Phase 2: RanasMEASURE

Collect data on behaviours, behavioural factors, and context

Summary

In the previous phase 1, RanasEXPLORE, we have learned about the different behavioural and contextual factors that form part of the RANAS model for behaviour change. The chapter also discussed the importance of carefully selecting the target behaviour and deciding for a project design that fits your context and resources. It also introduced the different steps to conduct qualitative interviews to explore the behavioural factors potentially steering the target behaviour and finally provided guidance on how to adapt the behavioural factors of the Ranas model to your project context.

In phase 2, RanasMEASURE, we will build on the findings from RanasEXPLORE to develop the tools needed for a quantitative baseline survey and discuss what needs to be considered when planning the survey. The first step 2.1 is to develop a questionnaire measuring the behaviour and the behavioural factors, which have now been adapted to the specific context. The information we gained from RanasEXPLORE will guide the development of the quantitative questionnaire. If required, we develop a protocol of structured observations of the target behaviour. In the second step 2.2, the questionnaire and observations are implemented in a baseline survey. The results of phase 2, RanasMEASURE, are quantitative data on behaviours, behavioural factors, and context for the specific target audience.

The steps of this phase are:

2.1. Develop a questionnaire and a behaviour observation protocol

2.2. Conduct a baseline survey

Step 2.1 Develop a questionnaire and a behaviour observation protocol

In this step, we develop a survey tool to measure the target behaviour and the behavioural factors. To measure the behaviour, we have three options: direct observations, spot checks, and self-reports (i.e. questionnaires). For the behavioural factors, we have only one option: self-reports measured with the help of a questionnaire. The same is true for some of the contextual factors (e.g. a respondent's age) while others are observable or measurable by spot checks (e.g. distance of the water source). To prepare the survey tools, the first step is to consult the outputs from phase 1, RanasEXPLORE. There, we defined the target behaviour, target population as well as the behavioural and contextual factors we want to measure.

Beware that the development of the questionnaire is a crucial step: it requires rigor, time, knowledge and skills. It may be advisable to seek assistance from a RANAS expert for this essential step, even if you have experience in using KAP – knowledge, attitude, practice – surveys as a thorough understanding of the RANAS model is required (Box: Comparing RANAS surveys to KAP surveys).

Key actions

Select mode of data collection

There are different ways to conduct interviews: face-to-face, via phone call or online. If the survey includes a direct conversation with the participant, the answers can either be recorded using paper-pencil or electronically. Direct interaction (face-to-face or phone-based) has the advantage of being more direct and adaptable to the needs of the participant. Whereas internet-based surveys reduce social desirability and are time-saving but participants need to be literate. It is advisable to think through all possible advantages

and disadvantages before selecting on mode of data collection (Box: Advantages and disadvantages of data collection methods).

Introduction and consent

The questionnaire starts with an introduction that briefly explains the general purpose of the survey to the household. It outlines the importance of the respondent's participation, a statement guaranteeing confidentiality, and a section obtaining informed consent (Tool: Example introduction and consent form). It includes information on how participants can hand in complaints regarding the survey. To guide the participant through the interview, we include instructions and information wherever necessary during the interview.

Development of behavioural, psychosocial and contextual questions

To measure the behaviour as well as each behavioural and contextual factor, we formulate at least one and often several questions. Different question formats (Box) can be used: open questions with or without predefined response options, or closed questions with uni- or bipolar rating scales. Formulating meaningful questions and response options is very important and possible pitfalls are manifold. It is essential to follow some basic rules for formulating questions, response options and rating scales (3 Boxes). One option to make rating questions easier to be answered by participants is the use of a visual scale (Box).

Further, the questions have to be comprehensible to the target population. Therefore, it is essential that people familiar with the local languages are involved in the questionnaire development. If the questions cannot be developed directly in the local language (e.g. because the focal person of the project does not speak the local language), we have to translate them in the next step (see Step 2.2 baseline survey).

