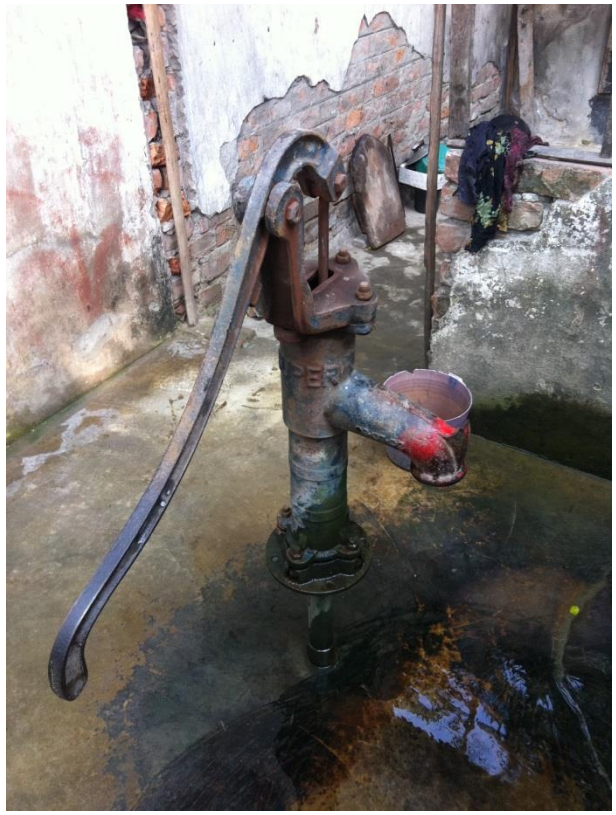

Systematic Behavior Change in Water Sanitation and Hygiene

A practical guide using the RANAS approach

Version 1.0, August 2016

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HELVETAS Swiss Intercooperation

eawag aquatic research

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For more information, please refer to
http://www.eawag.ch/en/department/ess/empirical-focus/environmental-and-health-psychology-ehpsy/

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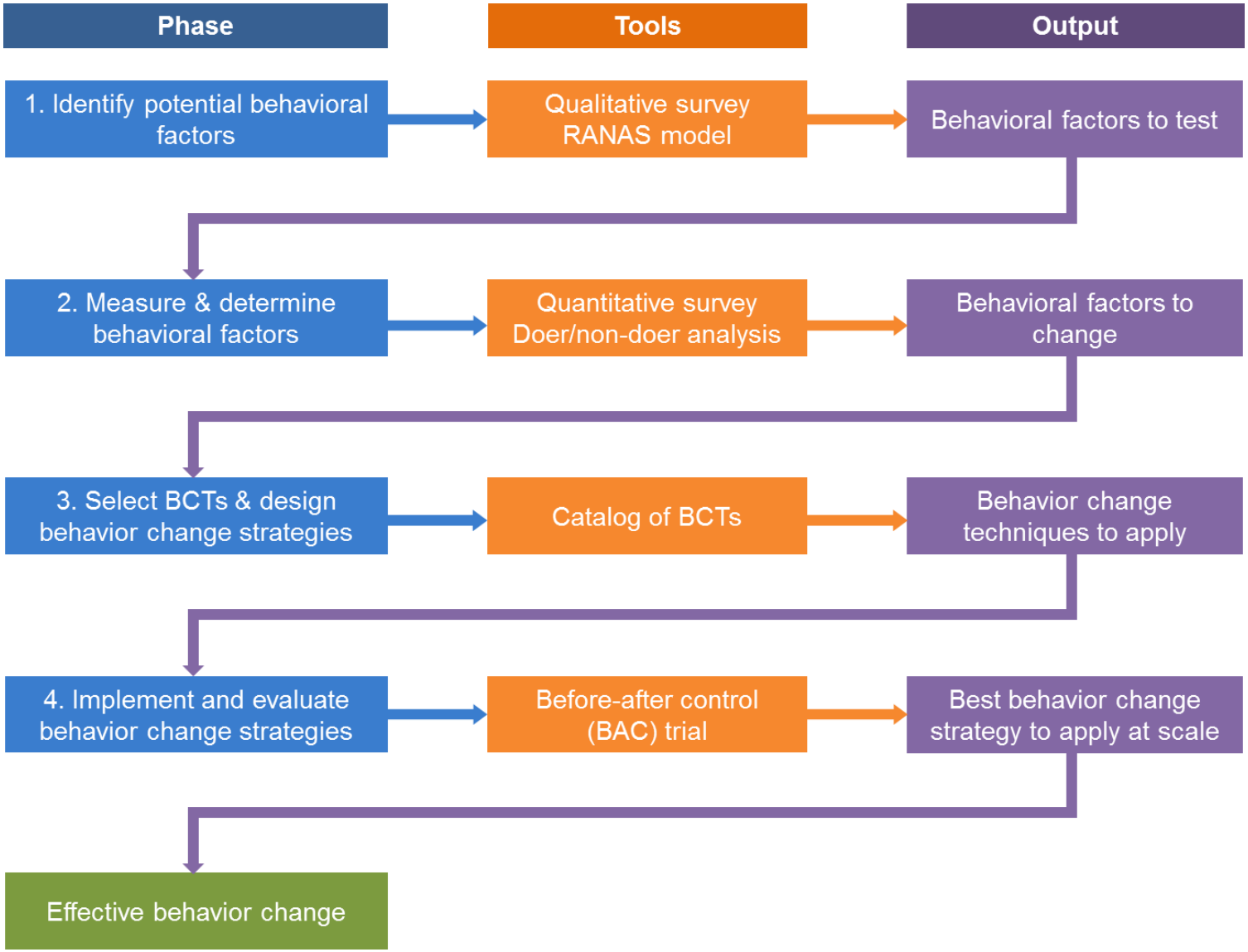
The RANAS approach to systematic behavior change



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Introduction

Why behavior change?

Your organization has installed lots of safe wells all over a developing country, but you notice that these wells are rarely used despite awareness-raising campaigns about the health effects of drinking safe water. Or your organization markets the building of latrines to avoid open defecation, but the uptake of these latrines is only moderate. Or your organization promotes handwashing intensively, but even so only a small proportion of the population washes their hands with soap. If this occurs, naturally, you ask yourself why. It might be that your promotion activities have somehow failed to change the mindsets of the intended beneficiaries. For behavior to change, people's mindsets must change, because all behavior is based on processes in people's minds: Knowledge is activated, beliefs and emotions rise to the fore, and an intention to perform a particular behavior emerges, eventually resulting in observable behavior. Taking this into account, the next question is how to conduct behavior change activities that modify behavior effectively.

How can behavior change be induced?

There are various methods for promoting behavior change. Many organizations apply promotion activities to raise awareness of health risks and to increase health knowledge. However, several studies have shown that raising risk awareness and health knowledge does not necessarily result in behavior change, and that risk awareness and health knowledge are just two among a multitude of behavior-steering factors. One goal of this manual is to make practitioners aware of the multitude of behavior-steering factors that have been elaborated within the social sciences.

