

HOUSEHOLD WATER INSECURITY EXPERIENCES SCALE (HWISE)

PROJECT HANDBOOK/FIELDWORK MANUAL



What is water insecurity?

Water insecurity is the inability to access and benefit from affordable, adequate, reliable and safe water for wellbeing and a healthy life (Jepson et al., 2017)



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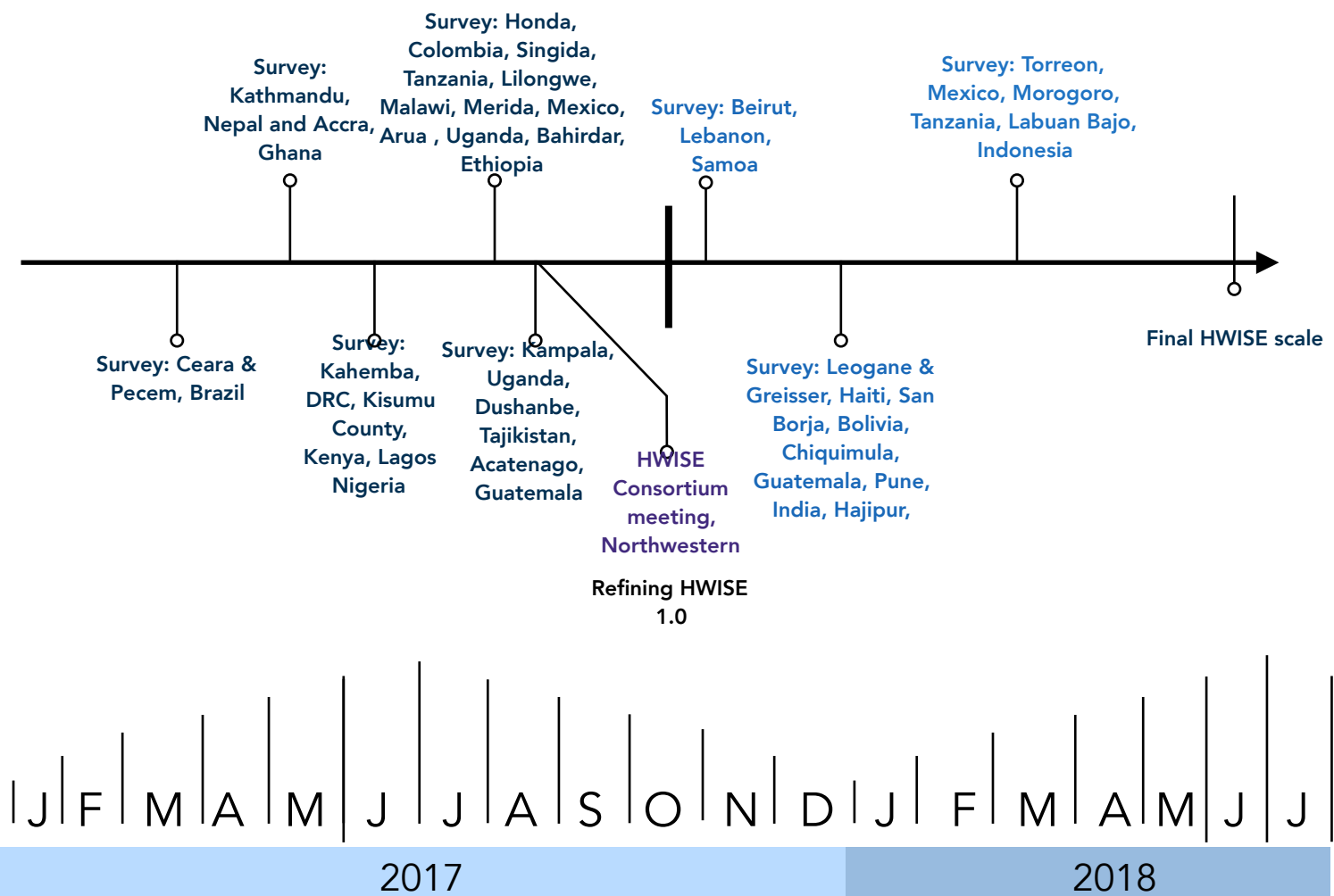
1. Overall objectives

This manual is meant to provide guidance on data collection using the **Household Water Insecurity Experiences Scale (HWISE) Survey**. The HWISE tool is important because it can be used to **assess risks** of adverse outcomes associated with household water insecurity, **target scarce resources** to mitigate household water insecurity, and **measure the impacts** of interventions and policies on household water insecurity.

2. Timeline

HWISE 1.0

HWISE 2.0



3. Introduction to Household-Level Water Insecurity

Water is fundamental to health and nutritional wellbeing. Water is needed for personal consumption (drinking, cooking, taking medications), economic productivity (watering livestock and crops, operating businesses), as well as hygiene and sanitation (Figure 1).

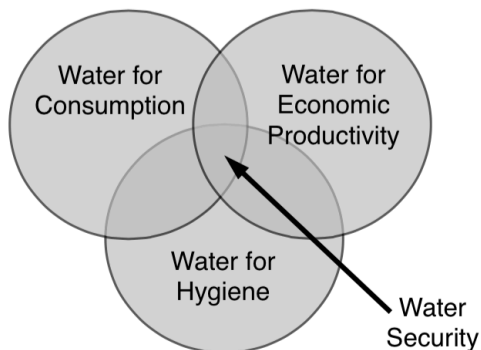


Figure 1. 3 components of water security

Water scarcity is a growing problem. There is widespread agreement that difficulty with regular availability and access to water in sufficient quantity and quality is a serious problem that will only increase, given climactic changes and increased water use (1,2). Four billion people face severe water scarcity for at least 1 month per year, while half a billion people suffer from severe water scarcity year round. (3)

Water insecurity is pivotal to the health of all, but especially women and children. In most parts of the developing world, women bear the physical responsibility and psychological burden of ensuring

adequate household water (4-5). This can be very demanding in terms of time and energy, e.g. walking long distances to water sources, carrying heavy jerrycans. It can also leave women vulnerable to physical and sexual violence en route to remote sources (6-8). Further, water acquisition can leave women less time for other critical responsibilities (which are also often water-intensive and promote health and hygiene), e.g. bathing children, washing clothes. It can also compromise women's ability to care for their children, including the energy and time demands of breastfeeding and clinic visits (9). It can preclude women from engaging in wage-earning activities, and girls from attending school (10). Also of note, pregnant and lactating women have less physical ability to access water, making the need for readily accessible, clean water especially vital during pregnancy and lactation (11).