The sample questionnaire (Tool) presents questions to measure behaviour, all RANAS behavioural factors and some contextual factors for water treatment with chlorine. Please bear in mind that these are sample questions and it is not a ready-to-use questionnaire. The questions have 1) to be adapted to the specific behaviour and population group (Step 1.2) and 2) to be adapted and extended based on the specific local conditions (Step 1.3). In most cases, you will need additional questions to the sample questions . In particular, more contextual factors have to be considered in most cases.

Identification of households

In case in Step 1.1 we decided to use a project design with a follow-up survey, we have to find the same households and target persons surveyed at baseline again for the follow-up survey. Therefore, we need questions that collect sufficient information to unambiguously identify an individual person even after a long time. The type of information that is suitable depends on the context, we often need to ask for the name of the participant and the name of her/his father. Household ID numbers or GPS coordinates can also be helpful. In any case it is crucial to later store the interview data separate from personal identification measures (see Step 3.1 in RanasANALYZE prepare dataset for data analysis).

Behaviour observation protocol

The questionnaire measures behaviour by self-reports. A more reliable and valid way, however, is to use direct observations and spot checks (Box 1.3 in phase 1). For example, observe where a person goes to defecate, whether a person washes hands with soap after defecation, or how much litter can be found in the streets. Direct observations are usually very time-consuming and thus costly. However, they are more objective than self-reports. In other words, there is always a trade-off between having a more precise measure (direct observation) and practicality (self-reports). We recommend to complement self-reports with at least short spot-check observations.

Spot checks measure the behaviour indirectly; they measure proxy indicators of the behaviour (e.g. soap and water at the handwashing station to measure handwashing) and outputs of the behaviour (e.g. PET bottles in the sun to measure solar water disinfection, SODIS). Therefore, they are somewhat less precise than direct observations. However, they are very quickly and easily collected and thus very cost effective. Examples of spot checks include the water level in the water filter to measure water filtering, cleanliness of hands to measure handwashing, the amount of correctly separated garbage in different garbage containers to measure waste separation, and cleanliness of latrines to measure toilet cleaning.

For both direct observations and spot checks, we prepare a protocol that includes specific instructions on what and how to observe as well as a checklist to record the observations (Tool: Example Observation Protocol, Tool: Example Spot Check Observation). Usually, spot checks can be included in the same document as the questionnaire; for direct observations, it is advisable to prepare a separate manual.

Arranging questions in a meaningful order

Once all the questions have been formulated, we compile the questionnaire by arranging all the questions into a meaningful sequence. Box 2.1.2 (General rules for arranging the questions in a questionnaire) provides some rules for arranging the questions. If an observation protocol is used, it usually makes sense to place this in the end of the questionnaire after the interview questions.

To assist the interviewer, we can also include hints on question types, household selection or definition of terms used in the questions.

Translate the questionnaire and observation protocols into the local language

Unless the questionnaire has been prepared in the local language, we have to translate it, taking into account the specific vocabulary and dialect of the target population. The translation is vital; simply providing data collectors with the original, untranslated questionnaire and letting them each translate the questions individually is not an option. In such a scenario, each data collector would ask the questions slightly differently and perhaps even change the wording from interview to interview. To be able to compare the data for analysis, all the data collectors have to ask the questions identically; therefore, we need a translated questionnaire.

We have two options for the translation; we can hire a translator, or we can translate the questionnaire together with the data collectors during training. Box 2.2.1 provides more information on the two approaches.

Key resources and information

- Results from Step 1.2: the specified target behaviour and population group
- Results from Step 1.3: the list of psychosocial and contextual factors adapted to the local context
- Knowledge and experience in questionnaire design
- Sample questions, see Tool 2.1.1: Sample questionnaire
- Locally knowledgeable person

Outputs

Survey tool that includes a structured questionnaire and, optionally, an observation protocol. With these, we can ensure that we collect the same types of information from all participants in the same way.

Step 2.2: Conduct a baseline survey

Introduction

After the questionnaire and observation protocols are finalized, the next step is to conduct the baseline survey. With this survey, we will gain a more detailed understanding of the situation in the population. This data will be used for the doer and non-doer analysis in RanasANALYZE (phase 3), before we then derive the behaviour change techniques in RanasDESIGN (phase 4). It is important to survey a relatively large and representative sample of the population to receive a clear picture of the frequency of the behaviour and the psychosocial factors. The sample of individuals selected in this step will be surveyed again in RanasEVALUATE after the intervention. Thus, we can follow their changes in behaviour and psychosocial factors over time.