Furthermore, we should capitalize on more than 50 years of empirical psychology, the science of mind and behavior. Environmental and health psychology in particular investigate techniques by which behavior can be changed. Environmental psychology deals with the interaction between people and the environment and works on such topics as how to encourage people to keep their environment clean, to save energy, and to preserve nature. Health psychology is about how to induce a healthier lifestyle. Its literature contains a vast number of scientific studies on encouraging people to quit smoking, to lose weight, to eat healthily, to do more sport, and so on. In short, environmental and health psychology are likely to be very helpful in understanding and changing mindsets and thus behavior, and their studies have gathered an enormous amount of experience that can be applied in the development context. Therefore, the approach presented in this guideline relies substantially and systematically on findings and theories from environmental and health psychology.

What is systematic behavior change?

We propose a systematic behavior change methodology that (1) identifies potentially relevant factors for behavior change based on theories of psychology; (2) measures behavioral factors in a valid way; (3) determines behavioral factors that are relevant for behavior change; (4) enables the selection of behavior change techniques based on evidence; and (5) evaluates the techniques' effectiveness in changing behavior and the mechanisms of behavior change. Together, these elements ensure that behavior change is conducted in a reliable and valid way, because each phase of the methodology is reproducible and therefore subject to analysis and learning. The lessons learned are not based on subjective evaluation but on a systematic methodology.

Purpose of this manual

The aim of this manual is to give practitioners a tool to help them when designing an effective behavior change campaign. The methodology is explained step by step, all necessary skills and other requirements are described, and possible pitfalls are noted.

The RANAS approach to systematic behavior change in a nutshell

The Risks, Attitudes, Norms, Abilities, and Self-regulation (RANAS) approach to systematic behavior change is an established method for designing and evaluating behavior change strategies that target and change the factors influencing a specific behavior in a specific population. In brief, it is an easily applied method for measuring behavioral factors, assessing their influence on behavior, designing tailored strategies that change behavior, and measuring the effectiveness of these. Although it was originally developed to change behavior in the water, sanitation and hygiene (WaSH) sector in developing countries, it is applicable to a range of behaviors in various settings and populations. The RANAS approach to systematic behavior change involves four phases (see Figure 1): First, identify potential behavioral factors; second, measure the behavioral factors identified and determine those steering the behavior; third, select corresponding behavior change techniques (BCTs) and develop appropriate behavior change strategies; and fourth, implement and evaluate the behavior change strategies. In the following, we briefly describe these four phases.

The four phases of the RANAS approach

Phase 1: Identify potential behavioral factors

First, the exact behavior to be changed and the specific population group to be targeted are defined; we specify who exactly should change which behavior. Then, we collect information on behavioral factors, namely psychosocial and contextual factors that might influence the target behavior. Psychosocial factors are elements in the mindset of a person (such as knowledge, beliefs, and emotions), whereas context factors are elements outside of a person (e.g. distance to a safe well). These factors can be learned by conducting short qualitative interviews with various stakeholders at different levels, including the target population. Following this, the potential psychosocial and contextual factors that we have identified are allocated to the RANAS psychosocial factors summarized in the RANAS model of behavior change. This may involve adapting and extending the model. The RANAS model integrates leading theories of behavior change and findings of environmental and health psychology and thus uses scientific expertise built on decades of research. By using the RANAS model to classify and organize the potential psychosocial and contextual factors, we ensure that no important behavioral factors are neglected. The RANAS model is described in greater detail in the next chapter, The RANAS model of behavior change.

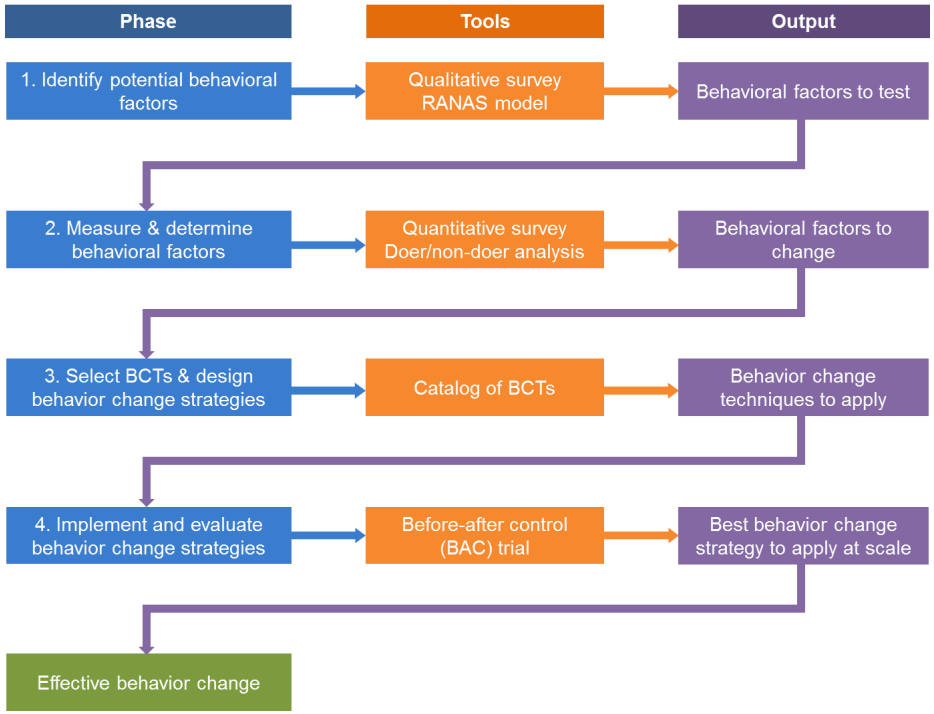


Figure 1: Flow chart of the RANAS approach to systematic behavior change.

Phase 2: Measure the behavioral factors and determine those steering the behavior

First, we develop a questionnaire to measure the behavior and the potential behavioral factors and a protocol to conduct observations of the target behavior. Template tools have been designed for questionnaires and observation protocols, and these have to be adapted to the local conditions. A doer/non-doer analysis is conducted to identify the behavioral factors steering the target behavior. This means that the responses of people who do the behavior (doers) are compared to the responses of those who do not (non-doers); a large difference in the responses between doers and non-doers shows that the behavioral factor in question critically steers the behavior and thus can be addressed through behavior change techniques (BCTs) to change the behavior.

Phase 3: Select BCTs and develop appropriate behavior change strategies

The BCTs that are thought to change the critical behavioral factors specified in Phase 2 are selected for application in behavior change strategies. A catalog of BCTs has been compiled to achieve this. The catalog lists which BCTs are thought to change which psychosocial factor, based on evidence from environmental and health psychology. The BCTs have to be adapted to the local context and combined with suitable communication channels, which constitute the mode of delivery of the BCTs. Together, the BCTs and the communication channels form a behavior change strategy.

Phase 4: Implement and evaluate the behavior change strategies

To verify the efficacy of these behavior change strategies and to optimize them, the strategies are evaluated with a before-after control (BAC) trial. This means that the behavior and the potential behavioral factors are measured with a questionnaire and with observations both before (Phase 2) and after (Phase 4) implementing the strategies. Further, a control group has to be formed and measured. This is to control for changes in behavior which occurred independently of the intervention.