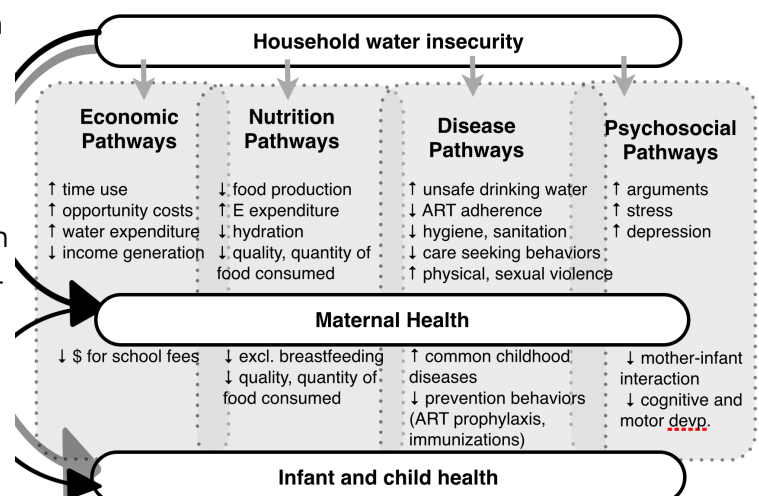


Fig 2. Potential pathways of influence of WI on maternal and child

Currently, we cannot measure water security at the level of the household or individual, i.e. at the endpoint of water use. Although there are myriad national, regional, community,

and hydrologic indexes of water availability (12-15), and strong formative work about water access at the level of the household [e.g. from Ethiopia (16), Texas (17), and Bolivia (18)], to our knowledge, there are no validated scales for measuring water access at the household or individual levels globally. Without a comprehensive, validated scale to measure household WI, we cannot know the prevalence of household WI access, nor empirically test its potential impacts on economic, nutrition, disease, and psychosocial health outcomes (cf. Fig. 1). Therefore, this work is innovative because we will conduct the rigorous psychometric and statistical analyses necessary to transform a list of questions into a rigorously validated scale.

A tool analogous to the household-level food insecurity scales, but to measure water security access at the household level, could be “game-changing”. Indeed, our ability to measure food security access in the household has advanced our understanding of the underlying causes of a range of adverse health outcomes, from HIV acquisition and progression (19) to depression and poorer health (20, 21). It has also been useful for developing interventions and policies to mitigate food insecurity, and has helped to explain why some interventions have not had intended effects (22).

4. Overview of data collection methods

4.0 Community Integration

In sites where the HWISE survey will be implemented, it is critical to first get approval and community buy-in from relevant authorities. Some areas may be more sensitive to surveying than others, so informing the police, local leaders, and/or elder community members may be necessary in order to avoid later complications.

4.1 Sampling

The **gold standard** of participant sampling would be to identify mutually exclusive and exhaustive categories of areas known to be of high, medium, and low water insecurity. A random sampling technique could then be applied to select a sample from the population.

This is the first endeavor to measure household water insecurity, and our assessments are based on information available from a variety of sources, such as, but not limited to: community mapping of water resources/uses/problems, previous surveys on water resources/use/issues, and knowledge of key stakeholders.

We have outlined a few useful steps for sampling below:

1. Choose the number of neighborhoods or interviewer areas for sampling based on informed knowledge of available information about the state of water insecurity. Develop a criterion for neighborhood selection.

- a. Depending on your desired total sample size, it could be one or more of each type of neighborhood.
- b. If there is a need for unbalanced neighborhood sampling, focus on oversampling high and medium areas of water insecurity to capture more variation.

2. Then, in each neighborhood, interviewers can use any of the following techniques to randomly select participants:

- a. Interviewers should obtain or develop a list of house numbers (if possible) for selected neighborhoods or interviewer areas. Based on this list (i.e. sampling frame), interviewers should select every 2nd, 3rd, or 4th house number on the list until the predefined sample for that neighborhood has been attained.
- b. Alternatively, interviewers can do the WHO random sample walk (i.e. a random number is chosen and interviewers will sample every nth household). For example, if the number 3 is chosen, interviewers would sample every 3rd household.
- c. If this survey is being included as part of a larger assessment, interviewers should follow the sampling protocol defined by their principal investigator and study team.

4.2 Description of Surveys

Approximately 250 participants will be surveyed per site. Survey data will allow us to understand the impacts of household water insecurity. We expect that water insecurity will have consequences for economic productivity, nutrition, disease, and psychosocial wellbeing. Therefore, we have developed a survey that asks 32 questions about **water insecurity**, and other questions about sociodemography, water quality, quantity, accessibility, reliability and utility, food insecurity, perceived stress, and infant feeding (Table 1). Together, these questions will help us to understand if our 32-question water insecurity tool is valid for use globally, and that it measures the actual experiences of water insecurity, and will allow us to explore the consequences of water insecurity at the household level.

Table 1. Survey questions with rationale

Topic	Brief Description	Rationale
Socio-demography	Neighborhood, region, district/residence	Participants Characteristics
	Role in household	
	Gender of Household head/respondent	
	Relationship status	
	Age of household head/respondent	
	Person responsible for collecting water in the household	
	Household size (# of adults & # of kids)	
	Type of housing	
	Religion and denomination	

Household Water Insecurity Experiences Scale (HWISE)	30-item scale on household water insecurity	Scale
Water sharing	Borrowing/loaning, what are you expected to give in return, from whom do you borrow?	Water sharing
Water Quality	Source of primary drinking water (WHO categories for improved & unimproved sources)	Variation between groups
	Source of primary non-drinking water (WHO categories for improved & unimproved sources)	
	Assessment of drinking water to be safe or unsafe	
	Participants treating their water	
Water Accessibility	The amount of money spent by the household in water collection	Convergent validity
	Estimate the time spent in collecting water from water source	
	Frequency of water collection	
Water Quantity	Amount of drinking water stored in household (L)	Convergent validity
	Amount of non-drinking water stored in household (L)	
Water Utility	Amount of water drank in a day (L)	Discriminant validity
Water Stability/Reliability	Which of the months in a year do households experience water insecurity?	Variation between groups
	Which times of day do households experience water insecurity?	
Food Insecurity	9-item estimate via Household Food Insecurity Access Scale (HFIAS). <i>Coates, Swindale, & Bilinsky. (2007). Household Food Insecurity Access Scale (HFIAS) for measurement of food access: indicator guide.</i>	Predictive validity of scale
Perceived Stress	4-item Estimate via Cohen's Perceived Stress Scale. <i>Cohen, Kamarck, & Mermelstein. (1994). Perceived stress scale.</i>	Predictive validity of scale
Infant Feeding	1 open-ended question on perceptions of how water insecurity may affect infant & young child feeding	Formative, establish relationship
	Open-ended question about job/work	

Socio-Economic Status	A ladder showing the degree of participants socio-economic status (scaled 1 to 10, with 1 being the best off, most educated, most money, and the most respected job; at the bottom participants with less money, education, least respected jobs)	Predictive validity of scale
	Estimate socioeconomic status via income of participants or household	
Data Quality	4-items on interviewer-assessed quality of responses	Data quality

4.3 Data Collection

Data will be collected using either paper forms or a tablet-based application (information on downloading tablet-based forms can be found on page 26). Each participant you survey will have a unique participant identification number, which will be recorded on the survey. To maintain the confidentiality of our participants, we will not list their names on the interview or survey forms. Each participant will be given a unique identifier, such that he or she will be distinguishable from other participants within study sites and across study sites.

Please include zeros before any single or double digit participant IDs to distinguish them clearly (e.g. Participant 10 will be PID 010, participant 1 will be PID 001).