The key actions presented here do not all need to be executed sequentially; some can occur in parallel and, depending on the mode of data collection, some can be omitted.

Key actions

Define the sample size and the sample selection procedure

Whenever the target population is too large to be surveyed in its entirety, we have to select a part of the population and survey this sample. To receive a high-quality sample, two aspects are relevant: first, the sample size and second, the selection procedure. Box 2.2.1: Instructions for sample size calculation and sample selection procedure gives instructions based on both aspects.

Schedule the data collection, define the number of data collectors to be employed and supervisors to be appointed

When the sample size and sample selection procedure has been defined, we can schedule the data collection and define the number of data collectors to be employed. It is necessary to know the approximate daily capacity of a data collector. Guideline figures on usual capacity of data collectors are provided in Box 2.2.1 (Guideline on data collection scheduling). For a team of 10 data collectors, you need at least one local supervisor, who organizes the data collection and supervises the team. A local supervisor should have the same mother tongue as the target population and be familiar with local customs and social protocols.

Employ data collectors

The next key task is to select and employ data collectors. Box 2.2.2: Selection of data collectors provides some information on the requirements for data collectors and the advantages and disadvantages of appointing health promoters as data collectors. We recommend employing one or two additional data collectors; they serve as stand-ins during data collection.

Organize the data collection

A visit to all the communities to be surveyed is essential to inform them about the upcoming data collection, to meet the relevant authorities, and to receive their consent and support. In some contexts, it may be helpful to ask for a letter of support from the authorities to be distributed to the data collectors. In case of phone-based or internet data collections, this action can be omitted. Under certain circumstances, ethical clearance might have to be sought.

Provision of the questionnaire

We need to prepare the questionnaire for data collection, either program it for use on electronic devices when used online or print the questionnaire for paper-pencil data collection.

Programming the questionnaire for electronic data collection needs some preparation and skills. Common tools are free services like KOBO collect or ODK collect or paid services like Survey CTO. A detailed instruction for programming and saving electronic data using KOBO collect can be found on the UNHCR webpage under this link.

Train the data collectors

The collection of data with reliable quality requires intensive training of the data collectors in which all supervisors take an active part. Note that this is a crucial step; it might be advisable to seek assistance from an expert for this, especially when applying the RANAS approach for the first time.

The duration of the training depends on the length of the questionnaire and the mode of data collection and lasts between 3 and 5 days. The training includes a pretest day in the field. It lasts longer when the survey instruments contain direct observations and when the questionnaire is translated jointly with the data collectors. Box 2.2.3 provides an exemplary outline for training data collectors.

It may be helpful to ask the team to complete a short evaluation form and/or exam every evening to detect any difficulties in understanding the training content. Use role-plays to ensure that data collectors get used to the tool and handle participants respectfully at all times. Role plays also help to develop strategies to ask difficult or sensitive questions.

In case the training cannot be realized face-to-face, it can also be provided using an online communication platform (e.g., zoom or teams). In this case, plan for more breaks and stretch the training over more time,

if possible. Box 2.2.4 lists some recommendations on remote/online trainings. All organizational aspects for the training are listed in Box 2.2.2: Instructions for the organization of the data collector training.

Pretest of the survey instruments

The training ends with a pretest day in the field or remote in case of phone- or internet-based data collection. It is conducted with participants which are not part of the actual baseline sample but which share the key characteristics of the study participants (e.g. their situation is also rural). The pretest day has two goals. First, it is an important exercise for the data collectors. Second, we can test the survey instruments: the questionnaire, the spot checks, and the direct observation manual. We can verify whether the interview partners understand all the questions, whether all questions are answerable, and whether the questions are correctly and completely understood by the population. We can also check whether the spot checks and the direct observation manual are applicable and correspond to the situation in the field. Feedback from the data collectors is essential to achieve the second goal; we need their experience to optimize the survey instruments.