The differences in behavior scores and in behavioral factor scores before and after the strategies' implementation are calculated and compared to those of the control group. The behavior change strategies have been effective when the before-after differences in behavior and behavioral factors are larger for the population that received the strategies than for the control group. The strategies can be refined if needed. Otherwise, they can be applied directly at larger scales or in other, similar areas, backed up by the evidence that they are effective in changing behavior.

Conclusion

Although the complete RANAS approach takes several months, it is worth applying; it results in behavior change strategies which (1) are tailored to the population, (2) have been proven to change behavior effectively under local conditions, and (3) thus provide an evidence base for further interventions. Not only is behavior changed effectively, but substantial arguments are gained with which to attract support from local government and donors for future projects.

The RANAS model of behavior change

The RANAS model forms the core of the RANAS approach (see Figure 2). The model has four components: psychosocial factors, which are grouped into five blocks (blue blocks), behavior change techniques (BCTs) that correspond to the factor blocks (purple blocks), behavioral outcomes (green blocks), and contextual factors (pink blocks). This chapter outlines the factor blocks, the corresponding BCTs, the behavioral outcomes, and the contextual factors. More detailed descriptions of the psychosocial factors and the BCTs are presented in Phases 2 and 3, respectively.

Psychosocial factor blocks and BCTs

The first block comprises the risk factors, which represent a person's understanding and awareness of the health risk. Information BCTs, such as the presentation of facts or risk information, can be applied to target them. Development organizations often apply these techniques alone. Attitude factors appear in the second block. They are a person's positive or negative stance towards a behavior and can be addressed through persuasive BCTs. Norm factors form the third block; they represent the perceived social pressure to do a behavior and are targeted through norm BCTs. The ability factors form the fourth block. They represent a person's confidence in her or his ability to practice a behavior and are targeted through infrastructural, skill, and ability BCTs. Self-regulation factors form the last block. They represent a person's attempts to plan and self-monitor a behavior and to manage conflicting goals and distracting cues. Planning and relapse prevention BCTs can be applied to change them.

Behavioral outcomes

All the psychosocial factors together determine the behavioral outcomes. The RANAS model considers four behavioral outcomes: behavior, intention, use, and habit. Behavior refers to the execution of actions. Both the desired behavior and competing behaviors must be considered – for example, not only drinking safe water (Behavior A) but also drinking untreated water (Behavior B). Intention represents a person's readiness to practice a behavior: how willing the person is to implement a behavior. In the water and sanitation sector, the behavior of interest often constitutes the use of a technology, such as a water filter or sanitation facility. Habits are routinized behaviors that are executed in specific, repeating situations nearly automatically and without any cognitive effort.

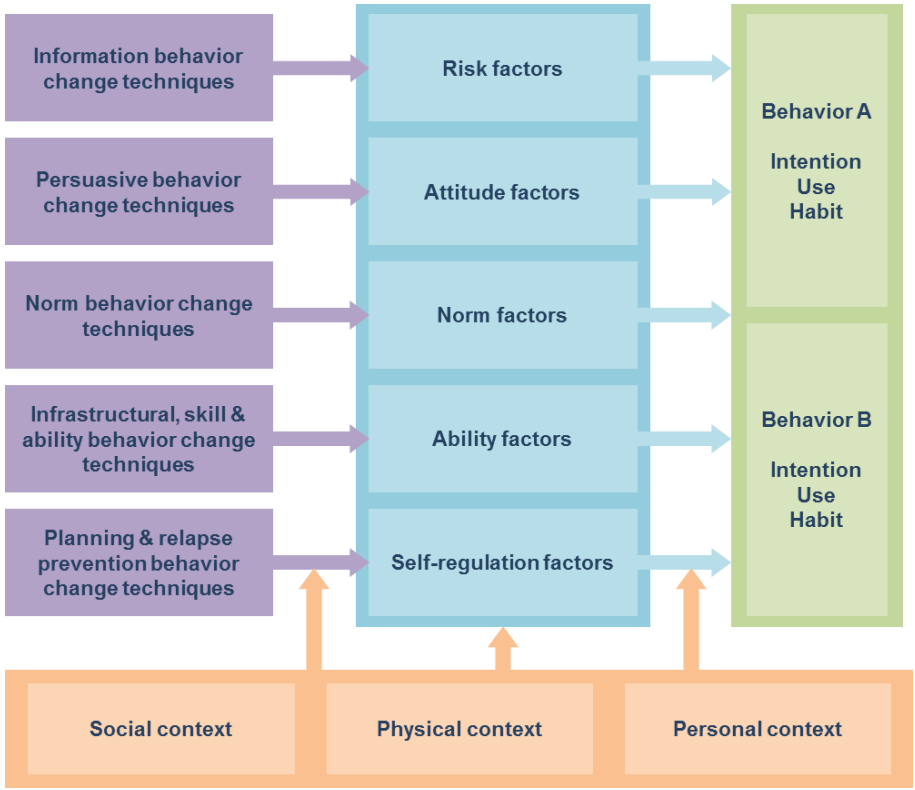


Figure 2: The RANAS model of behavior change.

Contextual factors

Behavior and the psychosocial factors that give rise to it are embedded in contextual factors. In the RANAS model, the contextual factors can influence behavior in three ways. First, they may alter the BCTs' influence on psychosocial factors. For instance, an information BCT providing detailed and complex medical information on diarrheal disease and the necessity of handwashing may increase health knowledge and perceived vulnerability for a highly educated person but be ineffective for an illiterate person, who is overly challenged by the technical terms used and the complex interrelations described. Second, they can affect behavior by changing the psychosocial factors. For example, a person with low income might perceive soap to be very expensive, while a person with high income perceives it as cheap. Third, they may alter the psychosocial factors' influence on behavior; for instance, a person might be strongly committed to collecting safe water, but the commitment may not translate into behavior due to a lack of access to a safe water source.

The contextual factors can be divided into three categories: social, physical, and personal. The social context is constituted by culture and social relations, laws and policies, economic conditions, and the information environment. The physical context consists of the natural and built environment. Finally, the personal context is formed by socio-demographic factors such as age, sex, and education and by the physical and mental health of the person.

How to use this manual

Points to consider when using this manual

This manual serves as a reference guide and cookbook to systematic behavior change in the WaSH sector. Although it is a step-by-step guide, we recommend that you study the whole manual and make yourself familiar with all the steps before you start a behavior change project. To use the analogy of a recipe, it is essential to know about all the ingredients needed, all the preparation and cooking steps, and all the utensils required before starting to cook a meal.

Structure of the main part

The manual's main part follows the four phases of the RANAS approach to systematic behavior change. Each of the four phases consists of several steps; these define the key chapters of this manual. Every key chapter is divided into three sections: Overview, Tools and examples, and Experiences of an implementing NGO. In addition, some also feature Boxes. These text sections are described below.

Overview

The Overview section provides a brief overview of the phases, including why it is important and how it fits into the systematic behavior change process. It outlines the key activities that should be carried out, summarizes the key resources and information needed, names the typical challenges that may be encountered, and lists the essential outputs to be produced.