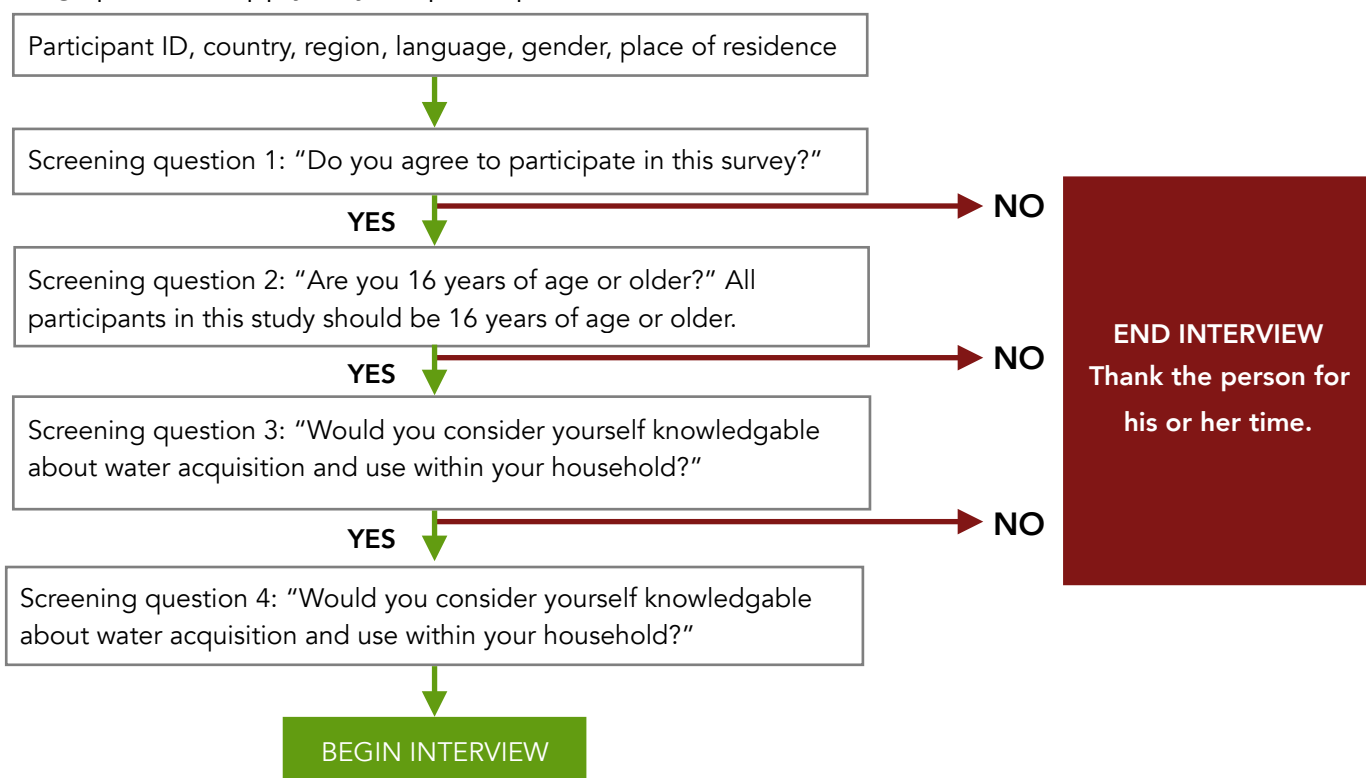
STEP 1: Each interviewer will also have a unique ID so that they are distinguishable from one another. Each interviewer should be assigned a range of participant IDs to use so that there is not overlap in IDs. For example, if there are 5 interviewers, and the target is 250 participants for that site, each interviewer should be provided with a range of 50 participant ID numbers and a buffer of at least 20 additional participant ID numbers (70 in total) in case participants do not complete interviews or end surveys prematurely.

Sample range of participant IDs for 5 interviewers (e.g. 50 participants and 20 buffer IDs)

Interviewer ID Numbers	Participant ID ranges
Interviewer 1 (I001)	001-071
Interviewer 2 (I002)	072-144
Interviewer 3 (I003)	145-215
Interviewer 4 (I004)	216-286
Interviewer 5 (I005)	287-357

Interviewers will list their interviewer ID number, country and region where the survey is occurring, the unique participant ID, language of interview, sex of the participant, and participant's place of residence (categorized as rural, peri-urban, or urban) prior to screening and consenting participants.

STEP 2: Using a series of three questions, interviewers will screen participants to determine if they are eligible to participate in the study. Follow the flowchart below to see how the screening questions apply to your participants.



4.4 BEGIN SURVEY

Section 1.1. Sociodemographics: Part 1

We will begin the interviews with a brief section on sociodemographic information. Questions include the participant's neighborhood, region/district, and whether they live in a rural, urban, or peri-urban area. This section also includes questions on gender of household head and respondent, relationship to the head of household, relationship status, the gender of the head of household, participant's age, number of children (people 16 years of age and younger) in the household, and number of adults (people older than 16 years of age) in the household.

When asking about households, a person is considered a household member if he or she sleeps under the same roof and takes food from the same pot as the respondent.

We will also ask who within the household is responsible for making sure there is enough water. For this question, if the participant responds that they share this responsibility, ask her or him who within the household they share the responsibility with and select the responses in the survey that most closely correspond with what he or she reported. We will also ask participants what type of home they live in. It is important to note not only the type of home, but also if participants rent, own, or lease the property. If none of the options apply to the person you are interviewing, you can select 'other' and write in a response for housing type.

Section 2. Household Water Insecurity Scale

The 30 water insecurity questions are intended to capture a range of experiences and indicators of water insecurity at the household level. Not all questions will be applicable to all households in your site. In fact, some questions may not be applicable to any households in your site. **While you may be concerned about bothering the participant, please remember that it is very important that all the questions are asked in the same way across all study sites and that ALL questions in the survey are asked to respondents.** This will help us to create a final survey that addresses the most important and applicable aspects of water insecurity across the world.

If the participant displayed annoyance or any other negative indicators of their feelings in this section of the survey or any other, please make note of it at the end in the "Data Quality" section of the survey. To the best of your ability, describe the negative aspects you picked up on, and note whether it was a specific question or what the problem was.

For this series of questions, ask participants how often each of the situations occurred within the past 4 weeks (or one month). ***Now I'm going to ask you about your own personal experiences with water. For each of the items, please indicate how many times within the past 4 weeks or 30 days.***

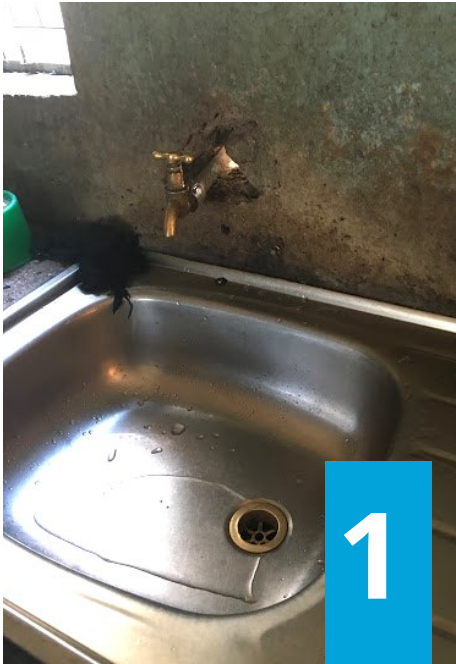
- 1 **Never** If a participant says that they never experienced the situation, respond with A "Never"
- 2 **Rarely:** If a participant says that they experienced the situation 1 or 2 times in the past 4 weeks, choose B "Rarely"
- 3 **Sometimes:** If the participant says they experienced the situation between 3-10 times in the past month, choose C "Sometimes"
- 4 **Often:** If the participant says they experienced the situation between 11-20 times in the past month, choose D "Often"
- 5 **Always:** If the participant says they experienced the situation more than 20 times in the past month, choose E "Always"
- 99 **Don't know:** If the participant says they do not know or remember, choose DK "Don't know"

- 88 Not applicable/I don't have this:** In some cases, questions may not be applicable to participants. For example, some households may not have children, in this instance, you would select NA "Not applicable/ I don't have this"

Helpful tip: If participants do not feel confident in their answers, or are having a difficult time responding, probe the participant on the number of times these items have occurred in one week and multiply by four to get a cumulative response.