Revise the survey instruments

In nearly all cases, the survey instruments have to be revised after the pretest day. Plan at least one or two days to update the questionnaire, including the observation protocols. Bear in mind that when you change questions, the new formulations have to be translated as well, then programmed and we need to make sure the interviewers work with the latest version of the questionnaire.

Conduct the data collection

During data collection, it is essential that the data collectors are accompanied every day by one or, depending on the team size, several local supervisors. The tasks of the supervisors are outlined in Box 2.2.3: Instructions for the supervisors during data collection. If data collectors are not supervised, data quality may suffer; survey instruments may be (1) incorrectly completed due to misunderstandings, (2) left incomplete due to an error, resulting in missing data, or (3) falsely completed due to cheating. Only through adequate supervision can we guarantee to collect data of high quality.

Key resources and information

- Result from Step 2.1: baseline survey.
- Information on the population figures of the project region and the communities.

Outputs

Survey data from a sample of the target population group.

Box 2.1: Comparing RANAS surveys to KAP surveys

Most behaviour change interventions in the water, sanitation, and hygiene (WaSH) sector are preceded and followed by a **K**nowledge, **A**ttitudes, and **P**ractice (KAP) survey to inform and evaluate the interventions. While there are similarities between KAP surveys and RANAS surveys, they also differ in certain crucial respects.

First, KAP surveys only consider knowledge and attitudes. However, we know from existing scientific evidence that knowledge and attitudes are neither the only nor even the most important determinants of behaviour. Consequently, the RANAS surveys include a much broader range of behavioural factors: (1) risk factors (similar to knowledge); (2) attitude factors (both surveys); (3) norm factors (only RANAS survey); (4) ability factors (only RANAS survey); and (5) self-regulation factors (only RANAS survey).

Second, different KAP surveys do not define knowledge, attitudes, and practice consistently. Therefore, even KAP questions for the same behavior and population vary significantly. In contrast, RANAS behavioural factors and outcomes have been defined precisely (Tool 1e: Definitions of behavioural factors). This allows the consistent formulation of survey questions.

Third, the RANAS approach to systematic behaviour change, where the RANAS survey is part of, allows to identify behaviour change interventions fitting the relevant behavioural factors (see catalogue of **B**ehaviour **C**hange **T**echniques, BCTs, in chapter 4 "RanasDESIGN"). For KAP surveys, no such tool to develop a corresponding behaviour change intervention exists.

Box 2.2: Advantages and disadvantages of data collection methods

Advantages	Disadvantages
Face-to-face interviews	
- Engagement of participant is easier	- Highest social desirability bias
- Flexible reaction to participants needs and questions	- More time-consuming
- No literacy required	-
- Interview length can flexibly be adapted (max. 60 minutes)	-
Phone-based interviews	
- Flexible planning of interviews	- No visual interaction with participant
- Flexible reaction to participants needs and questions	- Connectivity and reachability of participants
- No literacy required	- Potential social desirability bias
-	- Interview should not exceed 15 minutes
Internet-based interviews	
- Less social desirablity bias	- No assistance in case of questions or problems
- Time-saving for data collection	-
- Literacy required	-

Paper-pencil vs. Electronic data collection	
- No electronic devices needed	- No data-entry needed
- No dependency on electricity	- Data is instantly saved as it was entered into the data collection tool
- Data entry: very time-consuming, high chance of data entry errors	-

Box 2.1.2: General rules for arranging the questions in a questionnaire

- Go from general to particular.
- Go from easy to difficult.
- Go from factual to abstract.
- Start with simple demographic questions (e.g. education, main livelihood, age).
- Start with those questions that might be influenced by other questions, e.g. start with questions about the behavior before asking about *Others' approval* of the behavior.
- Start with closed format questions.
- Start with questions relevant to the main subject.
- Do not start with sensitive questions, including sensitive demographic questions (e.g. income).