Tools and examples

The Tools and examples section provides resources that you can adapt to implement a systematic behavior change project. These resources include instructions, template forms, and examples adapted from recent behavior change projects.

Case study

The Case study section presents experience gained from a systematic behavior change project targeting handwashing in Zimbabwe. The main aim is to make each phase more concrete.

Experiences of an implementing NGO

This section presents the experiences of a non-governmental organization, HELVETAS Swiss Intercooperation, in applying the RANAS approach in some of their WaSH projects. The main aim is to point out challenges that may arise in practice to help you anticipate these.

Boxes

Boxes provide further information, illustrative examples for key concepts, and some tips.

Additional resources

You can find more detailed information on some key concepts and further tools and examples in the Electronic Supplementary Information (ESI) here: *http://www.eawag.ch/en/department/ess/empirical-focus/environmental-and-health-psychology-ehpsy/*

Case Study

Design, Implementation and Evaluation of a Handwashing Campaign in Harare, Zimbabwe - A case study applying the practical guide Systematic Behavior Change in Water Sanitation and Hygiene

Overview

Consistent hand hygiene can reduce morbidity and mortality from diarrheal and respiratory diseases. Diarrhea and pneumonia are still the leading causes of mortality among children under five years of age in low-income and middle-income countries. Recent findings suggest that interventions promoting handwashing with soap lead to a 40% reduction in the risk of diarrhea. Despite its health impact, handwashing with soap is seldom practiced. It is estimated that less than 20% of people worldwide wash hands with soap after contact with feces, with a mean prevalence of 13% to 17% in low- and middle-income regions. Considering these low handwashing rates, interventions promoting handwashing behavior are of paramount importance.

The objectives of our project were to promote handwashing with soap at critical times among school children, caregivers, and policy makers in Harare, Zimbabwe and to disseminate the results among international actors in the water, sanitation, and hygiene (WaSH) sector.

The handwashing campaign is part of the second phase of the Handwashing in India and Africa project initiated and funded by the Swiss Agency for Development and Cooperation (SDC). High-density suburbs of Harare, Zimbabwe and the province of Ngozi in rural Burundi were chosen as pilot areas for the handwashing campaigns. While the political situation in Burundi did not allow the project to be completed there, the part in Zimbabwe was largely implemented as planned and is the subject of this case study.

The campaign was designed by Eawag in collaboration with the Università della Svizzera Italiana and WASH United. The data collection was implemented by Eawag in collaboration with the University of Zimbabwe. The campaign was implemented by ActionAid Zimbabwe and in collaboration with the Ministry of Health and Child Welfare of the Government of Zimbabwe and Eawag.

This case study aims at illustrating how *Systematic Behavior Change in Water, Sanitation and Hygiene. A practical guide using the RANAS approach* was applied in a real project. The structure of this case study follows the steps of *Systematic Behavior Change* exactly: It presents how we put each *phase*, *step*, and *key action* described in *Systematic Behavior Change* into practice during our handwashing campaign in Zimbabwe and what the results were. Our aims are to bridge the gap between the steps described in *Systematic Behavior Change* and their application in the field and to inspire practitioners to follow our example.

For more information, please refer to the Electronic Supplementary Information online here: *http://www.eawag.ch/en/department/ess/empirical-focus/environmental-and-health-psychology-ehpsy/*

Experiences of an implementing NGO

Overview

Several studies have shown that improved water technologies lead to better water quality at the source but not necessarily to better water quality at the point of use. This was also observed in the recently conducted impact study of the Helvetas Swiss Intercooperation Project in Benin in 2013 and in another research study in Nepal in 2015. The unsatisfactory water quality at the point of use is largely explained by inadequate practices in hygiene, water transport, and storage and underlines the need for behavioral changes ranging from handwashing through the use of toilets to water treatment and storage.

This shows the need to address behavior change in the Helvetas Swiss Intercooperation WASH Project in a more systematic way; innovative approaches are needed to achieve lasting results.

Based on these findings, Helvetas started the Learning Expedition Behavior Change program. In 2014 and 2015, HELVETAS started three pilot projects in partnership with Eawag, using the RANAS approach in Mali (handwashing), Benin (handwashing and water transport and storage), and Mozambique (handwashing and latrine use). The aim was to improve the impact of HELVETAS's WaSH projects on behavior change and to test the applicability of the approach in the field with local teams. On the basis of this experience, the approach has been adapted to HELVETAS's needs and will be integrated into its future WaSH activities. The following provides a short overview of the projects conducted in the three countries. For more information on HELVETAS, please refer to www.helvetas.org.

Overview of the projects

Mali

The Jikura Project is a 4-year project in the region of Sikasso and Bougouni. Its aim is to improve the living conditions of the population by strengthening sustainable access to water, sanitation, and good hygiene practice; this involves installing sustainable water services and sanitation.

Benin

Two projects, Qualieau and Epecs, aim to provide clean water from renovated and improved wells and innovative small water supplies to rural health centers, public schools, and rural communities in the Department of Bourgou and Atacora in Northern Benin. Since 2009, the project has built 152 improved wells and more than 100 schools, reaching 230,000 beneficiaries.

Mozambique

The Progoas III Project in Mozambique is located in eight districts in the provinces of Cabo Delgado and Nampula and seeks to reach 30,000 people. The aim of the Progoas III Project is to improve the living conditions and health of rural populations in the two provinces in a sustainable manner, through the participation of men and women in local governance systems and the provision of sustainable water and sanitation services.

Phase 1: Identify potential behavioral factors

In Phase 1, we first define the exact behavior to be changed and the specific population group to be targeted; we specify who exactly should change which behavior. Then, we collect information on behavioral factors that might influence the target behavior in the specific population, for example by conducting qualitative interviews. In this way, we gain a first impression of the factors that potentially determine the target behavior in the specific population and situation. Following this, the potential behavioral factors that we have identified are allocated to the RANAS psychosocial factors; this involves us in adapting and extending the model to the local context.

