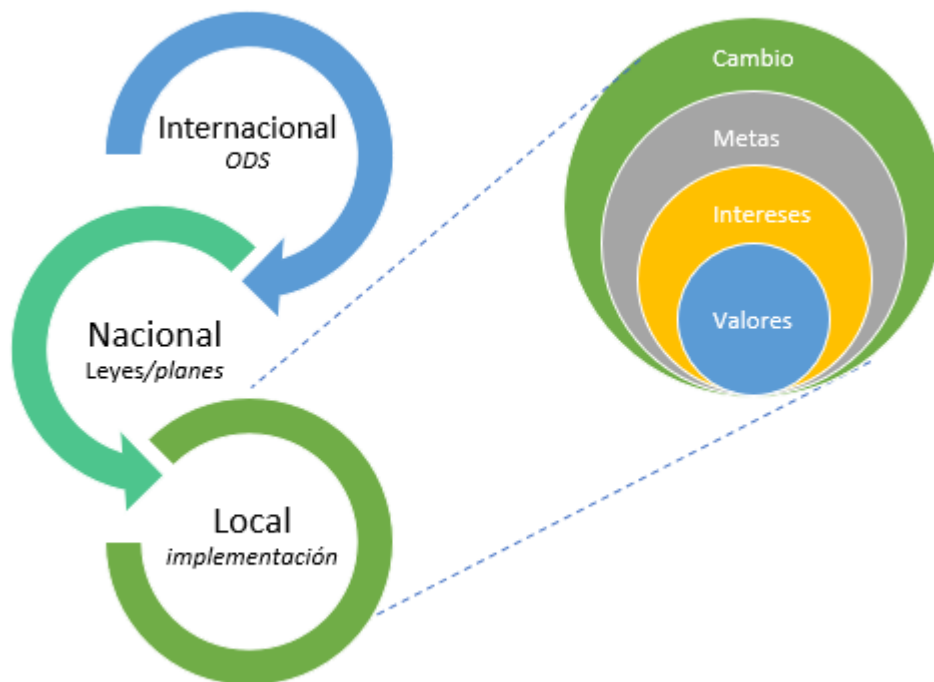
Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The proposed indicators are useful for monitoring the most urgent challenges in water & sanitation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The proposed indicators do not really address the targets and therefore are useless.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The proposed indicators are not transparent, because achievements of the target which are not addressed by the indicator are not considered.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
At present it is not possible to establish better indicators (which would address all aspects of the target).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The proposed indicators do not address equality and non-discrimination, what needs to be changed urgently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
At present it is not possible to establish better indicators (which would address equality and non-discrimination).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
At present disaggregation between rural and urban is the only possible disaggregation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If you disagree with the last question, which area could be possibly disaggregated as well?	_____				

Thank you very much for your participation!

Appendix C

Interview sheets (Spanish)

Entrevista sobre las perspectivas actuales y futuras, metas y objetivos en el sector de agua potable y saneamiento



Situación Actual

1) Ordene las siguientes áreas y aspectos desde la más desarrollada (8) hasta la menos desarrollada (1) en **ÁREAS URBANAS** según su opinión.

- | | |
|--|--|
| <input type="checkbox"/> Suficiencia de agua para consumo doméstico | <input type="checkbox"/> Acceso a saneamiento (inodoros) |
| <input type="checkbox"/> Calidad de agua potable | <input type="checkbox"/> Acceso a higiene * |
| <input type="checkbox"/> Acceso al agua | <input type="checkbox"/> Drenaje de aguas residuales |
| <input type="checkbox"/> Capacidad de pago por agua y servicios de saneamiento | <input type="checkbox"/> Tratamiento de aguas residuales |
| | <input type="checkbox"/> Otro (por favor, especificar) |
-

2) Ordene las siguientes áreas y aspectos desde la más desarrollada (8) hasta la menos desarrolladas (1) en **ÁREAS RURALES** según su opinión.

- | | |
|--|--|
| <input type="checkbox"/> Suficiencia de agua para consumo doméstico | <input type="checkbox"/> Acceso a saneamiento (inodoros) |
| <input type="checkbox"/> Calidad de agua potable | <input type="checkbox"/> Acceso a higiene * |
| <input type="checkbox"/> Acceso al agua | <input type="checkbox"/> Drenaje de aguas residuales |
| <input type="checkbox"/> Capacidad de pago por agua y servicios de saneamiento | <input type="checkbox"/> Tratamiento de aguas residuales |
| | <input type="checkbox"/> Otro (por favor, especificar) |
-

3) ¿Dónde observa la necesidad más urgente de acción en **ÁREAS URBANAS** (por favor seleccione **una** sola respuesta)?

- | | |
|--|--|
| <input type="checkbox"/> Suficiencia de agua para consumo doméstico | <input type="checkbox"/> Acceso a saneamiento (inodoros) |
| <input type="checkbox"/> Calidad de agua potable | <input type="checkbox"/> Acceso a higiene * |
| <input type="checkbox"/> Acceso al agua | <input type="checkbox"/> Drenaje de aguas residuales |
| <input type="checkbox"/> Capacidad de pago por agua y servicios de saneamiento | <input type="checkbox"/> Tratamiento de aguas residuales |
| | <input type="checkbox"/> Otro (por favor, especificar) |
-

* Acceso a instalaciones para lavado de manos, agua, jabón

4) ¿Dónde observa la necesidad más urgente de acción en **ÁREAS RURALES** (por favor seleccione **una** sola respuesta)?