Box 2.2.1: Two approaches to questionnaire translation

Employ translators

When hiring a translator, it is important that the translator (1) is informed about the RANAS model and the specific meaning of the behavioral factors so as to translate the questions appropriately and (2) is not only familiar with the local language but with the specific vocabulary and dialect of the target population. Ideally, to verify the quality of the translation, it is back-translated into the original language by a second translator and compared with the original questionnaire. Where differences arise between the original and the back-translated versions, the translations have to be revised.

Translate together with the data collectors during training

An alternative approach is to translate the questionnaire, or at least the key words of each question and response option, into the local language while training the data collectors. This approach may be preferable, because the data collectors (1) gain a more detailed understanding of the questionnaire and the underlying model, which will help them during the interviews, (2) perceive the translated questionnaire as a collective output, and (3) are therefore more strongly committed to asking the questions as jointly agreed. An essential is the presence of the local supervisor, who has learned about the RANAS approach in detail and can assist in the joint translation of the questionnaire.

Box 2.2.1: Guideline on data collection scheduling

Of course, this depends on the length of the questionnaire and on whether the survey also involves direct observations or spot checks. However, we can usually schedule using these guideline figures:

- Duration of one interview: 15-30 minutes – refusals are rare.
- Duration of one direct handwashing observation: 2–4 hours.
- Capacity of one data collector per day:

    - 5–8 interviews or
    - 2 direct handwashing observations, each followed by an interview.
- Capacity of 5 data collectors in one week (6 working days):
    - 150 – 240 interviews or
    - 60 handwashing observations and interviews.
- Capacity of 10 data collectors in one week (6 working days):
    - 300 – 480 interviews or
    - 120 handwashing observations and interviews.

It is important to bear in mind that during the first few days, before the data collectors are fully familiar with the survey instruments, their capacity is somewhat lower.

Box 2.2.2: Selection of data collectors

Requirements:

- Local -
    - Shares the same mother tongue, and preferably the same dialect, as the target population
    - Is familiar with the local customs and social protocols so as to increase acceptance within the target population
- Fluent in a language shared with the project leader
- Socially competent
- Good communication skills
- Respectful and attentive behaviour in dealing with participants

Advantages of appointing health promoters as data collectors:

- No recruitment necessary
- They know the projects
- We know them already

Disadvantages of appointing health promoters as data collectors:

- It may be difficult for them to change from the role of health promoter to that of an objective data collector who exerts no influence. This is especially true during the survey after the intervention.
- Participants may be inclined to distort their responses to please former promoters with exemplary answers. Again, this is especially true during the follow-up survey.

Box 2.2.3 Exemplary outline for training data collectors

The training includes the following topics:

- Introduction to the research project (day 1)
- Introduction to the survey tools (day 1)
- Explanation of different question types and demonstrations of how to ask them (day 1)
- Discussion of dos and don’ts in data collection, including ethical considerations (day 1)
- Question-by-question discussion of the questionnaire, including potential translation of key words (day 2 to day 4)
- Exercise on household selection procedure and introduction to households (e.g. day 3)
- Exercise on challenging situations in the field or for interviews on phone (e.g. day 4)
- Discussion of spot checks and exercise (e.g. day 5)

- Discussion of direct observation manual and exercise (e.g. day 5)
- Handling of devices and applications for electronic data collection (e.g. day 5)
- Role plays to practice the interview (e.g. throughout the questionnaire discussion)

Optional: Discussion on awareness related to power relations between interviewer and participants

Box 2.2.4 Recommendations for remote or online trainings

- Include self-learning activities that participants can either practice in groups or alone and that can be done between online training sessions
- Include interactive activities such as quizzes or games, videos or pone-based mock interviews to provide diversity in lecturing methods
- If internet connection is low, prerecord your presentation and provide it followed by a Q&A session to participants
- Training of trainers can help to disseminate the content when online training is difficult, e.g., because of internet connectivity or electricty issues
- Rather plan for more but short online sessions than a full-day workshop

Box 2.2.1: Instructions for sample size calculation and sample selection procedure

Sample size calculation

To define the sample size, we need to obtain information on population figures in the project region. Usually, the key figure is the number of households. We need information on the number of households both across all project communities and for each community separately. We define the total sample size based on the total number of households across all communities. We suggest the following rules of thumb:

- In general, survey 10% of the households.
- Never survey less than 50, better more than 100 households.
- Do not survey more than 1000 to 1500 households.

