









OXFAM GB HOUSEHOLD-LEVEL SUSTAINABLE WATER AND SANITATION INDEX

Oxfam GB's Sustainable Water and Sanitation Strategy (Mizniak et al., 2017) states that, to achieve sustainability, we must 'work with essential partners in a unified approach to connect poor and vulnerable communities to water and sanitation services, ensuring they are working equitably' to 'keep water and sanitation systems operational, accessible, and affordable'.

Building on our approach for measuring other complex themes, such as Women's Empowerment (Bishop & Bowman, 2014; Lombardini et al., 2017) and Resilience (Hughes & Bushell, 2013; Fuller & Lain, 2015), we gathered a set of 'dimensions' to create a household-level Sustainable Water and Sanitation Index. The dimensions shown in Table 1 were developed by listing out and then consolidating factors identified in the following sources:

1. Oxfam GB's Sustainable Water and Sanitation Strategy (Mizniak et al., 2017) and Outcomes-based Monitoring Framework (Medland, 2018)
2. Sustainable Development Goal 6 (UN 2018)
3. A literature review of existing frameworks and indexes relevant for measuring sustainable water and sanitation (Banerjee & Morella, 2011; Bartram et al., 2014; Bratton & Gyimah-Boadi, 2016; Giné-Garriga & Pérez-Foguet, 2018; Kayser et al, 2013; Porteous, 2016; Shilling et al., 2013; Thomas et al., 2018; WHO/UNICEF, 2017; Wilbur & Danquah, 2015)

Table 1. Six dimensions of Oxfam's Sustainable Water and Sanitation index.

Dimension	Definition
 Water Security*	People have consistent and sufficient access to preferable and acceptable water; water is not a source of worry, shame, or anger.
 Equity	Facilities, services, and related management systems and decision-making processes are inclusive all genders and vulnerable users.
 Institutions	Duty-bearers are accountable and transparent, levels of trust are high, and there is an enabling environment for service provision.
 Operations	Systems and services have an asset management scheme in place and enable easy and continuous access that is affordable and financially viable.
 Well-Being	People are satisfied with life, they are healthy and unburdened by waterborne diseases, and their children are attending school.
 The Environment	Communities have plans in place for water safety, waste management, water conservation, etc. and people are aware of and participate in these systems.

*Based on the Household Water Insecurity Experiences Scale (HWISE) (HWISE, 2019; Young et al., 2019).

The goal is to capture all key aspects that are known or suspected to contribute to the sustainability of water and sanitation systems and services. Having a single aggregate number (the index score) gives us a general sense of the water and sanitation situation of a population. At the same time, we can look at the different dimensions and indicators to understand possible stronger and weaker points. We can

use this information to track changes over time, to compare the situation in different communities, or to measure impact (e.g., by comparing the scores for groups of project participants and non-participants over time). Doing so can give us a more holistic measurement of our successes and failures (or both).

Figure 1 shows an example version of the index based on 14 indicators under six dimensions. The dimensions always remain constant, while the indicators are adaptable. However, indicators should not be removed simply because a project is not working on that aspect – the goal of the index is to capture what comprises Sustainable Water and Sanitation in the given context. Possible indirect effects can then also be better understood.

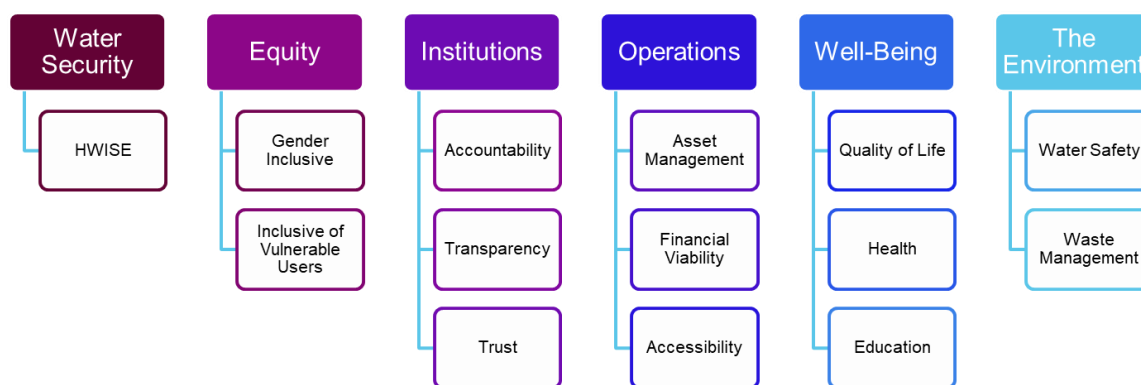


Figure 1. Sustainable Water and Sanitation index dimensions (top row) and indicators.