- | | |
|--|---|
| <input type="checkbox"/> Suficiencia de agua para consumo doméstico | <input type="checkbox"/> Acceso a saneamiento (inodoros) |
| <input type="checkbox"/> Calidad de agua potable | <input type="checkbox"/> Acceso a higiene * |
| <input type="checkbox"/> Acceso al agua | <input type="checkbox"/> Drenaje de aguas residuales |
| <input type="checkbox"/> Capacidad de pago por agua y servicios de saneamiento | <input type="checkbox"/> Tratamiento de aguas residuales |
| | <input type="checkbox"/> <i>Otro (por favor, especificar)</i> |
-

5) ¿Qué área es la que recientemente tiene la mayor cantidad de recursos financieros invertidos en **ÁREAS URBANAS** según su opinión (por favor seleccione **una** sola respuesta)?

- | | |
|--|---|
| <input type="checkbox"/> Suficiencia de agua para consumo doméstico | <input type="checkbox"/> Acceso a saneamiento (inodoros) |
| <input type="checkbox"/> Calidad de agua potable | <input type="checkbox"/> Acceso a higiene * |
| <input type="checkbox"/> Acceso al agua | <input type="checkbox"/> Drenaje de aguas residuales |
| <input type="checkbox"/> Capacidad de pago por agua y servicios de saneamiento | <input type="checkbox"/> Tratamiento de aguas residuales |
| | <input type="checkbox"/> <i>Otro (por favor, especificar)</i> |
-

6) ¿Qué área es la que recientemente tiene la mayor cantidad de recursos financieros invertidos en **ÁREAS RURALES** según su opinión (por favor seleccione **una** sola respuesta)?

- | | |
|--|---|
| <input type="checkbox"/> Suficiencia de agua para consumo doméstico | <input type="checkbox"/> Acceso a saneamiento (inodoros) |
| <input type="checkbox"/> Calidad de agua potable | <input type="checkbox"/> Acceso a higiene * |
| <input type="checkbox"/> Acceso al agua | <input type="checkbox"/> Drenaje de aguas residuales |
| <input type="checkbox"/> Capacidad de pago por agua y servicios de saneamiento | <input type="checkbox"/> Tratamiento de aguas residuales |
| | <input type="checkbox"/> <i>Otro (por favor, especificar)</i> |
-

* Acceso a instalaciones para lavado de manos, agua, jabón

7) ¿En qué área usted observa los mayores desafíos (**ÁREAS URBANAS**) (por favor seleccione **una** sola respuesta)?

- | | |
|--|---|
| <input type="checkbox"/> Suficiencia de agua para consumo doméstico | <input type="checkbox"/> Acceso a saneamiento (inodoros) |
| <input type="checkbox"/> Calidad de agua potable | <input type="checkbox"/> Acceso a higiene * |
| <input type="checkbox"/> Acceso al agua | <input type="checkbox"/> Drenaje de aguas residuales |
| <input type="checkbox"/> Capacidad de pago por agua y servicios de saneamiento | <input type="checkbox"/> Tratamiento de aguas residuales |
| | <input type="checkbox"/> <i>Otro (por favor, especificar)</i> |
-

Pueden clasificar los desafíos (económicos, personales, de conocimiento, etc.)

8) ¿En qué área usted observa los mayores desafíos (**ÁREAS RURALES**) (por favor seleccione **una** sola respuesta)?

- | | |
|--|---|
| <input type="checkbox"/> Suficiencia de agua para consumo doméstico | <input type="checkbox"/> Acceso a saneamiento (inodoros) |
| <input type="checkbox"/> Calidad de agua potable | <input type="checkbox"/> Acceso a higiene * |
| <input type="checkbox"/> Acceso al agua | <input type="checkbox"/> Drenaje de aguas residuales |
| <input type="checkbox"/> Capacidad de pago por agua y servicios de saneamiento | <input type="checkbox"/> Tratamiento de aguas residuales |
| | <input type="checkbox"/> <i>Otro (por favor, especificar)</i> |
-

Pueden clasificar los desafíos (económicos, personales, de conocimiento, etc.)

9) En caso de existir, ¿Qué aspectos están cubiertos en los planes de largo plazo (5-15 años) de su Organización/ Institución/ Compañía según su opinión (pueden seleccionar más respuestas)?

- | | |
|--|---|
| <input type="checkbox"/> Suficiencia de agua para consumo doméstico | <input type="checkbox"/> Acceso a saneamiento (inodoros) |
| <input type="checkbox"/> Calidad de agua potable | <input type="checkbox"/> Acceso a higiene * |
| <input type="checkbox"/> Acceso al agua | <input type="checkbox"/> Drenaje de aguas residuales |
| <input type="checkbox"/> Capacidad de pago por agua y servicios de saneamiento | <input type="checkbox"/> Tratamiento de aguas residuales |
| | <input type="checkbox"/> <i>Otro (por favor, especificar)</i> |
-

* Acceso a instalaciones para lavado de manos, agua, jabón

Objetivos de Desarrollo Sostenible (ODS)



8) ¿Ha escuchado hablar del ODS 6? SI NO

9) ¿Pueden nombrar los aspectos formulados en la Meta 6.1 acerca Agua Potable y la meta 6.2 acerca de Saneamiento e higiene?

10) ¿Cómo calificaría la representación de los ODS en los planes locales existentes a largo plazo de su Organización/ Institución/ Compañía?

Muy Buena **Buena** **Suficiente** **Poca** **Muy Poca**

4) El ODS meta 6.1 dice: **De aquí a 2030, lograr el acceso universal y equitativo a agua potable a un precio asequible para**. ¿Qué aspectos de la meta observa usted como más importante (por favor seleccione **dos** respuestas)?