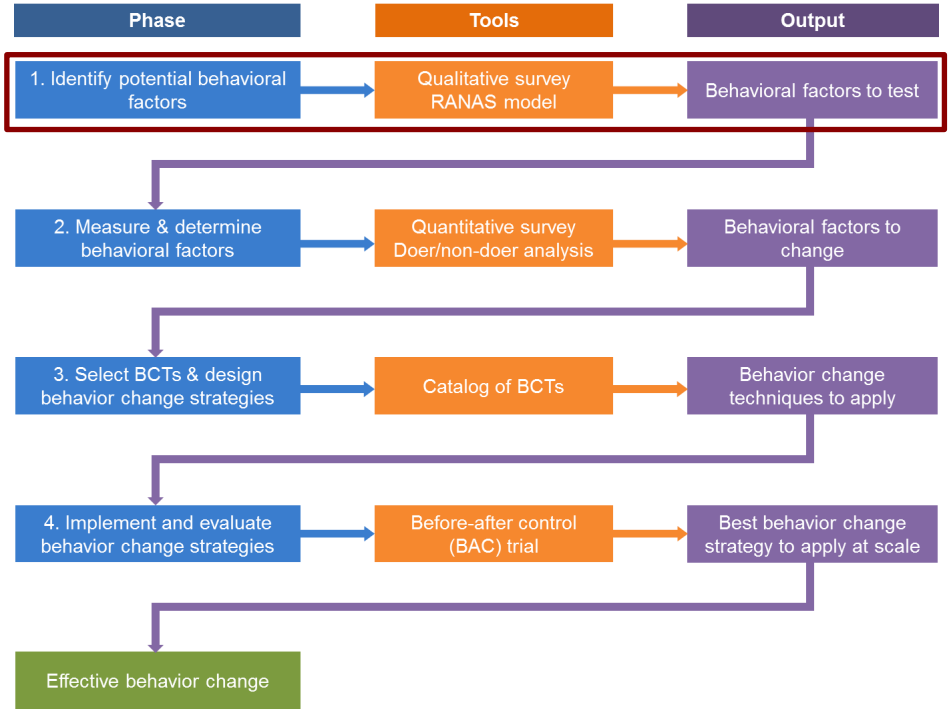


Figure 3: Flow chart of the RANAS approach to systematic behavior change.

Step 1.1: Define the behavior to be changed and the specific population group to be targeted

Overview

Introduction

The first step of every behavior change intervention is to define the specific behavior to be changed and the specific population group to be targeted. In other words, we specify who exactly should change which behavior. Otherwise, an intervention might not be purposeful and valuable time and resources could be wasted.

Key actions

Define the target behavior

Every water, sanitation, and hygiene behavior itself consists of multiple behaviors (see Box 1.1.1). Behavior change may be indicated for any of these. We have to define exactly which of these behaviors should be targeted through our intervention. This decision is based on the need for action in the target population. In some cases, it might be very clear which behavior has to be improved. In other cases, it might first be necessary to gather information on the behavioral status quo in the target population. For example, open defecation was highly prevalent in a Ugandan slum, so an organization considered promoting the construction of latrines. However, it was not lack of access to latrines that caused open defecation but the poor condition of the existing latrines. Consequently, the cleaning of latrines was targeted through an intervention instead of latrine construction.

This example also shows that behaviors often depend on preparatory behaviors. To stop open defecation, first a latrine has to be constructed, and then the latrine has to be used and kept clean. For handwashing to occur, soap and water first have to be available. For safe water to be consumed, it may be necessary to first disinfect the water. Therefore, preparatory behaviors also have to be considered when defining the target behavior.

Box 1.1.1: Behaviors in water, sanitation, and hygiene

Examples of water-related behaviors:

- Collecting drinking water at least mainly (>80%) from a safe source
- Regular cleaning of transportation containers
- Safe storing of drinking water in-house
- Regular cleaning of scooping and drinking vessels
- Point-of-use disinfection and/or filtering of drinking water
- Exclusive consumption of safe water by all household members

Examples of sanitation-related behaviors:

- Avoiding open defecation
- Constructing or purchasing toilets
- Using toilets
- Improving toilets; e.g. providing a cover or roof
- Avoiding inappropriate use
- Cleaning
- Emptying or paying for service

Examples of (other) hygiene behaviors:

- Handwashing with soap after contact with feces; e.g. after defecation
- Handwashing with soap before handling food; e.g. before eating
- Hygienic handling and cooking of food
- Washing the body with water and soap
- Menstrual hygiene
- Housing hygiene; e.g. safe storage of cookware

Describe all the components of the target behavior

A behavior is a sequence of actions; an action is an observable single act of movement. To define a behavior comprehensively, we have to describe all the actions involved exactly. Examples 1.1.1 and 1.1.2 present examples of such behavior descriptions.

To identify all the actions involved in a behavior, it may be helpful to look more closely at the daily routines in which behaviors are embedded in the target population. Having precise definitions of the behavior and its actions helps later on to specify the conditions that facilitate and hinder the behavior and thus to plan interventions.

Select the target population group

Next, the population group to be targeted has to be defined. Usually, different behaviors have different main actors (see Box 1.1.2 for examples of potential target population groups). Fetching water, for example, is often the task of the girls or the mother in a household; latrine construction usually falls to the domain of the male head of household. Therefore, the specific group to be targeted by an intervention typically depends on the behavior to be changed. Different interventions may be necessary for different target groups.

Box 1.1.2: Examples of potential target groups

- Women
- Men
- Primary caregivers
- Heads of households
- Children
- Pupils
- Leaders
- Teachers
- Most vulnerable

However, some behaviors, such as handwashing or latrine use, are or should be practiced by everyone. Even in these cases, the behavior of a particular group of people may have a greater influence on the household's or population's health, either directly (e.g. handwashing before cooking by primary caregivers) or indirectly by influencing others' behavior (e.g. teachers or natural leaders). To select the most appropriate target population group, it may be helpful to answer the questions in Tool 1.1.1.

Key resources and information

- Information on the behavioral status quo in the target population.
- Information on the key actors in the target population.

Typical challenges

- To confine the scope of the intervention to one or the few most pressing behaviors instead of aiming to change many behaviors at once.
- To differentiate behaviors clearly from each other.
- To identify every key action.
- To identify every key actor.

Outputs

- The behavior to be changed is defined exactly.
- The target population is defined exactly.

Tools and examples

Tool 1.1.1: Selection of the target population group: Key questions

To select the appropriate target population group, answer the following questions:

- Who are the persons to practice the target behavior?
- Whose behavior has the greatest influence on the family's health?
- Whose influence on others' behavior is highest?

Example 1.1.1: Example description of the behavior 'to use a latrine'

The behavior of using a latrine implies the following actions:

- Walk to the latrine, open the door, and remove the cover (preparatory actions).
- Defecate, clean the anus (main actions).
- Cover the latrine, (wash hands), leave the latrine, close the door, walk back (finalizing actions).

Example 1.1.2: Example description of the behavior 'to wash hands with soap'

The behavior of handwashing implies the following actions:

- Walk to handwashing facility (preparatory actions)
- Wet hands, apply soap, lather and scrub for 20 sec, rinse hands with water for 10 sec, dry hands in the air or with a clean towel (main actions)
- Walk back (finalizing actions).

Experiences of an implementing NGO

Gains

The projects often have the aim of improving hygiene behavior, which involves a whole set of actions (building, use and cleaning of a latrine, handwashing, safe transport and storage of water, etc.) Discussion helps us to realize how ambitious we are in our selection of target groups and to identify and prioritize the most important behavior we want to change.

Challenges

The task of defining the behavior is a challenge, because there are different definitions of behavior in our mind. In Mozambique, we discussed whether building a latrine and using it was one behavior or not. Is cleaning the toilet a separate behavior or a preparatory action? The conclusion was that we should focus on the use and that leaving the toilet in a clean condition was part of the right use of the toilet but that daily or weekly cleaning was not. These are the kinds of questions that arise and need to be discussed and clarified in the team.

The definition of the target population led to substantial discussion in Mozambique. Does the head of the family have the greatest influence on the use of the latrine, or do the women taking care of the children and the latrine? First, the reaction was that the family head has the power to change behavior. Only during the discussion did field workers suggest that the woman of the house might not have full power of decision but does have the greater effect on the use of the latrine; because she takes care of the children and is more interested in seeing the latrine used rightly, as she will have the task of cleaning it.