Further probing for each individual water insecurity question can be found on page 21 of this manual.

Number	Water Source	Number	Water Source
1	Piped water	9	Small water vendor
2	Standpipe	10	Tanker truck
3	Borehole/Tube well	11	Bottled water
4	Protected dug well	12	Bagged/sachet water
5	Unprotected dug well	13	Surface water
6	Protected spring	14	Other Person
7	Unprotected spring	15	Other
8	Rainwater collection		



Piped water into dwelling or compound: Water service pipe connected with in house plumbing with 1 or more taps



Public tap/standpipe: Public water point, has one or more taps constructed from brick, masonry, or concrete



Borehole/Tubewell (similar appearance):

Constructed by drilling into groundwater supplies and encasing water supply with pipes which prevents pollution of the water source by runoff or surface water



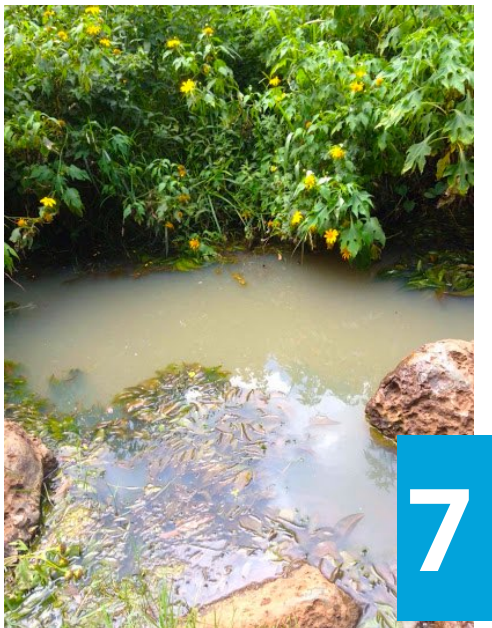
Protected dug well: Dug well protected by runoff by a well lining or casing raised above ground level and a platform that diverts spilled water away from the well



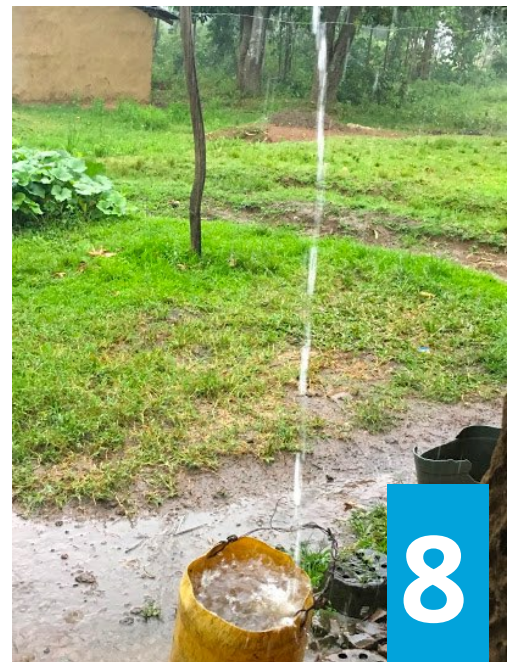
Unprotected dug well: Dug well that either is not protected from runoff, or is not protected from animal contamination



Protected spring: Natural spring is protected from runoff and contamination by a "spring box" constructed of brick, masonry, or concrete built around a spring so that water flows directly out of the box into a pipe or cistern



Unprotected spring: Spring without a "spring box" open to contamination from humans and animals



Rainwater: Collected or harvested rainwater from roof or ground catchment



Small vendor: Water seller transports water into a community using donkey carts, motorbikes, motor vehicles, bicycles, or on foot



Tanker truck: Water is brought into a community via a truck and is sold or distributed



Bottled water: Purchased bottled water



Sachet/bagged water: Purchased water sold in sachets or bags



Surface water: Any water located above ground (i.e. rivers, dams, lakes, ponds, streams, canals, and irrigation channels) 15

Section 4.1. Water Access: Water Acquisition

Once you have assessed which water source is being used, you will ask participants how long it will take them to access their water. This includes asking how long it takes to go to the water source, get water (including drawing or pumping water, and waiting in line), and return home. If participants respond that they access water within their house or compound, record this response as “0”. We will also ask participants how many trips they make to their indicated water source each week (this does not include any trips within the household or compound).

If the participant responds in hours, multiply the number of hours by 60 minutes to get the correct response. You may also comment at the end of the survey that you recorded this response in hours and the data cleaning team can convert to minutes later.

Section 4.2 Water Access: Water Purchasing and Treatment

We will also ask participants how much money they spend on getting water. Participants will likely respond using the amount in the currency where the survey is taking place. Please record the amount of money participants report and the unit of currency. This step is important because since there are many sites, we want to ensure that we can understand the relative amount spent in each study site, and we anticipate that this will differ by location.

We will ask participants if they treat their drinking water in any way to make it safer. This question is not meant to shame individuals if they do not treat their water, but rather, to get information on if and how water is treated. If participants do not treat their water, do not pressure them for a response on how they treat their water, or a false response may be given. However, if participants respond that they do treat their water, ask them what the primary treatment method they use is. The survey includes the options for boiling, filtering, and adding chemicals, but participants may use other methods, such as sedimentation. If this is the case, select ‘other’ and fill in the most appropriate response. If participants are treating water, please ask them how much money they spent treating water in the past 4 weeks. As outlined above, please indicate the currency.

Section 5.1. Water Quantity, Utility, and Stability: Water Storage

We will ask participants how many liters of water they store in their houses for drinking and for other uses. It may be useful to refer to photographs if participants cannot recall how much water they store. For instance, a participant may have three 20L jerrycans (60L in total) at their home for domestic purposes (cooking, cleaning, washing), but may have a smaller 10L container for drinking water storage. We have provided a chart with images that you can use to guide the participant as you review how much water they have stored. This chart is located on page 29. Not all sizes or types of containers are listed in the survey, but these images may help to facilitate the conversation about how much water participants are storing.

TRAINERS SHOULD USE THEIR BEST JUDGEMENT AND KNOWLEDGE OF WATER STORAGE CONTAINERS IN THE AREA TO RECORD THE AMOUNT OF STORED WATER

shortage and which months of the year they have plenty of water. This may not apply to every household, and months should only be circled if participants experience water shortage or have an abundance of water. We also ask what times of day households experience water shortages; this question may not apply to everyone, and if the participant you are interviewing does not have specific times of day during which they experience water shortage, this question can be skipped.