- | | |
|---|--|
| <p><input type="checkbox"/> Acceso a Agua
(Implica que debe haber agua suficiente para cubrir las necesidades domésticas de forma fiable y cerca del domicilio)</p> | <p><input type="checkbox"/> Acceso para todos
(Pueden utilizarla hombres, mujeres, niñas y niños de todas las edades, incluidas las personas con discapacidad)</p> |
| <p><input type="checkbox"/> Acceso Universal
(Abarca todos los contextos y situaciones, incluidos los hogares, las escuelas, los centros de atención sanitaria y los lugares de trabajo)</p> | <p><input type="checkbox"/> Acceso a agua potable segura
(El agua potable no contiene agentes patógenos ni niveles elevados de productos químicos tóxicos en ningún momento)</p> |
| <p><input type="checkbox"/> Acceso Equitativo
(Supone una reducción y eliminación progresiva de las desigualdades entre subgrupos demográficos)</p> | <p><input type="checkbox"/> Acceso a un precio asequible
(Implica que el pago de los servicios no es óbice para acceder a ellos ni para cubrir las necesidades humanas básicas)</p> |

5) ¿En qué aspecto(s) está(n) enfocado(s) su Organización/ Institución/ Compañía (pueden seleccionar más respuestas)?

- | | |
|---|--|
| <p><input type="checkbox"/> Acceso a Agua
(Implica que debe haber agua suficiente para cubrir las necesidades domésticas de forma fiable y cerca del domicilio)</p> | <p><input type="checkbox"/> Acceso para todos
(Pueden utilizarla hombres, mujeres, niñas y niños de todas las edades, incluidas las personas con discapacidad)</p> |
| <p><input type="checkbox"/> Acceso Universal
(Abarca todos los contextos y situaciones, incluidos los hogares, las escuelas, los centros de atención sanitaria y los lugares de trabajo)</p> | <p><input type="checkbox"/> Acceso a agua potable segura
(El agua potable no contiene agentes patógenos ni niveles elevados de productos químicos tóxicos en ningún momento)</p> |
| <p><input type="checkbox"/> Acceso Equitativo
(Supone una reducción y eliminación progresiva de las desigualdades entre subgrupos demográficos)</p> | <p><input type="checkbox"/> Acceso a un precio asequible
(Implica que el pago de los servicios no es óbice para acceder a ellos ni para cubrir las necesidades humanas básicas)</p> |

6) El ODS meta 6.2 dice: **De aquí al 2030, lograr el acceso a servicios de saneamiento e higiene adecuados y equitativos para todos y poner fin a la defecación al aire libre, prestando especial atención a las necesidades de las mujeres y las niñas y las personas en situación de vulnerabilidad.** ¿Qué aspecto de la meta observa usted que es el más importante (por favor seleccione **dos** respuestas)?

- Acceso a Saneamiento**
(Implica que las instalaciones estén cerca de los hogares y sea posible acceder a ellas fácilmente cuando sea preciso)
-
- Acceso Equitativo**
(Implica una reducción y eliminación progresiva de las desigualdades entre subgrupos demográficos)
-
- Acceso para todos**
(Pueden utilizarla hombres, mujeres, niñas y niños de todas las edades, incluidas las personas con discapacidad)
-
- Acceso adecuado**
(Implica que el sistema separa de modo higiénico los excrementos a fin de evitar que entren en contacto con las personas y los reutiliza o trata de manera segura in situ o los transporta y trata en otro lugar)

- Poner fin a la defecación al aire libre**
(Los excrementos de los adultos o niños se depositan en la maleza, el campo, la playa o cualquier otro espacio abierto; se expulsan directamente en un canal de drenaje, río, mar u otra masa de agua; o se tiran una vez envueltos en un material temporal)
-
- Atención especial a las necesidades de mujeres y niñas**
(Implica reducir la carga que supone la recogida del agua para las mujeres y las niñas y permitir que estas gestionen sus necesidades de saneamiento e higiene con dignidad. Atención a sus necesidades en los lugares donde más se utilizan las instalaciones, como las escuelas y los lugares de trabajo, y en contextos de alto riesgo, como los establecimientos de atención de salud y los centros de detención)
-
- Acceso a un precio asequible**
(Implica que el pago de los servicios no es óbice para acceder a ellos ni para cubrir las necesidades humanas básicas)

7) ¿En qué aspecto(s) está(n) enfocado(s) su Organización/ Institución/ Compañía (pueden seleccionar más respuestas)?

- Acceso a Saneamiento**
(Implica que las instalaciones estén cerca de los hogares y sea posible acceder a ellas fácilmente cuando sea preciso)
-
- Acceso Equitativo**
(Implica una reducción y eliminación progresiva de las desigualdades entre subgrupos demográficos)
-
- Acceso para todos**
(Pueden utilizarla hombres, mujeres, niñas y niños de todas las edades, incluidas las personas con discapacidad)
-
- Acceso adecuado**
(Implica que el sistema separa de modo higiénico los excrementos a fin de evitar que entren en contacto con las personas y los reutiliza o trata de manera segura in situ o los transporta y trata en otro lugar)

- Poner fin a la defecación al aire libre**
(Los excrementos de los adultos o niños se depositan en la maleza, el campo, la playa o cualquier otro espacio abierto; se expulsan directamente en un canal de drenaje, río, mar u otra masa de agua; o se tiran una vez envueltos en un material temporal)
-
- Atención especial a las necesidades de mujeres y niñas**
(Implica reducir la carga que supone la recogida del agua para las mujeres y las niñas y permitir que estas gestionen sus necesidades de saneamiento e higiene con dignidad. Atención a sus necesidades en los lugares donde más se utilizan las instalaciones, como las escuelas y los lugares de trabajo, y en contextos de alto riesgo, como los establecimientos de atención de salud y los centros de detención)
-
- Acceso a un precio asequible**
(Implica que el pago de los servicios no es óbice para acceder a ellos ni para cubrir las necesidades humanas básicas)

Igualdad

- 5) De las siguientes afirmaciones, ¿Dónde observa las brechas y desigualdades más grandes considerando el cumplimiento del derecho humano al agua? Por favor clasifique de 5 (cumplimiento alto) a 1 (cumplimiento bajo).