To specify the sample size per community, we apply the same ratio as for the total sample size, usually 10% of the households. Never survey less than 10 households in a community. If we are not able to survey all project communities, we have to select some communities at random, for instance by lottery. The more communities that are surveyed the better.

If the project design includes an evaluation survey it is recommended to adapt the sample size to possible drop-out of participants.

- If you plan to conduct the follow-up survey directly after the intervention phase, include at least 100, better 200 households.
- If you plan to conduct the follow-up with a time-laps of 12 months, include 200, better up to 400 households.

Sample selection procedure

Whenever an exhaustive survey is not possible, we have to select the households to be surveyed. To achieve a representative, unbiased sample, we apply a random selection procedure. This procedure avoids the risk that data collectors select households based on opportunity, namely that they simply survey those households which are most easily reached or available; such an approach is especially prone to bias. There are several methods for selecting households randomly. Which method is most appropriate depends on the local conditions. Three methods are discussed here:

1) True random sampling:

- Prepare a list of all households within a community.
- Select the households to be surveyed randomly, e.g. by throwing a coin or using a random number drawing program.

Note: True random sampling is the best sampling strategy. However, a complete household list is a prerequisite for this method.

2) Random route sampling for a team of 10 data collectors:

- Map the community together with locals.
- Select 10 crossroads randomly.
- For each crossroad, select one side of the road randomly.
- Appoint a data collector to that side of the road.
- Have the collector survey every third household (or another fixed regular interval) on that side of the road.
- If the target person is not at home or the household refuses to participate, note the absence or refusal to participate, skip the household, and select the next household in which the target person is at home.
- Afterwards, continue selecting every third household.

Note: Apply random route sampling whenever a list of households is not available but the community is clearly structured by streets.

3) Clustered random sampling for a team of 10 data collectors:

- Map the community together with locals.
- Group the community into clusters and select 10 clusters randomly.
- In each cluster, select one household randomly.
- Appoint a data collector to a household selected.
- Have the collector start with the appointed household.
- Afterwards, survey every third household (or another fixed regular interval) when walking in a circle to the left.
- If the target person is not at home or the household refuses to participate, note the absence or refusal to participate, skip the household and select the next household in which the target person is at home.
- Afterwards, continue selecting every third household when walking in a circle to the left.

Note: Apply clustered random sampling whenever a list of households is not available and the community is not clearly structured by streets.

Box 2.2.3: Instructions for the supervisors during data collection

- Organize transport, food, and accommodation for the team.
- Facilitate contact with the communities.
- Help the data collectors to find households.
- Verify that households are correctly selected, e.g., that not only people are selected that perform the target behaviour.
- Check that participants are handled respectfully and informed consent procedures are implemented (i.e., participants can refuse to participate and/or receive all information related to their participation)
- Motivate the data collectors, e.g. by giving positive feedback.
- Check that the interviews/observations are conducted according to instructions, e.g. by surprise visits.
- Check each survey instrument for missing data, e.g. if necessary, send data collectors back for completion.
- Check each survey instrument for inconsistencies in responses; these could indicate a misunderstanding of a certain question or a typing error by the data collector. If necessary, discuss these with the data collectors and clarify misunderstandings.
- Give data collectors' feedback on their use of each survey instrument.
- Arrange short daily team meetings to discuss possible problems, to answer questions and to give feedback on the completed questionnaires. It is important to maximize the consistency of the data collection procedure between data collectors.
- Number the survey instruments consecutively with a household ID number. This number replaces the identification information (e.g. name of participant and of her/his father) in the data file to ensure the survey's confidentiality.