The index is assessed using data gathered through household questionnaires. Each indicator can be measured with one or more questions, where each question has a pre-defined threshold of acceptability, adapted from the approach of Alkire and Foster (2011). A positive result (above the threshold) receives a score of '1', while a negative result (below the threshold) receives a score of '0'. Each indicator is calculated as the average of the scores for the individual questions, reported as a percentage on a scale from 0 to 100. Similarly, each dimension is calculated as the average of its indicators and the overall index is the average of the six dimensions, again on a scale of 0 to 100. Note that in cases where missing values are possible, the index can still be calculated by ignoring missing values. **A detailed table of example questions is provided in Appendix 1.**

We give equal weight to each dimension in the index; we have no theoretical justification to claim one is more important than another. Within each dimension, we also give equal weight to its indicators for the same reason. Therefore, individual questions are not weighted equally within the index; some indicators are measured with one question while others are measured by averaging 10 or more. Take the **Equity** dimension as an example with two indicators. *Gender Inclusive* is the average value across five variables (*equity1, equity4, equity5, equity6, equity7*) and *Inclusive of Vulnerable Users* is the average value across four variables (*equity2, equity3, feeoptynwat, feeoptynsan*). **Equity** equals *Gender Inclusive* plus *Inclusive of Vulnerable Users*, divided by two.

So far, in 2018 and 2019, the Sustainable Water and Sanitation Index has been used in three Oxfam GB Effectiveness Reviews in Africa. These evaluations (publications forthcoming) reviewed the impact of urban WASH projects in Lusaka, Zambia and Freetown, Sierra Leone and a rural WASH project in North Kivu, DRC.

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Annex 1: Example Indicators, Questions and Thresholds for each Dimension

This Annex provides example indicators, questions and thresholds for each dimension of the Oxfam GB Sustainable Water and Sanitation Index. Most of these can be adapted to the given context (as noted in each case). However, indicators should not be removed simply because a project is not working on that aspect – the goal of the index is to capture what comprises Sustainable Water and Sanitation in the given context.

Water Security dimension

These 12 items should always be used together (HWISE, 2019; Young et al., 2019).

Indicator	Variable	Question	Responses	Threshold for Index
Water Security (Average of 12 variables x 100)	<i>hwise1</i>	In the last month, how frequently did you or anyone in your household worry you would not have enough water for all of your household needs?	1 = Never (0 times) 2 = Rarely (1-2 times) 3 = Sometimes (3-10 times) 4 = Often (More than 10 times) 88 = Don't know	Never = 1 Rarely to Often = 0 Don't know = missing
	<i>hwise2</i>	In the last month, how frequently has your main water source been interrupted or limited (water pressure, less water than expected, dried up)?		
	<i>hwise3</i>	In the last month, how frequently have problems with water meant that clothes could not be washed?		
	<i>hwise4</i>	In the last month, how frequently has you or anyone in your household had to change schedules or plans due to problems with your water situation?		
	<i>hwise5</i>	In the last month, how frequently have you or anyone in your household had to change what was being eaten because there were problems with water (for washing foods, cooking)?		
	<i>hwise6</i>	In the last month, how frequently have you or anyone in your household had to go without washing hands after dirty activities (defecating or changing diapers, cleaning animal dung) because of problems with water?		
	<i>hwise7</i>	In the last month, how frequently have you or anyone in your household had to go without washing their body because of problems with water (not enough water, dirty, unsafe)?		
	<i>hwise8</i>	In the last month, how frequently has there not been as much water to drink as you would like for you or anyone in your household?		
	<i>hwise9</i>	In the last month, how frequently did you or anyone in your household feel angry about your water situation?		
	<i>hwise10</i>	In the last month, how frequently have you or anyone in your household gone to sleep thirsty because there wasn't any water to drink?		
	<i>hwise11</i>	In the last month, how frequently has there been no useable or drinkable water whatsoever in your household?		
	<i>hwise12</i>	In the last month, how frequently have problems with water caused you or anyone in your household to feel ashamed, excluded, and/or stigmatized?		