- Entre urbano y rural
 - Entre asentamientos formales e informales
 - Entre varones y mujeres
 - Entre personas con discapacidad y sin discapacidad.
 - Entre personas mayores y jóvenes
 - Otras (por favor especifique)
-

- 6) ¿Está de acuerdo o desacuerdo con las siguientes afirmaciones en el contexto de saneamiento de agua para consumo e higiene?

Afirmación	Totalmente de Acuerdo	De Acuerdo	Des-acuerdo	Totalmente en Desacuerdo
Para lograr que las personas disfruten equitativamente el derecho al agua, es absolutamente necesario recopilar datos desagregado (apartado) entre:				
Urbano y rural	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asentamientos formales e informales	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Varones y mujeres	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personas con y sin discapacidad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personas mayores y jóvenes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Otras (por favor especifique)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 7) ¿Conoce acerca de los aspectos concretas donde la desigualdad entre géneros (Varón y Mujer) existe en Perú y puedes nombrar algunos?
-
-

- 8) Las siguientes consideraciones han sido preliminarmente identificadas como relevantes para lograr que las personas, en especial mujeres, disfruten equitativamente el derecho al agua. Por favor indicar si usted está de acuerdo o en desacuerdo con los parámetros listados y ordénelos según su relevancia (5 para alta relevancia o 1 para poca relevancia)

Afirmación	De Acuerdo	Desacuerdo	Relevancia (De 5 a 1)
Es importante que las mujeres sean incluidas en el proceso de toma de decisiones para incluir sus necesidades.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Es necesario centrarse más en la recolección de información desglosada de acuerdo con el sexo para determinar dónde existen las desigualdades entre varones y mujeres.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Más atención debe ser puesta a las instalaciones sanitarias en los lugares de trabajo y escuelas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Más atención debe ser puesta en las instalaciones sanitarias en los lugares de trabajo y escuelas, en relación con la gestión de la menstruación*.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
En áreas donde el agua aún necesita ser recolectada, más esfuerzos deben ser hechos para reducir el tiempo de recolección.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Instalaciones sanitarias separadas, incluyendo instalaciones para el lavado de manos con jabón y papelera para asegurar los requerimientos apropiados de privacidad

Monitoreo e Indicadores

1) ¿Está de acuerdo o desacuerdo con las siguientes afirmaciones en el contexto de **desarrollo de indicadores** para el desarrollo de ODS, por favor, dar su opinión?

Afirmación	Totalmente de Acuerdo	De Acuerdo	Neutral	Desacuerdo	Totalmente en Desacuerdo
El desarrollo de indicadores está más orientado en lo que se puede medir en lugar de lo que debe ser medido.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Los indicadores deberían apuntar más al proceso en lugar del resultado.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Los indicadores actuales fallan en abordar la toma de decisiones.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Los indicadores deberían revelar la sostenibilidad y no enfocarse en lo insostenibilidad como niveles de contaminación o indicadores de pobreza.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Los indicadores deberían considerar más ética como: temas culturas, religiosos y políticos.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Se requieren indicadores basados en valores para medir la implementación de principios éticos para orientarlos hacia la sostenibilidad.*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Son necesarios indicadores que reflejen el comportamiento/progreso individual, para dar retroalimentación incluso sobre pequeños esfuerzos para lograr metas personales.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2) En su opinión, ¿Cuáles son los **principales desafíos** para monitorear las metas de los ODS (por favor elija un máximo de tres opciones)?

- | | |
|--|---|
| <input type="checkbox"/> Indicadores inapropiados | <input type="checkbox"/> El esfuerzo requerido para implementar un Sistema de monitoreo es demasiado alto |
| <input type="checkbox"/> Disponibilidad de datos | <input type="checkbox"/> Falta de capacidad humana |
| <input type="checkbox"/> Falta de recursos financieros | <input type="checkbox"/> Otros (especificar): |
-

* Posible indicador: El impacto ambiental de las organizaciones se reduce.

3) Teniendo en cuenta los desafíos actuales y aceptando el hecho de que un indicador perfecto no existe, ¿Cómo concuerda con las siguientes afirmaciones sobre los indicadores para el monitoreo del ODS 6 (Meta 6.1 y 6.2)?

Indicador 6.1.1: Proporción de la población que dispone de servicios de suministro de agua potable gestionados de manera segura.

Indicador 6.2.1: Proporción de la población que utiliza servicios de saneamiento gestionados de manera segura, incluida una instalación para lavarse las manos con agua y jabón.