We will also ask participants what they perceive to be the main cause of problems with water in their area, and what strategies they use when they do not have enough water or enough money to buy water.

Section 6. Food Insecurity

In this survey, we will also ask questions about food insecurity. These questions are similar to water insecurity, and we will be asking about the frequency of each of the experiences within the past 4 weeks (or one month).

Now I'm going to ask you about your experiences with access to food in the last four weeks. I will ask you about the frequencies that you have experienced a few situations, and I want you to tell me how frequently it has happened in the last four weeks.

You will notice that options for responses differ from the water insecurity survey:

- 1 Never** If a participant says that they never experienced the situation, respond with A "Never"
- 2 Rarely:** If a participant says that they experienced the situation 1 or 2 times in the past 4 weeks, choose B "Rarely"
- 3 Sometimes:** If the participant says they experienced the situation between 3-10 times in the past month, choose C "Sometimes"
- 4 Often:** If the participant says they experienced the situation more than 10 times in the past month, choose D "Often"
- 99 Don't know:** If the participant says they do not know or remember, choose DK "Don't know"

Section 7. Perceived Stress

In this survey, we also ask participants another type of scale question, the perceived stress scale. In this series of questions, we will ask participants about the number of times they have experienced specific thoughts or feelings within the last four weeks.

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, indicate how often you felt or thought a certain way.

- 1 **Never** If a participant says that they never experienced the situation, or have experienced the situation 0 times in the last 4 weeks, respond with A "Never"
- 2 **Rarely:** If a participant says that they experienced the situation 1 or 2 times in the past 4 weeks, choose B "Rarely"
- 3 **Sometimes:** If the participant says they experienced the situation between 3-10 times in the past 4 weeks, choose C "Sometimes"
- 4 **Fairly Often:** If the participant says they experienced the situation 11-20 times in the past 4 weeks, choose D "Fairly Often"
- 5 **Often:** If the participant says they experienced the situation more than 20 times in the past 4 weeks, choose E "Often"

Section 8. Infant feeding

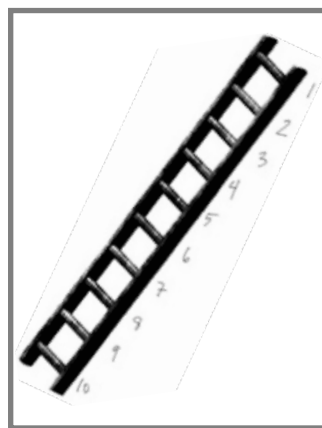
We are interested in learning if and how water insecurity affects the feeding of infants and young children (up to 12 months). Infant and young child feeding can include breastfeeding, feeding breastmilk from a cup or another way than at the breast, and the other types of food that children are fed at that age (i.e. porridge, soups, rice, etc.). We are interested in the ways that water insecurity may impact how infants are fed- from how getting/fetching water may change how much time mothers have to care for their children, how a lack of water may make certain foods harder to prepare, or may affect the quality or quantity of foods that are available, or any other things that participants may tell us.

The best way to explore all the possibilities of how water may affect infant feeding, is to ask an open-ended question: "*Can you tell me some ways that the water situation here affects how infants (under 12 months of age) are fed?*" We would like you to prompt for three ways, so ask "Is there another way that your water situation affects infant or young child feeding?" as a follow-up to the first and second response, until you receive three responses, or if the participant tells you they have no more ways. If the participant insists they do not know of any or more ways, please move on to the next section.

For this question and all other open-ended questions, please try to write word-for-word what the participant says.

Section 1.2. Sociodemography: Part 2

In the survey, we have included a second set of sociodemographic questions. You will notice that we have included a ladder (seen below) with numbers along the side rails. This ladder is meant to be a visual tool, much like



the water containers, to help participants think through their responses. In the question with the ladder, please ask participants to think of the ladder as the socioeconomic standing of people in their community, with the people who are the best off at the top and the people who are the worst off at the bottom and ask them to touch the rung that most closely corresponds to how they view their socioeconomic standing.

We will also ask participants to think of the ladder as a representation of the **water situation** in their community. We will ask them to place themselves on the rung of the ladder where they best fit. Those at the top of the ladder have the least amount of problems with water (e.g. have enough water for their needs, and can easily get water), and those at the bottom have the most problems with water.

Section 10. Data quality

At the end of each interview, we will ask how data collection went. We will first ask about the receptiveness of the respondent to each question by asking if the respondent showed any signs of mistrust, dishonesty, fear of you or the study, hostility, anger, or resentment, or evasion or trying to avoid answering. These questions will not be a reflection on you as the interviewer, but will help us to understand how the data collection process went and if participants feel comfortable with interviewers and surveys. We will also ask if there were any interruptions or distractions and how you would rank the overall quality of the data. If you have any concerns about the data collected, please list these concerns here with as much detail as possible. We want to ensure that our interviewers and study participants feel comfortable throughout the data collection process.

Field Notes

Sometimes it can be difficult to remember details about a household or community later after data collection is complete. Field notes provide a glimpse into the household and allow the interview to articulate his or her experiences. As you go into the communities, it may be useful to carry a notebook and pencil with you to write down any observations about the community as a whole, such as sources of water, if it is raining outside, what the houses within the community look like, how interviews are perceived, and anything you notice during surveys.

4.6 Debriefing

Since the goal of this study is for the water insecurity survey to be used around the world, we want to know how well it works in different contexts. Therefore, **all interviewers from each site** will be debriefed after completion of the surveys to determine how survey questions were understood and received by participants. Interviewers will be interviewed on where they conducted interviews (urban, rural, peri-urban areas), if the debriefing is occurring post-survey or post-cognitive interviewing, how many surveys (approximately) the interviewer completed, the primary language of the surveys, and questions specific to the

water insecurity scale. These include which of the 32 water insecurity questions worked best or were not well understood and why, which question was the most important to understand water insecurity in the specific region, and questions the interviewer wished we would have asked to better understand water insecurity.

5. Study Sites & Collaborators



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- **Cassandra Workman** (Morogoro, Tanzania)
- **Jam Farooq Ahmed** (Punjab, Pakistan)
- **Sonali Srivastava**, Anode Governance Lab (Rajasthan, India)
- **Divya Krishnakumar**, Anode Governance Lab (Rajasthan, India)
- **Nicola Hawley**, Yale University (Upolu, Samoa)

- **Stroma Cole**, UWE Bristol (Labuan Bajo, Indonesia)
- **Chad Staddon**, UWE Bristol (Labuan Bajo, Indonesia)
- **Andrea Sullivan**, University of Miami (Cartagena, Colombia)