Coping with challenges

Before discussing the target behavior to be changed by the project intervention, it helped to discuss one's own behavior in daily life (e.g. smoking and drinking) to realize the challenge of changing behavior, the need for preparatory behaviors, and so on. Everyone had a practical example to share, and it was helpful in further steps of the RANAS approach to have this personal reality link.

To address the questions, it was important to discuss the behavior in mixed groups of project managers, field staff, and the staff of implementing partner organizations and local authorities, who have a good understanding of local conditions. This allowed different views to be included and a common understanding of the behavior to be tackled. In our first pilot country, Mali, we held such a discussion prior to the introduction workshop and only in a very small team. This was done quickly, which did not allow the same common understanding to develop; many questions have arisen subsequently.

Step 1.2: Collect information on psychosocial and contextual factors that might influence the target behavior

Overview

Introduction

The next task is to collect information on psychosocial and contextual factors that might influence the practice of the target behavior. Psychosocial factors are elements in the mindset of a person, such as knowledge, beliefs, and emotions. The RANAS model summarizes the factors that typically determine behavior, based on decades of research in social, environmental, and health psychology. When we develop our interventions on the RANAS model, we ensure that they take these typical factors into consideration. At the same time, other atypical factors may be critical for a specific behavior in a particular population or context. For example, in a project on promoting the consumption of fluoride-free water in Ethiopia, we learned that a guest norm existed; people preferred to serve filtered water to guests, especially during coffee ceremonies. In addition, the specific content of a psychosocial factor may differ between populations and contexts. For example, in one place people may perceive drinking safe water as costly because all the safe water sources are far away (high time costs); in another place, they may think that drinking safe water is costly because the safe water sources available are very expensive (high monetary costs).

Contextual factors, in contrast, are conditions outside of a person's mindset that facilitate or hinder a behavior, such as existing water infrastructure or information provided at a health center. The RANAS model differentiates between the social, physical, and personal contexts. In Box 1.2.1, you find examples for each of these three fields.

It is important to gather first information on the psychosocial and contextual factors that may determine the target behavior in the specific population and situation early in the process of intervention development. For example, we can collect information by conducting qualitative surveys with various stakeholders at different levels, including the target population, and spot-check observations.

Box 1.2.1: Example of contextual factors

Social context:

- Culture and social relations, e.g. taboos, rites, or cultural norms
- Laws and policies, e.g. prohibition of open defecation, water rights, school budget for hygiene supplies, or curriculum on WaSH behavior
- Economic conditions, e.g. households' or communities' wealth
- Product and service accessibility, e.g. price of soap and water, or infrastructural facilities, e.g. availability of soap or reliability of water services
- Information environment, e.g. health information shared in health centers or schools

Physical/technical context:

- Natural environment, e.g. climate, seasons, water occurrence, or soil condition
- Built environment, e.g. well, latrine, or handwashing station

Personal context:

- Socio-demographic factors, e.g. age, sex, and education
- Physical and mental health of the person

Key actions

Conduct short qualitative surveys and spot-check observations

Qualitative surveys can be conducted either as individual interviews or as focus group discussions. However, focus group discussions, although widely used, bear the risk that group processes and social pressures hinder

participants from expressing their opinions and beliefs freely; we list some of these in Box 1.2.2.

Box 1.2.2: Focus group discussions: Group processes and pressure

Group processes and social pressure can impair focus group discussions. We have to keep this in mind when conducting focus group discussions. Distorting influences can include

- Past events and existing alliances in the community: risk that past events, such as conflicts, or existing alliances influence the participants' behavior and interaction.
- First topics: risk of sticking to the first topic that emerged in the discussion and neglecting other relevant topics.
- Silent participants: risk that some participants do not share their thoughts.
- Minorities: risk that minorities are not taken into consideration.
- Status differences: risk that lower-status people are not allowed to speak or do not feel comfortable in sharing their thoughts in the presence of higher-status people.
- Dominant participants: risk that certain participants dominate the discussion by defining the topics and using most of the discussion time.
- Leaders and respected people: risk that leaders and respected people dominate the discussion.
- Hidden agendas: risk that participants present biased information that serves their personal interests.

There are measures to minimize the influence of these group processes and social pressures in focus group discussions (see Box 1.2.3). Nonetheless, we advise individual interviews in combination with spot-check observations (see 2.1 for more information on spot-check observations). Together, they give the most comprehensive and accurate impression of the situation.

In Tool 1.2.1, you find instructions on how to organize and conduct qualitative interviews and focus group discussions. We recommend that you prepare a question guide for both. You can find sample questions in ESI 1.2. The actual interview or focus group discussion does not have to follow the question guide strictly (it is not a structured interview); however, the guide helps to ensure that all the relevant topics are addressed.

Box 1.2.3: Tips to minimize group processes and pressures in focus group discussions

- Organize separate meetings for those who perform the targeted behavior and those who do not (doers and non-doers).
- Depending on the culture, organize separate meetings for women and men.
- Depending on the culture, organize separate meetings for different social groups (e.g. people of different status).
- Try to include all participants in the discussion by explicitly asking specific participants (e.g. silent participants) to share their opinions and thoughts.

In qualitative surveys, the data quality is highly dependent on the skills of the data collectors. Accordingly, we have to select and train qualified interviewers carefully (see Step 2.2 for more information). Depending on the number of interviews intended, the project team can conduct the interviews themselves instead of hiring and training interviewers.

Analyze the surveys

Sophisticated tools exist to analyze qualitative research data, such as computer-assisted qualitative data analysis software (CAQDAS), which help in coding and text interpretation. However, such an approach is not necessary for this step. Instead, we apply a thematic analysis and examine our interview notes for recurring topics, patterns, features, and themes.

Key resources and information

- Results from 1.1: the specified target behavior and population group.
- Skilled and trained moderators.
- Skilled and trained interviewers.

Typical challenges

- To identify the right group and composition of people to mitigate data distortion by group processes and social pressure.
- To find skilled moderators who mitigate data distortion by group processes and social pressure.
- To find skilled interviewers that collect good quality data.
- To be sufficiently reflective to avoid a biased, subjective interpretation of the data.

Outputs

First insights are gained into the psychosocial and contextual factors that may influence the target behavior in the specific population.

Tools and examples

Tool 1.2.1: Instructions for organizing and conducting qualitative interviews and focus group discussions

Before the qualitative interview or focus group discussion

- Define the purpose of the interview or discussion.
- Determine the participants who should be from the target population you have specified in 1.1 (e.g. primary caregivers).
- Aim to conduct interviews or discussions with doers and non-doers.
- In the case of focus group discussions, determine the composition of the groups (see Box 1.2.3), and do not invite more than 8-10 people to one meeting.
- Prepare a question guide.
- Prepare questions on both the target behavior and the competing, undesired behavior.
- For focus group discussions, try to limit the number of guiding questions to a maximum of 12.
- Prepare open-ended questions, or follow up any closed questions with an open-ended question (see 2.1 regarding open and closed question formats).