Box 2.3: Question formats

Open questions		
Description	**Examples**	**Further information**
- The interviewer reads the question. - The participant answers in his/her own words. - The interviewer writes down the answer(s). For multiple-response questions: If the participant keeps silent after a response, the interviewer asks 'Anything else?' Only when the participant responds 'No', the interviewer proceeds to the next question.	*Single-response question:* What is the single most important reason to collect your drinking and cooking water at the arsenic safe well? …… *Multiple-response question:* What are the advantages of collecting your drinking and cooking water at the arsenic safe well? …… ……	Advantages: • We get the participant's own answers. • Allows exploration of the range of possible topics arising from an issue, including those that we had not anticipated. Disadvantages: • Time-consuming for the participant and the interviewer. • Answers are difficult to code and compare. • Time-consuming for the data processing, as the responses have to be categorized. • Open multiple-response questions: Difficult to analyse.

Open questions with given response options		
Description	**Examples**	**Further information**
- The interviewer reads the question. - The participant answers in his/her own words. - Based on the answer(s), the interviewer selects the corresponding response option(s). For multiple-response questions: If the participant keeps silent after a response, the interviewer asks 'Anything else?' Only when the participant responds	*Single-response question:* What is the single most important reason to collect your drinking and cooking water at the arsenic safe well? 1 Taste 2 Distance 88 Other……. *Multiple-response question:* What are the advantages of collecting your drinking and cooking water at the arsenic safe well? 1 Taste 2 Distance	Advantage compared to the previous format: Responses are pre-categorized to facilitate data gathering, entry, and processing. Prerequisite: knowledge about the most common responses. Disadvantage of open multiple-response questions: Difficult to analyse.

'No', the interviewer proceeds to the next question.	88 ☐ Other…….	

Closed questions with rating scales		
Description	**Examples**	**Further information**
- The interviewer reads the question and the response options. - The participant chooses a response option. - The interviewer ticks the chosen response option.	*Unipolar:* How much do you think that collecting all your drinking and cooking water at the arsenic safe well is tiring or not tiring? 1 ☐ Not tiring 2 ☐ A little tiring 3 ☐ Quite tiring 4 ☐ Tiring 5 ☐ Very tiring	Advantage: • Precise and explicit responses • Easy and quick to gather • Easy to compare and analyse • Easy to report Disadvantage: unknown responses or aspects are not detectable.

Box 2.4: Rules for formulating meaningful questions

Requirements	Explanations	Examples
Simple	Formulate the question as simple and straightforward as possible.	yes: “How much do you think that washing hands with soap before eating is time-consuming or not time-consuming?” no: “How much do you think that if you wash your hands with soap before you eat that this consumes much time or consumes not much time?”
Short	While the meaning of the first two questions is essentially the same, the first includes additional aspects or information which is not necessary but lengthens the question. If you have to ask a long, complex question (see third and fourth questions), to increase comprehension try to break it into several sentences (as in the fourth question).	no: “How much do you think that it may be disgusting or not disgusting if you drink untreated water which you had fetched from an unsafe water source?” Yes: “How disgusting is drinking untreated water to you?” No: “How confident or unconfident are you to start washing hands with soap before handling food again after you had stopped to wash hands for several days, for example because there was no water or soap for handwashing?” Yes: “Imagine you have stopped washing hands with soap before handling food for several days, for example because there was no water or soap for handwashing. How confident are you to start washing hands with soap and water before handling food again?”
Concrete	With the first question, we only gain information on whether the participant washes hands or not. However, no information is gained with regard to the handwashing agent or with regard to the key time. With the second question, we gain information on whether hands are washed with a specific agent at a specific key time.	No: “Do you wash your hands?” Yes: “Do you wash your hands with soap and water before eating?”
Unidimensional, without “and” or “or”	The question contains two separate ratings, one regarding the temperature and one regarding the color of the water. A response may represent a weighting of the two aspects or the	No: “How much do you like the temperature and the color of the water?”