6. Appendices

6.1. Additional Probing Questions for the Water Insecurity Access Scale

1. **HWISE 1:** How satisfied are you with your water situation on a scale of 1-5? (1 is not at all satisfied and 5 is completely satisfied)
 - a. Participants can articulate their level of satisfaction about their water source by considering water quality, access, quantity, and other factors.
2. **HWISE 2:** In the last 4 weeks, how frequently have you or anyone in your household been unable to access the **water that you preferred**?
 - a. Preferred water is the water that households would choose to use. In many places, people are not always able to use or access the water they would like and are forced to use other water sources.
3. **HWISE 3:** In the last 4 weeks, how frequently did you or anyone in your household **worry** you would not have enough water for all of your household needs?
 - a. Your household needs could include washing clothes, bathing yourself and/or your children, watering animals, washing dishes and utensils, cleaning your home, or other things your household needs water for.
 - b. In this question, we are wondering more about the worry about not having enough water than about the activities that you may not have water for.
4. **HWISE 4:** In the last 4 weeks, how frequently have you or anyone in your household **worried about the safety of the person** getting water for your household? By getting, I mean: traveling to, collecting the water, and returning with the water.
 - a. In many places, people have to travel, either by foot, by bicycle, by vehicle, or by other means, to get their water, and we would like to know if they worry about the safety of the person who is responsible for traveling to get water for the household to use. If the person responsible for getting water in your household do not leave your house to get water, this question will not be applicable to you.
5. **HWISE5:** In the last 4 weeks, how frequently has your household water supply from your main water source been **interrupted** or **limited** (e.g. water pressure, less water than expected)?
 - a. By interrupted, we mean that your water could have been turned off by the government or company that provides it, or stopped flowing due to issues with the supply or supplier, or that a storage tank now contains no water, or that the vendor

you use to purchase water regularly is not available, or that there is a drought you have to use another source to get water.

5a. HWISE5a: If your supply was interrupted or limited, were these **expected** (announced/scheduled) or unexpected?

b. This question is so that we can understand if the interruptions or limitations to your water supply are something that you can plan for or if they happen unexpectedly.

6. **HWISE 6:** In the last 4 weeks, how frequently has your household water situation impacted the cultivation of your **garden, crops, or fruit trees**?

a. This question refers to not having enough water for gardens, crops, or fruit trees.

Gardens, crops, or fruit trees includes any plants that you grow, and that you may not have enough water for. If you do not have a garden, crops, or trees, this question will not apply to you.

7. **HWISE 7:** In the last 4 weeks, how frequently has your household water situation impacted your raising of **animals and poultry**?

a. This question refers to not having enough water for animals, livestock, or poultry.

Animals and poultry mean any animals or livestock you may have, such as chickens, cattle, pigs, goats, sheep, alpacas, etc. that you may not have enough water for. If you do not have animals, livestock, or poultry, this question will not apply to you.

8. **HWISE 8:** In the last 4 weeks, how frequently have problems with water prevented you or anyone in your household from **earning money** (e.g. engaging in paid work, economic activities)?

a. This question refers to being unable to make money (either going to work, selling items, selling water, etc.) because you are dealing with problems with water. This

could include going to get water, waiting in line to purchase or get water, dealing with flood water, or other activities you may engage in related to water that prevent you from being able to go to work, stay at work, or force you to choose between getting water and earning money.

9. **HWISE 9:** In the last 4 weeks, how frequently have you or anyone in your household **lacked money** needed to **buy water**?

a. Buying water refers to paying for any water. This could include water that is piped into your house, water delivered to a tank or in buckets or containers to your house or compound, or buying water to take home. In households where people buy water, we would like to know how often you have not been able to buy water because you lacked money. For example, in some places, people sometimes have to choose between food and water, and this can make buying water more difficult.

10. **HWISE 10:** In the last 4 weeks, how frequently did you or anyone in your household want to buy water but there was **nowhere to buy it from**?

a. This question refers to the place where you buy water, if you buy water. In some places, during dry season or if there is another interruption in the water supply, it is not possible to purchase water from a preferred vendor or place. If you do not buy water, this question will not be applicable to you.

11. **HWISE 11:** In the last 4 weeks, how frequently did the children in your household **miss school** or **go to school late** because of problems with water (e.g. time spent fetching water, lack of water for bathing, etc.)?
- a. In some places, children will miss school or go to school late because they have to travel to water sources to get water, had to wait in order to get water, were unable to bathe before school, or for other reasons. If you do not have children in your household, this question will not be applicable to you.
12. **HWISE 12:** In the last 4 weeks, how frequently has there not been enough water in the household to **wash clothes**?
- a. This question refers only to water used for washing clothes. Sometimes households will have water for other activities, but may not have enough to wash clothes.
13. **HWISE 13:** In the last 4 weeks, how frequently have you or anyone in your household had to **change what was being eaten** because there were problems with water (e.g. for washing foods, cooking, etc.)?
- a. This question refers to water only used for cooking or preparing foods. In some places, people use water to wash and prepare foods and for cooking. This question means that your household may have wanted a different kind of food, but that you could not eat it and had to choose something else because you did not have enough water to prepare it or that you could not prepare a certain food because you didn't have enough water.
14. **HWISE 14:** In the last 4 weeks, how frequently have you or anyone in your household had to go **without washing hands** after **dirty activities** (e.g., defecating or changing diapers, cleaning animal dung) because of problems with water?
- a. This question refers to water for washing hands. Sometimes you may need to do dirty/unclean activities, like changing diapers, using a toilet, smearing mud or dung on walls or floors to insulate your home, cleaning, or taking care of animals and you may not have enough water to wash your hands after. If you choose not to wash your hands, this is different than not having enough water to wash them.
15. **HWISE 15:** In the last 4 weeks, how frequently have you or anyone in your household not **washed the faces and hands of children** because of problems with water?
- a. In many places, children wash their faces and hands before school and bedtime, and mothers wash the faces of the young babies, but sometimes there may not be enough water to do this. If you do not have children in your household, this question will not be applicable to you.
16. **HWISE 16:** In the last 4 weeks, how frequently have you or anyone in your household had to go without **washing their body** because of problems with water (e.g. not enough water, dirty, unsafe)?
- a. This question refers to water for bathing. Sometimes household members need to bathe, but there isn't enough water to do this. Or, there may be enough water for some members of the family to bathe, but not others. This refers to anyone in the household not being able to wash their body because there isn't enough water.

- 17.**HWISE 17:** In the last 4 weeks, how frequently has you or anyone in your household had to **change schedules/plans** due to problems with your water situation, such as problems getting or distributing water within the household? Activities that may have been interrupted include caring for others, doing household chores, etc.
- a. This question refers to your day being interrupted by problems with water. In some places, people have to travel to get water, and this takes time and can interrupt plans. If you want to go to visit a friend, for example and cannot do so because you have to go get water or because there are problems with water (such as flooding) that you have to deal with instead.
- 18.**HWISE 18:** In the last 4 weeks, how frequently have problems with water prevented you or anyone in your household from **attending social or cultural events** (e.g. church, funerals, community gatherings, cultural practices, etc.)?
- a. This question refers to any problems with water that prevents anyone in your household from going to community meetings, going for prayer/church, going for funerals and weddings. By problems with water, for example, you may not have enough water to bathe and do not feel clean enough to go, or that you may have to go and get water, which prevents you from being able to prepare for or attend social events, or that there may be other problems with water that prevent you from going to social events.
- 19.**HWISE 19:** In the last 4 weeks, how frequently have you or anyone in your household drank water that **looked, tasted, and/or smelled bad**?
- a. This question refers to the way your water tastes, smells, and looks. In some places, people do not have access to different types of water sources, and sometimes have to drink water that they do not think tastes good. Bad water may mean that the water tastes salty, bitter, sour, or spoiled, and/or that it may have dirt in it, it could also mean that it smells bad or is cloudy.
- 20.**HWISE 20:** In the last 4 weeks, how frequently have you or anyone in your household drank water that you thought was **unsafe**?
- a. This question refers to your water safety. In some places, people have to drink water that they do not think is safe to drink. This could be because they do not have access to or cannot afford different types of water from other sources, are unable to treat their water before it is consumed, because they are thirsty, or for other reasons.
- 21c. **HWISE 21c:** If you needed to borrow water, from how many people could you borrow water?
- b. In this question, we want to know how many people you can borrow water from if you ever need to do so. By borrow, we mean you received water from another person.
- 21.**HWISE 21:** In the last 4 weeks, how frequently have you or anyone in your household asked to **borrow** water from other people?
- a. By borrowing, we mean you received water from another person. In some places, people borrow water for their family members, neighbors, and friends if they do not have enough of it for their household.