During the qualitative interview or focus group discussion

- Execute the focus group discussion with one moderator and at least one note-taker.
- Start each interview or discussion with a short introduction.
- Briefly introduce yourself and your organization.
- Ask the participants to briefly introduce themselves.
- Explain your overall purpose, what you want to find out, and the reasons for the participants' involvement:
- General information about the target behavior, opinions regarding advantages, disadvantages, and barriers to the behavior
- Explain that you are interested in their thoughts and opinions and not in any particular answers and that there are no correct or incorrect answers.
- Explain that they help you and the community most when they give the answers that really represent their opinions.
- Obtain their agreement to documenting the interview or discussion.
- Conduct the interview or discussion following the question guide.
- Try to gather answers to the predefined questions.
- Ask additional follow-up questions whenever a topic is raised which needs further inquiry.
- Try to lead the participants back to the topic if the interview or discussion has strayed from the subject.
- Sum up the main points of the interview or discussion.
- Close the interview or discussion by thanking the participants for their help and asking whether they have any final comments or questions.

After the qualitative interview or focus group discussion

- Immediately after: Finalize the notes.
- Later: Examine the interview or discussion notes for recurring topics, patterns, features, and themes.

Example 1.2.1: Information on psychosocial and contextual factors of handwashing with soap collected in a project in Southern Ethiopia

In 2012, we conducted a handwashing promotion project in the Borena Zone in Southern Ethiopia. To collect information on psychosocial and contextual factors that might influence the practice of handwashing with soap, we conducted individual interviews in combination with spot-check observations. The interviews were carried out by the main investigator together with the local research coordinator. One of the spot checks was a handwashing demonstration: we asked participants to demonstrate how they usually washed their hands. We observed and recorded the agents and devices used (e.g. mug), where they washed their hands, and where the agents (e.g. soap and water) were stored.

Based on the interviews, we learned that the most common situations in which people wash their hands with soap included both health-relevant times, such as after defecation or before preparing food, and health-irrelevant times, such as handwashing after eating.

Thanks to the handwashing demonstration, we learned that no handwashing facilities existed and that the prevailing technique was to use a mug for handwashing. We also learned that soap is usually stored on a shelf or in a box distant from where the water is kept. Therefore, we updated the key actions to handwashing (compare with Example 1.1.2) as follows (changes in italics):

- *Fetch soap from shelf/box, walk to the water container, pour water into a mug (preparatory actions)*
- Wet hands, apply soap, lather and scrub for 20 sec, rinse hands with water for 10 sec, dry hands in the air or with a clean towel (main actions).
- *Put soap back on the shelf (finalizing actions).*

Based on the interviews, we identified the following barriers to handwashing with soap:

- Soap and water not being immediately available
- Lack of time to integrate handwashing into daily routines
- A dislike of the scent of soap hindering handwashing before eating.

The most frequently mentioned reasons for handwashing with soap were

- Having been told to do so during childhood
- It being a family custom to wash hands
- Feeling clean after handwashing.

Experiences of an implementing NGO

Gains

Our projects do not always have the time and capacity to conduct an in-depth analysis of the contextual factors that influence the behavior. We mainly focus on technical analysis and social and organizational or market assessment. Putting the behavior in relation to contextual factors helps to better understand the dynamic between the two.

It is also important to realize that negative contextual factors, such as a cholera epidemic, can have a positive impact, for example on hygiene practice, and vice versa.

Challenges

During the discussion, we usually tend to focus on the hindering factors, such as the poor economic condition of the target group, lack of soap in the village, etc. So, it is important also to pay sufficient attention to the favorable contextual factors. For example, the integration of hygiene education in the school curriculum in Benin has had a positive influence.

We have realized that we often have a predefined view of what is influencing what and forget some of the factors. The framework helps us to complete the analysis in a more systematic way.

Coping with Challenges

The same working group as in the previous steps brainstorms all the contextual factors first. The diversity of the group in Mozambique ensured that the analysis was more holistic. This helped to identify the key issues in the social, physical/technical, and personal contexts. The next step identifies the issues that have to be examined in more detail. In Mali, the influence of the tradition of washing hands in the same bowl or pan without soap before eating was identified as a social factor for which we needed more reliable information from the field through qualitative interviews.

Step 1.3: Allocate behavioral factors to the RANAS psychosocial factors

Overview

Introduction

In this phase, the main task is to allocate the potentially relevant behavioral factors that we have identified in Step 1.2 to the RANAS psychosocial factors. This is necessary to integrate our preliminary findings with existing scientific evidence. That is, we adapt and/or extend the RANAS model to suit the local context. In Phase 2, we use this adapted and extended model to prepare the RANAS survey; in this way, we ensure that we have taken both the local conditions and the existing scientific evidence into account when developing our intervention. In other words, we consider not only the behavioral factors that we identified in Step 1.2 but also all the original RANAS psychosocial factors; these are the factors which typically determine behavior and thus may also be relevant in the present case. Some of the contextual factors (e.g. socio-demographic factors), are also usually included in surveys. However, contextual factors, as their name implies, are strongly context dependent. Therefore, we do not provide a list of context factors to be considered.

Key actions

To allocate the potential behavioral factors to the RANAS psychosocial factors

To allocate the factors identified in Step 1.2 to the RANAS psychosocial factors, we first have to gain familiarity with the RANAS psychosocial factors. Tool 1.3.1 provides definitions of all the psychosocial factors along with examples of typical thoughts related to each factor. When we are familiar with all the RANAS psychosocial factors, we compare the psychosocial and contextual factors identified in Step 1.2 with the RANAS psychosocial factors and try to find correspondences.

Contextual factors differ from psychosocial factors, so you will not find a RANAS psychosocial factor that is directly equivalent. However, the contextual factors in most cases are related to a RANAS psychosocial factor. For example, although the contextual factor *High distance of safe water sources* does not have a direct equivalent in the RANAS psychosocial factors, it is related to the attitude factor *Beliefs about costs and benefits*, since these may relate to high time costs or high effort. In addition to finding corresponding psychosocial factors you can also classify the identified contextual factors to the three broad contextual factor groups, social, physical, and personal context.

Example 1.3.1 illustrates how to allocate the factors identified in Step 1.2 to the RANAS psychosocial factors. We strongly encourage you to seek a corresponding RANAS factor for each potential psychosocial and contextual factor identified. However, it is possible that you have identified some factors which, even after long consideration, do not have a direct equivalent in the RANAS psychosocial factors. These are the atypical factors mentioned in Step 1.2. Even though they do not determine behavior in general, they may be decisive for behavior in the specific population or situation and thus relevant for the development of the intervention. We advise you to add these atypical but potentially decisive factors to the allocated factor list (see the last lines in Example 1.3.1) . We consider these additional factors again when preparing the questionnaire in Step 2.1.

Key resources and information

- The RANAS model presented in the Introduction
- Results from Step 1.2: information on psychosocial and contextual factors.
- List of RANAS psychosocial factors; see Tool 1.3.1.

Typical challenges

To find clear correspondence between the RANAS psychosocial factors and the psychosocial and contextual factors identified.

Outputs

List of psychosocial and contextual factors adapted to the local context.