	rating of that one aspect which is more important to the participant.	
Without expressions unfamiliar to the target population	Depending on the sample, participants may or may not be familiar with the term *abdominal typhus*. In the latter case, the disease would first have to be explained to the participant.	No: "Have you ever suffered from abdominal typhus?"
Not suggestive	The first question implies that drinking untreated water is disgusting. The second question (1) emphasizes the subjectivity of the rating, and (2) leaves open whether it is disgusting or not.	No: "Do you agree that drinking untreated water is disgusting?" Yes: "How much do you think that drinking untreated water is disgusting?"
Careful regarding sensitive topics	Often the question is not so much whether it is possible to talk about a sensitive topic at all but rather which words are appropriate to use. Which topics are sensitive and which words are appropriate depend on the specific local context. In one context, for example, it is more appropriate to ask about "defecation", while in another the appropriate word may be "pooping".	"Where do you go to defecate?" "Where do you go to poop?"
In line with the response options	While the question is formulated as a yes-no question, the response option is a rating scale.	No: "Do you like the temperature of the water?" 1 ☐ Not at all 2 ☐ A little 3 ☐ Quite 4 ☐ Much 5 ☐ Very much

Box: Formulating meaningful response options

Requirements	**Examples**	**Explanations**
Precise	"At what time of the day do you usually go to fetch water?" 1 ☐ Morning 2 ☐ Afternoon 3 ☐ Evening	The answer options of the first question are very broad. Therefore, we cannot gain much information.

	[4] Irregularly “At what time of the day do you usually go to fetch water?” [1] Morning, before preparing breakfast [2] Morning, before eating breakfast [3] Morning, after breakfast [4] Morning, before preparing lunch [5] Noon, before eating lunch [6] Afternoon, after lunch [7] Afternoon, before preparing dinner [8] Evening, before eating dinner [9] Evening, after dinner [10] Evening, before going to sleep [11] Irregularly	For the second question, the answer options are much more specific, and we gain a clear picture about when a person fetches water. Note. Depending on the context, people may not be used to thinking in hours. Therefore, specifying the time (e.g. at 9am) may be difficult for them. Often it is more appropriate to ask about tasks which they do before or after.

Box: Formulating meaningful rating scales

Requirements	**Examples**	**Explanations**
The grades should be of a consistent breadth.	Example with a consistent breadth: [1] Never [2] Seldom [3] Sometimes [4] Often [5] Always Example with inconsistent breadth: [1] Never [2] Sometimes [3] Often [4] Very often [5] Always	Only with a consistent breadth can we calculate mean values in Step 2.3. In the lower example, the breadth between grade 0 and 1 is larger, and between 2, 3 and 4 smaller than between 1 and 2.
The scale at best contains 5 grades.	Example with 3 grades: [1] Never [2] Often [3] Always Example with 5 grades:	With less than 5 grades, the rating scale is not able to differentiate adequately between participants. With more than 5 grades, participants tend to be overwhelmed by the number of

	1 ☐ Never	2 ☐ Seldom	3 ☐ Sometimes	4 ☐ Often	5 ☐ Always	response options and the degree of differentiation.

Box 1.5: Visual Scale

The visual scale can help participants to complete the questionnaire. The visual scale is used for answer scales with 5 grades where the answers are increasing (i.e. from “not at all” to “very much”).

- Every circle represents one answer option
- For the first four to five questions, the interviewer reads the answer options of the question while pointing to the respective circles.
- Later on, the respondent formulates the answer while showing it on the circles.
- For each question, the participant needs to say his/her answer and point on the according circle. If the concept is not understood, the interviewer needs to repeat the answer options again

How to use a visual scale (example dialogue)

Interviewer: How much do you like the taste of chlorinated drinking water? Do you like it not at all (interviewer points at the smallest circle), do you like it a little bit (interviewer points at the second circle), do you quite like it (interviewer points at the third circle), do you like it (interviewer points on the fourth circle), do you like it very much (interviewer points on the fifth circle). Please choose one of the answer options by pointing on the according circle and say your chosen option.

Participant: I like it a little (participant points at the second circle).

Interviewer takes notes on the answer and continues with the next question by reading out the answer options again. S/he repeats this for four to five questions until the respondent has understood the concept and can point on the corresponding circle immediately and say his/her chosen answer option.

Option:

The scale can be introduced by using an example: Imagine the rising sun. In the morning, the sun is not at all hot (point at the first circle), then during the morning it gets hotter (point on the second circle) and hotter (point at the third circle), one hour before noon it is already hot (point at the fourth circle) and at noon it is very hot (point at the fifth circle). Other examples can be comparing the rising feeling of being hungry or sleepy.