21a. **HWISE 21a:** From whom? Please list all the ways you are connected to these people. For example, neighbor, family member, or both neighbor and family member.

- a. If you borrowed water, from whom did you borrow it from? We want to know not only who you borrowed water from, but also your relationship is with the person or people you borrow water from. For example, your sister may be your neighbor, and we want to know if you borrow water from your 'neighbor' if you actually mean your sister, or another person who is a neighbor and is not related to you.

21b. **HWISE 21b:** What were you expected to give in return?

- a. If you borrowed water from someone, did they expect you to give something back to them for it? In some places, people will borrow water and share water later or share food or money in exchange.

30. **HWISE 30:** In the last 4 weeks, how frequently have you or anyone in your household loaned water to anyone?

- a. By loaning, we mean you gave water to someone else. In some places, people give water to family members, friends, neighbors, and other people if the person does not have enough water for their household.

22. **HWISE 22:** In the last 4 weeks, how frequently did you or anyone in your household have problems with water that caused **difficulties with neighbors, water providers, or others** in the community?

- a. This question refers to any difficulties you may have with your neighbors, friends and community members because of water. For example, in some places, people have to wait in line for a very long time before they can buy water and this can cause arguments. Also, sometimes some people, such as water providers or landlords may have more power or control over the water access or distribution than others, and this can also cause problems.

23. **HWISE 23:** In the last 4 weeks, how frequently did you or anyone in your household have problems with water that caused **difficulties within your household**?

- a. This question refers to any difficulties you may have with other people in your household because of water. For example, in some places, household members will have arguments about how much water should be used, how much money is paid for water, and who gets to choose how water is used.

24. **HWISE 24:** In the last 4 weeks, how frequently did you or anyone in your household feel **angry** about your water situation?

- a. This question refers to feeling angry or other negative emotions you have because of water. By your water situation, we mean how you get water, not having enough water, not having enough of the kinds of water you prefer, being worried about the quality of your water, water issues affecting your life and schedule, and anything else related to getting and using water that can cause you to feel angry.

25. **HWISE 25:** In the last 4 weeks, how frequently has there not been **as much water to drink** as you would like for you or anyone in your household?

- a. This question refers to drinking water in your household. In some places, there is not always enough water for everyone to drink as much as they would like. Or there may be water for some people, but not others.
- 26.**HWISE 26:** In the last 4 weeks, how frequently have you or anyone in your household gone to **sleep thirsty** because there wasn't any water to drink?
- a. This question refers to not having enough water to drink in your household and feeling thirsty when you are going to sleep. For example, people can go many hours without drinking water because they do not have enough, or because they are saving it for other household members, other uses, or for other reasons. People who may really want to drink water before they go to sleep may not have access to any.
- 27.**HWISE 27:** In the last 4 weeks, how frequently has there been **no useable or drinkable water** whatsoever in your household?
- a. This question refers to not having any water in your household that can be used for household activities or for drinking. For example, in some places, people do not have enough storage to keep water or are unable to get enough water to be able to use it for their needs with some remaining for storage. In other places, water may flood a home, but none of the water that has gone into the house is useful for drinking, washing, cooking, or other activities.
- 28.**HWISE 28:** In the last 4 weeks, how frequently have you or anyone in your household thought of **moving dwellings** because of the water situation there?
- a. In some places, people are leave their homes because there is not enough water, because of flooding, or for other reasons related to water. They may move temporarily or permanently.
- 29.**HWISE 29:** In the last 4 weeks, how frequently have problems with water caused you or anyone in your household to **feel ashamed/excluded/stigmatized**?
- a. There are many reasons why people might feel ashamed, excluded, or stigmatized because of problems with water. This could include not being able to provide visitors with water if they stop by your home, or being unable to bathe before being around other people in your community.

6.2. Subset of HWISE survey items that are candidates for the final validated scale

Candidate HWISE Questions
3.1. In the last 4 weeks, how frequently have you or anyone in your household been unable to access the water that you preferred ?
3.2. In the last 4 weeks, how frequently did you or anyone in your household worry you would not have enough water for all of your household needs?
3.3. In the last 4 weeks, how frequently have you or anyone in your household worried about the safety of the person getting water for your household?
3.4. In the last 4 weeks, how frequently has your household water supply from your main water source been interrupted or limited (e.g. water pressure, less water than expected, dried up)?
3.5. In the last 4 weeks, how frequently have problems with water prevented you or anyone in your household from earning money (e.g. engaging in paid work, economic activities)?
3.6. In the last 4 weeks, how frequently have you or anyone in your household lacked money needed to buy water?
3.7. In the last 4 weeks, how frequently did you or anyone in your household want to buy water but there was nowhere to buy it from?
3.8. In the last 4 weeks, how frequently has there not been enough water in the household to wash clothes ?
3.9. In the last 4 weeks, how frequently have you or anyone in your household had to change what was being eaten because there were problems with water (e.g. for washing foods, cooking, etc.)?
3.10. In the last 4 weeks, how frequently have you or anyone in your household had to go without washing hands after dirty activities (e.g., defecating or changing diapers, cleaning animal dung) because of problems with water?
3.11. In the last 4 weeks, how frequently have you or anyone in your household had to go without washing their body because of problems with water (e.g. not enough water, dirty, unsafe)?
3.12. In the last 4 weeks, how frequently has you or anyone in your household had to change schedules/plans due to problems with your water situation, such as problems getting or distributing water within the household?
3.13. In the last 4 weeks, how frequently have problems with water prevented you or anyone in your household from attending social or cultural events (e.g. church, funerals, community gatherings, cultural practices, etc.)?
3.14. In the last 4 weeks, how frequently have you or anyone in your household drank water that looked, tasted, and/or smelled bad ?

3.15. In the last 4 weeks, how frequently have you or anyone in your household drank water that you thought was unsafe ?
3.16. In the last 4 weeks, how frequently have you or anyone in your household asked to borrow water from other people?
3.17. In the last 4 weeks, how frequently did you or anyone in your household have problems with water that caused difficulties with neighbors , water providers, or others in the community?
3.18. In the last 4 weeks, how frequently did you or anyone in your household have problems with water that caused difficulties within your household ?
3.19. In the last 4 weeks, how frequently did you or anyone in your household feel angry about your water situation?
3.20. In the last 4 weeks, how frequently has there not been as much water to drink as you would like for you or anyone in your household?
3.21. In the last 4 weeks, how frequently have you or anyone in your household gone to sleep thirsty because there wasn't any water to drink?
3.22. In the last 4 weeks, how frequently has there been no useable or drinkable water whatsoever in your household?
3.23. In the last 4 weeks, how frequently have problems with water caused you or anyone in your household to feel ashamed/excluded/stigmatized ?