Afirmación	Totalmente de acuerdo	De Acuerdo	Neutral	Desacuerdo	Totalmente en desacuerdo
Los indicadores propuestos son útiles para monitorear los desafíos más urgentes en agua y saneamiento.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Los indicadores propuestos no abordan realmente las metas y, por lo tanto, son inútiles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Los indicadores propuestos no son transparentes, porque los logros del objetivo que no son abordados por el indicador no son tomados en cuenta.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Actualmente, no es posible establecer mejores indicadores (que aborden todos los aspectos de la meta).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Los indicadores propuestos no abordan la igualdad y no-discriminación, lo cual debe cambiarse con urgencia.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Actualmente, no es posible establecer mejores indicadores (que aborden igualdad y no-discriminación).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Actualmente, la única desagregación posible es la desagregación entre lo rural y lo urbano.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Si no está de acuerdo con la última pregunta, ¿Qué área podría ser posiblemente desagregada también?	<hr/>				

¡Muchas gracias por su participación!

Appendix D

Results of Evaluated Interviews

PART 1		1) Sort the following Areas and Aspects from most developed (8) to least (1) in urban areas according to your opinion.								
Work Area	Sufficiency of Water	Drinking Water Quality	Access to Water	Affordability of W & S	Access to Sanitation	Access to Hygiene	Waste-water Drainage	Treatment of Waste-water	Other (please state)	
Non-profit organization	6	8	7	3	5	4	1	2	-	
Private entity	2	8	3	1	6	7	5	4	-	
Research institute	6	6	5	7	5	6	6	4	-	
Universidad	8	5	7	3	6	4	2	1	-	
International organization	7	1	8	6	5	2	4	3	-	
Government	7	6	8	5	6	4	6	3	-	

PART 1		2) Sort the following Areas and Aspects from most developed (8) to least (1) in rural areas according to your opinion.								
Work Area	Sufficiency of Water	Drinking Water Quality	Access to Water	Affordability of W & S	Access to Sanitation	Access to Hygiene	Waste-water Drainage	Treatment of Waste-water	Other (please state)	
Non-profit organization	7	5	8	6	4	3	2	1	-	
Private entity	5	6	7	4	3	8	2	1	-	
Research institute	3	4	6	6	3	3	2	2	-	
Universidad	7	5	8	3	4	4	2	1	-	
International organization	7	2	8	6	4	1	5	3	-	
Government	7	2	8	8	1	2	1	1	-	

PART 1		3) Where do you see the most urgent need for action in urban areas (please select one single answer)?								
Work Area	Sufficiency of Water	Drinking Water Quality	Access to Water	Affordability of W & S	Access to Sanitation	Access to Hygiene	Waste-water Drainage	Treatment of Waste-water	Other (please state)	
Non-profit organization	-	-	-	-	-	-	-	1	-	
Private entity	1	-	-	-	-	-	-	-	-	
Research institute	-	-	-	-	-	-	-	1	-	
Universidad	-	-	-	-	-	-	-	1	-	
International organization	-	1	-	-	-	-	-	-	-	
Government	-	-	-	-	-	-	-	1	-	

PART 1		4) Where do you see the most urgent need for action in rural areas (please select one single answer)?								
Work Area	Sufficiency of Water	Drinking Water Quality	Access to Water	Affordability of W & S	Access to Sanitation	Access to Hygiene	Waste-water Drainage	Treatment of Waste-water	Other (please state)	
Non-profit organization	-	1	-	-	1	-	-	1	-	
Private entity	1	-	-	-	-	-	-	-	-	
Research institute	-	-	1	-	-	-	-	-	-	
Universidad	-	1	-	-	-	-	-	-	-	
International organization	-	1	-	-	-	-	-	-	-	
Government	-	1	-	-	-	-	-	-	-	

PART 1		5) In which area are recently the most financial resources invested in urban areas (please select one single answer)?								
Work Area	Sufficiency of Water	Drinking Water Quality	Access to Water	Affordability of W & S	Access to Sanitation	Access to Hygiene	Waste-water Drainage	Treatment of Waste-water	Other (please state)	
Non-profit organization	1	-	-	-	-	-	-	-	-	
Private entity	-	-	1	-	-	-	-	-	-	
Research institute	1	-	-	-	-	-	-	-	-	
Universidad	1	-	-	-	-	-	-	-	-	
International organization	-	-	1	-	-	-	-	-	-	
Government	1	-	-	-	-	-	-	-	-	

PART 1		6) In which area are recently the most financial resources invested in rural areas (please select one single answer)?								
Work Area	Sufficiency of Water	Drinking Water Quality	Access to Water	Affordability of W & S	Access to Sanitation	Access to Hygiene	Waste-water Drainage	Treatment of Waste-water	Other (please state)	
Non-profit organization	-	-	1	-	-	-	-	-	-	
Private entity	1	-	-	-	-	-	-	-	-	
Research institute	-	1	-	-	-	-	-	-	-	
Universidad	1	-	-	-	-	-	-	-	-	
International organization	-	-	1	-	-	-	-	-	-	
Government	1	-	-	-	-	-	-	-	-	

PART 1		7) In which area you see the biggest challenges (urban area) (please select one single answer)?								
Work Area	Sufficiency of Water	Drinking Water Quality	Access to Water	Affordability of W & S	Access to Sanitation	Access to Hygiene	Waste-water Drainage	Treatment of Waste-water	Other (please state)	
Non-profit organization	-	-	-	-	-	-	-	1	-	
Private entity	1	-	-	-	-	-	-	1	-	
Research institute	-	-	-	-	-	-	-	-	1	
Universidad	-	-	-	-	-	-	-	1	-	
International organization	-	-	-	1	-	-	-	1	-	
Government	-	-	-	-	-	-	-	1	-	