Equity dimension

In this dimension, indicators can be adapted as needed.

Indicator	Variable	Question	Responses	Threshold for Index
Gender Inclusive (Average of 5 variables x 100)	<i>equity1</i>	The water and sanitation needs of people of all genders are being met equally.	1 = True 0 = False	True = 1 False = 0
	<i>equity4</i>	Women and men share equal responsibility in ensuring that the water and sanitation needs of their households are met.		
	<i>equity5</i>	Women and men are equally aware of how to provide feedback and submit complaints about local water and sanitation management.		
	<i>equity6</i>	Feedback and input from women and men about local water and sanitation management is equally valued.		
	<i>equity7</i>	Women and men are equally aware of their water and sanitation rights.		

Indicator	Variable	Question	Responses	Threshold for Index
Inclusive of Vulnerable Users (Average of 4 variables x 100)	<i>equity2</i>	The water and sanitation needs of people with disabilities and/or chronic illnesses are being met.	1 = True 0 = False	True = 1 False = 0
	<i>equity3</i>	The water and sanitation needs of children are being met.		
	<i>feeoptynwat</i>	Do you know of any options for those who are not able to pay for water?	1 = Yes	Yes = 1
	<i>feeoptynsan</i>	Do you know of any options for those who are not able to pay for sanitation?	0 = No	No = 0

Institutions dimension

In this dimension, indicators can be adapted as needed.

Indicator	Variable	Question	Responses	Threshold for Index
Accountability (Average of 3 variables x 100)	<i>watsansatisfaction</i>	Overall, how satisfied are you with your water and sanitation services and systems?	1 = Very dissatisfied 2 = Somewhat dissatisfied 3 = Somewhat satisfied 4 = Very satisfied	Very/somewhat satisfied = 1 Very/somewhat dissatisfied = 0
	<i>holdacc_yn</i>	Have you done anything in the past year to try to encourage or pressure the government and service providers to provide better water and sanitation services?	1 = Yes 0 = No	Yes = 1 No = 0
	<i>holdacc_conf</i>	How confident do you feel in your ability to encourage or pressure government and service providers to provide better water and sanitation services?	1 = Not confident 2 = Somewhat confident 3 = Very confident	Very/somewhat confident = 1 Not confident = 0

Indicator	Variable	Question	Responses	Threshold for Index
Transparency (Average of 3 variables x 100)	<i>info_yn</i>	Do you get any information about the management of your water and/or sanitation systems?	1 = Yes 0 = No	Yes = 1 No = 0
	<i>info_who</i>	Do you know who you can go to if you have questions, concerns or need information about your water and/or sanitation systems?		
	<i>info_enough</i>	Do you feel that you get enough information about the management of your water and sanitation services?		

Indicator	Variable	Question	Recommended Responses	Suggested Threshold for Index
Trust (Average of 7 variables x 100)		How much would you say you trust each of the following in relation to water and sanitation laws, systems and services?	1 = Not at all 2 = Just a little 3 = Somewhat 4 = A lot 9 = Not applicable	A lot/Somewhat = 1 Not at all/Just a little = 0 Not applicable = missing
	<i>trust1</i>	Local government?		
	<i>trust2</i>	Local Development Committee?		
	<i>trust3</i>	Water and sanitation service providers?		
	<i>trust4</i>	Property owner (landlord/landlady)? (if renter/cartaker)		
	<i>trust5</i>	Non-governmental organisations (NGOs)?		
	<i>trust6</i>	Community-based organisations (CBOs)?		
<i>trust7</i>	National/Central government?			

Operations dimension

In this dimension, some variables are assessed using a threshold based on more than one question. These indicators can be adapted as needed.