6.3. Instructions for Downloading Forms in ODK

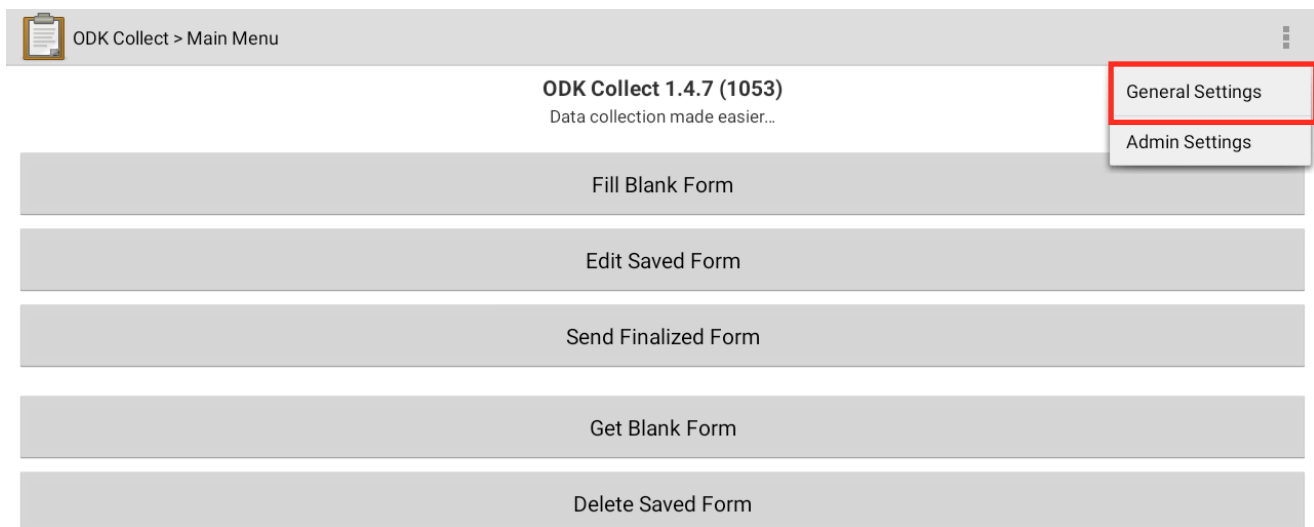


1. INTRODUCTION

- A. This guide is prepared for users of the Open Data Kit App. It assumes the user has downloaded the app and installed it on an Android device. It also assumes that the user has been provided account information by the System Administrator.

2. CONNECTING TO THE SERVER

- A. Click the three stacked squares and select "General Settings"



- B. Select "Username" and enter the provided username
C. Select "Password" and enter the provided password
D. Select "Configure Platform Settings" and enter the provided aggregate address into the "URL": <https://global-ethnohydrology-study.appspot.com>

ODK Collect > General Settings

ODK Collect
Tap to visit <http://opendatakit.org>

SERVER SETTINGS

Platform
ODK Aggregate

2. Configure platform settings

Google account

1. Username
pith.moromo@gmail.com

Password

BEFORE YOU PROCEED: Please make sure that 'Delete after send' in General Settings has been disabled. This is very important! If this is not disabled, it is possible that data could be lost!

3. RETRIEVING FORMS

- A. From the Main Menu, select "Get Blank Form"
- B. Select each form that you would like to download
- C. Click "Get Selected" to download the forms

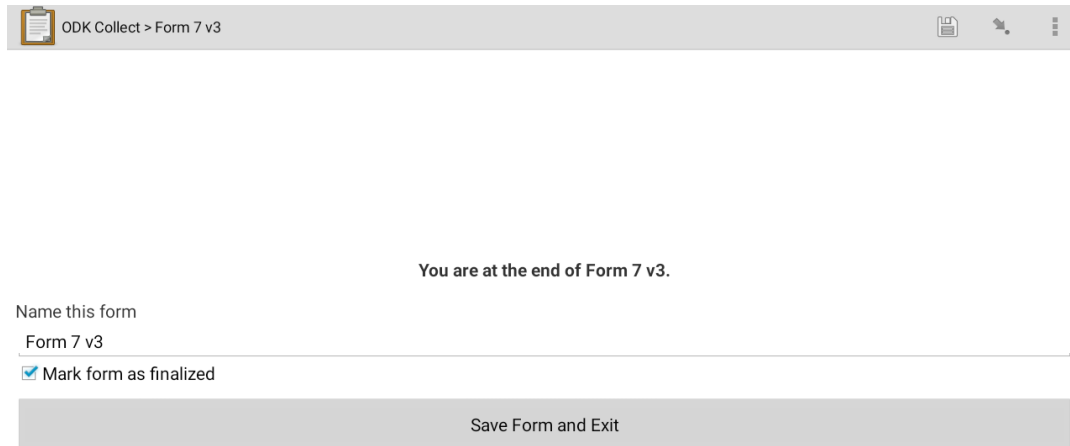
ODK Collect > Get Blank Form

Form 6 Complete ID: f6_v14	<input type="checkbox"/>
Form 7 v1 ID: f7v1	<input type="checkbox"/>
Form 7 v2 ID: f7v2	<input type="checkbox"/>
Form 7 v3 ID: f7v3	<input checked="" type="checkbox"/>
Visit 6 Pii En Ngima ID: Form 6	<input type="checkbox"/>
Visit 6 Pii En Ngima Final ID: Form 6 Final	<input type="checkbox"/>
Visit 6 Pii En Ngima v10 ID: Form 6 v10	<input type="checkbox"/>
test ID: test	<input type="checkbox"/>

Toggle All Refresh Get Selected

4. COLLECTING DATA

- A. From the Main Menu, select "Fill Blank Form"
- B. Begin entering data - swipe left and right to move between questions
- C. Once at the end of the form, mark it as finalized and selected "Save Form and Exit"



ODK Collect > Form 7 v3

You are at the end of Form 7 v3.

Name this form
Form 7 v3

☒ Mark form as finalized

Save Form and Exit

5. SENDING FINALIZED FORMS

- A. From the Main Menu, select "Send Finalized Form"
- B. Select the forms you would like to send
- C. Click "Send Selected"
- D. SEND FINALIZED FORMS AT THE END OF EVERY DAY**
- E. If you have sent a form to the server, and the form no longer exists in the aggregate, please notify HWISE Northwestern staff immediately and the form will be re-uploaded to the aggregate. You can then visit "Send finalized forms" and toggle on "View all sent and unsent forms" using the general menu (3 vertical dots) and then re-send the forms.



















ODK Collect > Send Finalized Form

Practice
Finalized on Sat, Mar 19, 2016 at 11:45

6.4. Water Storage Container Guide

TRAINERS SHOULD USE THEIR BEST JUDGEMENT AND KNOWLEDGE OF WATER STORAGE CONTAINERS IN

Plastic Bottle	Jerry Can	Barrel	Sim Tank
 0.5 L	 5 L	 150 L	 200 L
 1L	 10 L	 200 L	 500 L
 15 L	 18 L	 600 L	 5,000 L
 20 L	 20 L	 2,000 L	 13,5000 L

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