PART 1		8) In which area do you see the biggest challenges (rural area) (please select one single answer)?								
Work Area	Sufficiency of Water	Drinking Water Quality	Access to Water	Affordability of W & S	Access to Sanitation	Access to Hygiene	Waste-water Drainage	Treatment of Waste-water	Other (please state)	
Non-profit organization	-	1	-	-	-	1	-	-	-	
Private entity	-	1	1	-	-	-	-	-	-	
Research institute	-	-	-	-	-	-	-	-	1	
Universidad	-	-	-	-	-	-	-	1	-	
International organization	-	1	-	-	1	-	-	1	-	
Government	-	1	-	-	-	-	-	-	-	

PART 1	9) If existing, which aspects are covered in existing long-term plans (5-15 years) of your Organization/Institution/Company (you may select more answers)?								
Work Area	Sufficiency of Water	Drinking Water Quality	Access to Water	Affordability of W & S	Access to Sanitation	Access to Hygiene	Waste-water Drain-age	Treatment of Waste-water	Other (please state)
Non-profit organization	-	1	1	-	-	-	-	-	-
Private entity	-	1	1	-	-	-	-	-	-
Research institute	-	1	-	-	-	-	-	1	-
Universidad	1	-	-	-	-	-	-	-	-
International organization	-	1	-	-	1	1	-	-	-
Government	1	1	1	1	-	-	1	1	-

PART 2	1) Have you heard of SDG 6		2) Can you name aspects formulated in the target 6.1 about drinking water and the target 6.2 about sanitation and hygiene?				
Work Area	YES	NO	Water for all	Water Quality	Access to sanitation	Access for all	Hygiene (Water + Soap)
Non-profit organization	1	-	1	1	-	-	-
Private entity	1	-	-	-	-	-	-
Research institute	1	-	-	1	1	-	-
Universidad	1	-	-	1	1	-	-
International organization	1	-	-	-	-	-	-
Government	1	-	1	1	-	-	-

3) How would you qualify the representation of the SDGs in the existing local long-term plans of your Organization/Institution/Company?				
Very good	Good	Sufficient	Poor	Very poor
-	-	-	-	-
1	-	-	-	-
-	-	-	1	-
-	-	-	1	-
-	-	-	1	-
1	-	-	-	-

4) SDG target 6.1 states: By 2030, achieve universal and equitable access to safe and affordable drinking water for all. Which aspects of the target do you see as most important (please select two answers)?					
Access to Water	Universal access	Equitable access	Access to all	Access to safe drinking water	Access to affordable drinking water
-	-	-	1	1	-
-	1	-	-	-	-
-	-	-	-	1	-
-	-	-	1	1	-
-	1	-	-	1	-
-	1	-	-	1	-

PART 2	5) On which aspects does the work of your Organization/Institution/Company focus on (you may select more answers)?				
Work Area	Access to Water	Universal access	Access to all	Access to safe drinking water	Access to affordable drinking water
Non-profit organization	-	-	1	1	-
Private entity	-	1	-	-	-
Research institute	-	-	-	-	-
Universidad	1	1	-	1	-
International organization	-	-	-	1	-
Government	1	1	-	1	1

6) SDG target 6.2 states: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations. Which aspects of the target do you see as most important						
Access to Sanitation	Equitable access	Access to all	Adequate access	End open defecation	Special attention to needs of women and girls	Special attention to those in vulnerable situation
-	-	-	1	-	-	-
-	-	1	-	-	-	-
1	-	-	-	-	-	-
1	-	-	1	-	-	-
-	-	-	-	1	-	-
1	-	1	-	-	-	-

PART 2	7) ¿En qué aspecto(s) está(n) enfocado(s) su Organización/ Institución/ Compañía (pueden seleccionar más respuestas)?						
Work Area	Access to Sanitation	Equitable access	Access to all	Adequate access	End open defecation	Special attention to needs of women and girls	Special attention to those in vulnerable situation
Non-profit organization	-	-	-	-	-	1	-
Private entity	-	-	1	-	-	-	-
Research institute	1	-	-	-	-	-	-
Universidad	1	-	-	1	-	-	-
International organization	-	-	-	-	1	-	-
Government	1	-	1	-	-	-	-

PART 3						
	1) Out of the following statements, where do you see the biggest gaps and inequalities considering the fulfillment of the human right to water. Please rank from 5 high fulfillment to 1 low fulfillment.					
Work Area	Between urban and rural	Between formal and informal settlements	Between men and women	Between disabled and not disabled persons	Between older and younger people	Other (please state)
Non-profit organization	5	5	5	4	4	-
Private entity	5	4	2	3	1	-
Research institute		5	-	-	-	-
Universidad	5	4	2	3	1	-
International organization	1	3	-	2	-	-
Government	5	4	2	1	3	-

PART 3															
	2) Do you agree or disagree with the following statements in the context of drinking water sanitation and hygiene? To achieve the equal enjoyment to the right to water, it is absolutely necessary to collect disaggregated (separated) data between:														
Work Area	Urban and rural					Formal and informal settlements					Men and women				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Non-profit organization	1	-	-	-	-	1	-	-	-	-	1	-	-	-	-
Private entity	1	-	-	-	-	1	-	-	-	-	1	-	-	-	-
Research institute	-	1	-	-	-	-	1	-	-	-	-	1	-	-	-
Universidad	1	-	-	-	-	1	-	-	-	-	-	-	1	-	-
International organization	-	1	-	-	-	-	-	1	-	-	-	1	-	-	-
Government	1	-	-	-	-	1	-	-	-	-	1	-	-	-	-

Work Area	Disabled and not disabled persons					Older and younger people					Other (please state)				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Non-profit organization	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Private entity	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Research institute	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-
Universidad	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-
International organization	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-
Government	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-