Indicator	Variable	Question	Responses	Threshold for Index
Asset Management (Average of 6 variables x 100)	<i>confident_oandm</i>	For water and sanitation systems, how confident are you in the committee to manage routine operation and maintenance to avoid break downs?	1 = Not confident 2 = Somewhat confident 3 = Very confident 88 = Don't know 99 = No committee	Very/somewhat confident = 1 Not confident or No committee/Don't know = 0
	<i>confident_repair</i>	If yes, for water and sanitation systems, how confident are you in this committee to manage major repairs after a break down?		
	<i>confident_replace</i>	If yes, for water and sanitation systems, how confident are you in this committee to manage a full replacement if the current system cannot be repaired?		
	<i>confident_shock</i>	If yes, for water and sanitation systems, how confident are you in this committee to manage through a crisis, shock or disaster?		

	<i>watbd</i>	When it last happened that you could not use your main drinking water source because it was broken down, about how long was it broken down before it was repaired and functioning properly again?	0 = It has never happened 1 = 1 to 2 days 2 = 3 to 7 days	It has never happened to 3 to 7 days = 1 More than 1 week or more = 0
	<i>sanbd</i>	When it last happened that you could not use your main toilet or sanitation facility because it was broken down, about how long was it broken down before it was repaired and functioning properly again?	3 = More than 1 week but less than 1 month 4 = 1 month or more	

Indicator	Variable	Question	Responses	Threshold for Index
Financial Viability (Average of 6 variables x 100)	<i>feestructwat</i>	What is the fee structure for use of the main system that you use for water?	1 = Fixed cost per month 2 = Fixed cost per amount or use 3 = Variable cost per month 4 = Variable cost per amount or use 5 = There is no fixed structure, payment is irregular, or it changes often 6 = There is no fee structure, it's free 8 = Don't know	Fixed or variable = 1 Irregular or free = 0 Don't know = 0
	<i>feestructsan</i>	What is the fee structure for use of the main system that you use for sanitation?		
	<i>paydifficultwat</i>	How difficult is process of paying for services for water?	1 = Very difficult 2 = Somewhat difficult 3 = Not difficult at all	Not difficult at all = 1 Very/somewhat difficult = 0
	<i>paydifficultsan</i>	How difficult is the process of paying for services for sanitation?		
	<i>fairpricewat</i>	Do you think your main service is fairly priced for water?	1 = The pricing is completely unfair 2 = The pricing is somewhat unfair 3 = The pricing is somewhat fair 4 = The pricing is completely fair	Completely/Somewhat fair = 1 Completely/Somewhat unfair = 0
	<i>fairpricesan</i>	Do you think your main service is fairly priced for sanitation?		

Indicator	Variable	Question	Responses	Threshold for Index
Accessibility (Average of 7 variables x 100)	<i>watimproved</i>	What is your main source for drinking water during the dry season?	1 = <u>Unimproved</u> (unprotected dug well, unprotected spring, cart with small tank/drum, tanker truck, surface water, bottled/sachet water)	Piped/Improved in both seasons = 1
		What is your main source for drinking water during the dry season?	2 = <u>Improved</u> (public tap, standpipe, or kiosk, tube well or borehole, protected dug well, protected spring, rainwater collection) 3 = <u>Piped water on premises</u> (in the house or on the plot or yard)	Unimproved during one or both seasons= 0
	<i>sanimproved</i>	What type of sanitation facilities do members of your household use most often now?	1 = None (in the open) 2 = Pit toilet/latrine, open/uncovered 3 = Pit toilet/latrine, closed/covered 4 = Flush toilet/latrine	Closed pit/flush toilet = 1 Open pit/none = 0
	<i>watdomestic</i>	What is the main source you use for other domestic purposes?	1 = <u>Unimproved</u> (unprotected dug well, unprotected spring, cart with small tank/drum, tanker truck, surface water, bottled/sachet water) 2 = <u>Improved</u> (public tap, standpipe, or kiosk, tube well or borehole, protected dug well, protected spring, rainwater collection) 3 = <u>Piped water on premises</u> (in the house or on the plot or yard)	Piped/Improved = 1 Unimproved = 0
	<i>san_sp</i>	Is your main toilet or sanitation facility private, only for your household, or is it shared?	Private = 1 Shared = 0	Private = 1 Shared = 0
	<i>wat_loc</i>	Where is your main drinking water source located?	1 = off the property (off-plot) 2 = on the property (on-plot) 3 = in the house	In the house/On-plot OR less than 10 minutes total (walk + queue time) = 1
		If off-plot, how long does it take to walk there (one way)?	Number of minutes (one way)	Off-plot AND more than 10 minutes total (walk + queue time) = 0
		If off-plot, how long do you have to wait in queues at the source before you get water? (per trip)	Number of minutes (per trip)	
<i>wataccess</i>	When your main drinking water source is functioning normally, how many hours per day are members of your household able to access it?	Number of hours (1 to 24)	24 hours = 1 <24 hours = 0	
<i>sanaccess</i>	When your main toilet or sanitation facility is functioning normally, how many hours per day are members of your household able to access it?			