PART 3						
3) Do you know concrete aspects/areas where inequality between gender exists in Peru, and can you name some?						
Work Area	Salary	Safety	Participation	Domestic violence	The woman is responsible for "water"	Access to sanitary facilities
Non-profit organization	1	1	1	1	1	-
Private entity	-	-	-	-	-	-
Research institute	-	-	-	-	1	1
Universidad	-	-	-	-	-	-
International organization	-	-	-	-	-	1
Government	1	-	1	-	-	-

PART 3						
4) The following considerations have been preliminarily identified as relevant to achieve the equal enjoyment of the right to water for women. Please indicate whether you agree or disagree with the parameters listed and rank them according to their relevance (1 high relevance to 5 low relevance).						
Work Area	It is important that women are included in decision making processes to name their needs.	A stronger focus on the collection of sex disaggregated data is needed to figure out where inequalities between men and women exists.	More attention should be paid to sanitation facilities in work and school places.			
				Agree	Disagree	Relevance
				1	-	5
				1	-	4
				1	-	-
				1	-	5
				1	-	5
				1	-	5
Work Area	More attention should be paid to sanitation facilities in work and school places, regarding menstruation management.	In areas where water still needs to be collected, more effort should be paid to reduce collection time.				
				Agree	Disagree	Relevance
				1	-	-
				1	-	3
				1	-	-
				-	-	2
				1	-	4
				1	-	5

PART 4					
1) Do you agree or disagree with the following statements in the context of Indicator development for SDG monitoring, please state your opinion.					
Indicator development is more oriented in what can be measured than in what should be measured.					
Work Area	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Non-profit organization	-	1	-	-	-
Private entity	-	1	-	-	-
Research institute	-	1	-	-	-
Universidad	-	1	-	-	-
International organization	-	1	-	-	-
Government	-	1	-	-	-
Indicators should be aimed at the process rather than the result.					
Work Area	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Non-profit organization	1	-	-	-	-
Private entity	-	-	1	-	-
Research institute	1	-	-	-	-
Universidad	-	1	-	-	-
International organization	-	1	-	-	-
Government	-	1	-	-	-
Present indicators miss to address decision-making.					
Work Area	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Non-profit organization	-	-	-	-	1
Private entity	-	-	-	1	-
Research institute	1	-	-	-	-
Universidad	-	-	1	-	-
International organization	-	1	-	-	-
Government	-	1	-	-	-
Indicators should reveal sustainability and not focus on unsustainability like pollution levels or poverty indicators.					
Work Area	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Non-profit organization	-	-	-	-	1
Private entity	-	-	-	1	-
Research institute	-	1	-	-	-
Universidad	-	1	-	-	-
International organization	-	1	-	-	-
Government	-	-	-	1	-
Indicators should consider more ethics such as cultural, religious, and political subjects.					
Work Area	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Non-profit organization	-	-	1	-	-
Private entity	-	-	1	-	-
Research institute	1	-	-	-	-
Universidad	1	-	-	-	-
International organization	-	-	1	-	-
Government	-	1	-	-	-
Value-based indicators to measure the implementation of ethical principles are required to guide towards sustainability.					
Work Area	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Non-profit organization	-	-	-	1	-
Private entity	1	-	-	-	-
Research institute	-	1	-	-	-
Universidad	-	1	-	-	-
International organization	-	-	1	-	-
Government	-	1	-	-	-

Work Area	Indicators are necessary which reflect the individual behavior/progress, to give feedback on even small efforts achieving personal goals.					2) In your opinion what are main challenges for monitoring of SDG targets?					Others
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Inappropriate indicators	Data availability	Lack of financial resources	The required effort for implementing a monitoring system is too high	Lack of human capacity	Lack of indicators
Non-profit organization	-	-	-	-	1	-	-	-	1	-	-
Private entity	1	-	-	-	-	-	-	1	-	-	-
Research institute	1	-	-	-	-	-	-	-	1	-	-
Universidad	-	1	-	-	-	-	1	1	-	-	-
International organization	-	1	-	-	-	-	1	1	-	1	-
Government	-	1	-	-	-	-	1	-	1	-	-

PART 4		3) Considering the present challenges and accepting the fact that a perfect indicator does not exist, how do you agree with the following statements concerning indicators for SDG 6 Monitoring (target 6.1 and 6.2)?														
Work Area	The proposed indicators are useful for monitoring the most urgent challenges in water & sanitation.					The proposed indicators do not really address the targets and therefore are useless.					The proposed indicators are not transparent, because achievements of the target which are not addressed by the indicator are not taken into account.					
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
Non-profit organization	1	-	-	-	-	-	-	-	1	-	-	-	-	1	-	
Private entity	1	-	-	-	-	-	-	-	1	-	-	-	-	1	-	
Research institute	-	-	1	-	-	-	-	1	-	-	-	-	1	-	-	
Universidad	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
International organization	-	1	-	-	-	-	-	-	1	-	-	-	-	1	-	
Government	-	1	-	-	-	-	-	-	1	-	-	1	-	-	-	

	At present it is not possible to establish better indicators (which would address all aspects of the target).				
Work Area	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Non-profit organization	-	-	1	-	-
Private entity	-	-	1	-	-
Research institute	-	-	-	1	-
Universidad	-	-	-	-	-
International organization	-	-	1	-	-
Government	-	-	-	-	1

The proposed indicators do not address equality and non-discrimination, what needs to be changed urgently.				
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
-	1	-	-	-
-	-	-	1	-
-	1	-	-	-
-	-	-	-	-
-	-	-	1	-
-	1	-	-	-

At present it is not possible to establish better indicators (which would address equality and non-discrimination).				
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
-	-	-	1	-
-	-	-	1	-
-	-	-	1	-
-	-	-	-	-
-	-	1	-	-
-	-	-	-	1

	At present disaggregation between rural and urban is the only possible disaggregation.				
Work Area	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Non-profit organization	-	-	-	1	-
Private entity	-	-	-	1	-
Research institute	-	-	-	1	-
Universidad	-	-	-	-	-
International organization	-	1	-	-	-
Government	-	-	-	1	-

If you disagree with the last question, which area could be possibly disaggregated as well?				
Woman / Man	informal /formal	Disability		
1	1	-	-	-
-	-	1	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
1	-	-	-	-

Appendix E

Indicator Application Tupicocha

JMP SERVICE LADDER		Requirement	Reached	Requirement	Reached	Requirement	Reached
Safely managed	Drinking water from an improved water source which is located on premises, available when needed and free from fecal and priority chemical contamination	improved source	269	on premises	120	free of faecal contaminations	-
		available when needed	2			free of chemical contaminations	-
Basic	Drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing	improved source	269	collection time < 30 min	110		
Limited	Drinking water from an improved source for which collection time exceeds 30 minutes for a roundtrip including queuing	improved source	269	collection time > 30 min	157		
Unimproved	Drinking water from an unprotected dug well or unprotected spring	unprotected dug well or spring	36				
Surface Water	Drinking water directly from a river, dam, lake, pond, stream, canal or irrigation canal	river, lake, dam, pond, stream, canal	115				

JMP SERVICE LADDER - URBAN		Requirement	Reached	Requirement	Reached	Requirement	Reached
Safely managed	Drinking water from an improved water source which is located on premises, available when needed and free from fecal and priority chemical contamination	improved source	169	on premises	68	free of faecal contaminations	-
		available when needed	2			free of chemical contaminations	-
Basic	Drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing	improved source	169	collection time < 30 min	101		
Limited	Drinking water from an improved source for which collection time exceeds 30 minutes for a roundtrip including queuing	improved source	169	collection time > 30 min	-		
Unimproved	Drinking water from an unprotected dug well or unprotected spring	unprotected dug well or spring	15				
Surface Water	Drinking water directly from a river, dam, lake, pond, stream, canal or irrigation canal	river, lake, dam, pond, stream, canal	41				

JMP SERVICE LADDER - RURAL		Requirement	Reached	Requirement	Reached	Requirement	Reached
Safely managed	Drinking water from an improved water source which is located on premises, available when needed and free from faecal and priority chemical contamination	improved source	100	on premises	44	free of faecal contaminations	-
		available when needed	-			free of chemical contaminations	-
Basic	Drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing	improved source	100	collection time < 30 min	-		
Limited	Drinking water from an improved source for which collection time exceeds 30 minutes for a roundtrip including queuing	improved source	100	collection time > 30 min	56		
Unimproved	Drinking water from an unprotected dug well or unprotected spring	unprotected dug well or spring	21				
Surface Water	Drinking water directly from a river, dam, lake, pond, stream, canal or irrigation canal	river, lake, dam, pond, stream, canal	74				

JMP SERVICE LADDER		Requirement	Reached	Requirement	Reached	Requirement	Reached
Safely managed	Use of improved facilities which are not shared with other households and where excreta are safely disposed in situ or transported and treated off-site	improved facilities	-	not shared with other households	-	excreta safely disposed (in situ or treated off-site)	-
Basic	Use of improved facilities which are not shared with other households	improved facilities	-	not shared with other households	41		
Limited	Use of improved facilities shared between two or more households	improved facilities	79	shared with other households	17		
Unimproved	Use of pit latrines without a slab or platform, hanging latrines or bucket latrines	pit latrines without slab or platform	306				
Open Defecation	Disposal of human faeces in fields, forests, bushes, open bodies of water, beaches and other open spaces or with solid waste	no facilities	-				

JMP SERVICE LADDER - URBAN		Requirement	Reached	Requirement	Reached	Requirement	Reached
Safely managed	Use of improved facilities which are not shared with other households and where excreta are safely disposed in situ or transported and treated off-site	improved facilities	-	not shared with other households	-	excreta safely disposed (in situ or treated off-site)	-
Basic	Use of improved facilities which are not shared with other households	improved facilities	64	not shared with other households	41		
Limited	Use of improved facilities shared between two or more households	improved facilities	64	shared with other households	17		
Unimproved	Use of pit latrines without a slab or platform, hanging latrines or bucket latrines	pit latrines without slab or platform	165				
Open Defecation	Disposal of human faeces in fields, forests, bushes, open bodies of water, beaches and other open spaces or with solid waste	no facilities	-				

JMP SERVICE LADDER - RURAL		Requirement	Reached	Requirement	Reached	Requirement	Reached
Safely managed	Use of improved facilities which are not shared with other households and where excreta are safely disposed in situ or transported and treated off-site	improved facilities	-	not shared with other households	-	excreta safely disposed (in situ or treated off-site)	-
Basic	Use of improved facilities which are not shared with other households	improved facilities	56	not shared with other households	-		
Limited	Use of improved facilities shared between two or more households	improved facilities	56	shared with other households	56		
Unimproved	Use of pit latrines without a slab or platform, hanging latrines or bucket latrines	pit latrines without slab	141				
Open Defecation	Disposal of human feces in fields, forests, bushes, open bodies of water, beaches and other open spaces or with solid waste	no facilities	-				

Appendix F

Advanced Indicator Application

Tupicocha