Well-Being dimension

In this dimension, indicators can be adapted as needed.

Indicator	Variable	Question	Responses	Threshold for Index
Quality of Life (Average of 2 variables x 100)	<i>lifesatisfaction</i>	Overall, how satisfied are you with life these days?	1 = Very dissatisfied 2 = Somewhat dissatisfied 3 = Somewhat satisfied 4 = Very satisfied	Very/Somewhat satisfied = 1 Very/Somewhat dissatisfied = 0
	<i>pss-4</i>	In the last month, how often have you felt that you were unable to control the important things in your life?	0 = Never 1 = Almost never 2 = Sometimes 3 = Fairly often 4 = Very often	(Calculate PSS-4) Total score 8 or more = 1 Total score less than 8 = 0
		In the last month, how often have you felt confident about your ability to handle your personal problems?		
		In the last month, how often have you felt that things were going your way?		
		In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?		

Indicator	Variable	Question	Responses	Threshold for Index
Health (Average of 7 variables x 100)	<i>health</i>	Overall, how would you describe your state of health now?	1 = Very poor 2 = Poor 3 = Good 4 = Very good	Very good/Good = 1 Very poor/Poor = 0
	<i>stomachpain</i>	In the last week, have you had any stomach pain (because of a health problem/illness)?	1 = Yes 0 = No	No = 1 Yes = 0
	<i>fever</i>	In the last week, have you had a fever?		
	<i>diarrhoea</i>	I'm sorry to have to ask this, but in the last week, have you had any diarrhoea?		
	<i>unwell</i>	In the last week, have you felt so unwell that you had to interrupt your normal daily activities (because of a health problem/illness)?		
	<i>typhoid</i>	Have you had typhoid (diagnosed at a health centre or hospital) in the last 1 year?		
	<i>cholera</i>	Have you had cholera (diagnosed at a health centre or hospital) in the last 1 year?		

Indicator	Variable	Question	Responses	Threshold for Index
Education (Average of 3 variables x 100)	<i>schoolnow</i>	Are all school-aged children in the household attending school? (ideally counted from household roster)	1 = Yes 0 = No	Yes = 1 No = 0
	<i>absenceany</i>	Have any school-aged children in the household missed school in the past 1 month for any reason? (ideally counted from household roster)	1 = Yes 0 = No	No = 1 Yes = 0
	<i>absencewatsan</i>	Have any school-aged children in the household missed school in the past 1 month due to water and sanitation related issues such as inadequate facilities at the school, too busy collecting water, etc.? (ideally counted from household roster)		

The Environment dimension

In this dimension, indicators can be adapted as needed.

Indicator	Variable	Question	Responses	Threshold for Index
Water Safety (Average of 3 variables x 100)	<i>environment1</i>	Water systems in my community are monitored to ensure water is safe to drink.	1 = True 0 = False	True = 1 False = 0
	<i>environment2</i>	Water safety plans exist and are enforced to protect drinking water sources in my community from contamination.		
	<i>environment3</i>	Water points are fenced and animals are contained to keep drinking water safe.		

Indicator	Variable	Question	Responses	Threshold for Index
Waste Management (Average of 4 variables x 100)	<i>environment4</i>	Sanitation systems in my community are monitored to ensure wastewater/sewage is safely managed.	1 = True 0 = False	True = 1 False = 0
	<i>environment5</i>	Solid waste management plans exist and are enforced to keep my community clean from refuse.		
	<i>environment6</i>	People in my community participate together in a monthly or weekly cleaning day.		
	<i>environment7</i>	My community has been certified as Open Defecation Free (ODF).		

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