Tools and examples

Tool 1.3.1: Definitions of psychosocial factors

Definitions of psychosocial factors		
RANAS psychosocial factors	**Definitions**	**Examples of typical thoughts**
Risk factors, representing a person's understanding and awareness of the health risk		
Health Knowledge	A person's knowledge about a disease's causes, personal consequences, and preventive measures.	"If I drink raw water I might get diarrhea".
Vulnerability	A person's estimation of the general probability of contracting a disease and subjective awareness of the personal risk of contraction.	"The risk that I get diarrhea is high".
Severity	A person's assessment of the seriousness of an infection and the significance of the disease's consequences.	"If I get diarrhea I cannot go to the market to sell my products, so I lose money".
Attitude factors, representing a person's positive or negative stance towards a behavior		
Beliefs about Costs and Benefits	A person's beliefs about the monetary and non-monetary costs (time, effort etc.) and benefits (lower medical costs, improved health) of a behavior, including social benefits (higher status, appreciation by others).	"Fetching water at the safe source is time-consuming".
Feelings	A person's emotions (joy, pride, disgust etc.) when thinking of a behavior or its consequences or when practicing the behavior.	"I like to wash hands with soap".
Norm factors, representing the perceived social pressure towards a behavior		
Others' Behavior	A person's observation and awareness of others' behavior, his or her perceptions of which behaviors are typically practiced by others.	"Nearly all community members use a latrine for defecation".
Others' (Dis)Approval	A person's perceptions of which behaviors are typically approved or disapproved of by relatives, friends, and neighbors. This includes awareness of institutional norms, i.e. the dos and don'ts expressed by recognized authorities such as village, tribe, and religious leaders or other institutions.	"My relatives approve when I chlorinate my drinking water".
Personal Importance	A person's beliefs about what she or he should do or should not do.	"I feel personally obliged to wash hands with soap before I feed my baby".

Definitions of psychosocial factors (continued)		
RANAS psychosocial factors	**Definitions**	**Examples of typical thoughts**
Ability factors, representing a person's confidence in her or his ability to practice a behavior		
How-to-do Knowledge	A person's knowledge of how to execute the behavior.	"When I chlorinate my drinking water, I have to leave the water to stand for at least 30 minutes before drinking it".
Confidence in Performance	A person's perceived ability to organize and execute the courses of action required to practice a behavior.	"I am confident in my ability to use the water filter correctly".
Confidence in Continuation	A person's perceived ability to continue to practice a behavior, which includes the person's confidence in being able to deal with barriers that arise.	"I am confident that I can find the time and money to regularly buy all drinking water at the safe source".
Confidence in Recovering	A person's perceived ability to recover from setbacks, to continue the behavior after disruptions.	"I am confident in my ability to restart using the latrine for defecation even after it was broken for several weeks".
Self-regulation factors, representing a person's attempts to plan and self-monitor a behavior and to manage conflicting goals and distracting cues		
Action Planning	The extent of a person's attempts to plan a behavior's execution, including the when, where, and how of the behavior.	"I plan to refill the water filter every evening before going to sleep".
Action Control	The extent of a person's attempts to self-monitor a behavior by continuously evaluating and correcting the ongoing behavior toward a behavioral goal.	"Yesterday I arrived late at the borehole and it was already closed; so today I really have to remember to go in time!"
Barrier Planning	The extent of a person's attempts to plan to overcome barriers which would impede the behavior.	"If I don't have enough soap at home I won't be able to wash my hands regularly. Therefore I keep a stock of two soaps in the cupboard and refill it as necessary every market day".
Remembering	A person's perceived ease of remembering to practice the new behavior in key situations.	"Every evening before going to sleep I drink a cup of water and thus remember to refill the water filter".
Commitment	The compulsion a person feels to practice a behavior.	"I am committed to drinking only chlorinated water".

Example 1.3.1: Allocation of the identified behavioral factors of handwashing with soap in a project in Southern Ethiopia

In the first phase of a handwashing promotion project in the Borena Zone in Southern Ethiopia, we identified several psychosocial and contextual factors of handwashing (see Example 1.2.1). The table below displays how we allocated the factors we had identified to the RANAS psychosocial factors. We assumed that not having a handwashing facility, using a mug and storing soap distant to the water source would affect people's *Confidence in continuation*, as they do not allow the behavior to be practice easily. Further, we allocated soap and water not being immediately available to *Barrier planning*, as it seemed a relevant barrier which should be targeted through *Barrier planning*. No additional, atypical psychosocial or contextual factors were found.

Allocation of the identified psychosocial and contextual factors to the RANAS psychosocial factors			
RANAS psychosocial factors	**Corresponding identified psychosocial factors**	**Corresponding identified contextual factors**	**Matching contextual factor group**
Risk factors			
Health Knowledge	—	—	—
Vulnerability	—	—	—
Severity	—	—	—
Attitude factors			
Beliefs about Costs and Benefits	Lack of time to integrate handwashing into daily routines	—	—
Feelings	Feeling clean after handwashing Not liking scent of soap	—	—
Norm factors			
Others' Behavior	A family custom to wash hands	—	—
Others' (Dis)Approval	Having been told to do so during childhood	—	—
Personal Importance	—	—	—

Allocation of the identified psychosocial and contextual factors to the RANAS behavioral factors (continued)			
RANAS psychosocial factors	**Corresponding identified psychosocial factors**	**Corresponding identified contextual factors**	**Matching contextual factor group**
Ability factors			
How-to-do Knowledge	—	—	—
Confidence in Performance	—	—	—
Confidence in Continuation	—	No handwashing facilities Prevailing technique: use a mug Soap is usually stored on a shelf or in a box distant from where the water is kept	Physical context
Confidence in Recovering	—	—	—
Self-regulation factors			
Action Planning	—	—	—
Action Control	—	—	—
Barrier Planning	—	Soap and water not being immediately available	Physical context
Remembering	—	—	—
Commitment	—	—	—
Additional, atypical psychosocial and contextual factors			
	—	—	—
	—	—	—

Experiences of an implementing NGO

Gains

Understanding the RANAS approach with the different psychosocial factors increased knowledge of how behaviors are influenced. In particular, the factors involved in norms and self-regulation were new to the teams and created a broader view that did not only focus on health and risk issues.

The link between environmental conditions and psychosocial factors was an eye-opener for all the teams, and it will help future work in the field to conduct analyses in a more systematic way, even if the RANAS approach is not completely applied.

Challenges

To become familiar with the RANAS psychosocial factors takes time, as these psychological terms are abstract and remote from our daily work. The WaSH project teams often consist of engineers, who are not closely familiar with social science concepts and practice.

Coping with challenges

It was important to plan enough time to go through the different factors and use one's personal behavior as an example to better understand what the different factors mean. In Mali, one of the project staff smoked, so this example was used. Reformulating the names of factors in one's own words linked them to the local context and so was very helpful in increasing understanding.

It also helped to categorize the contextual factors as positive or negative so as to understand their interrelation and to realize that some of the contextual factors can have an influence on RANAS psychosocial factors.

Phase 2: Measure the behavioral factors and determine those steering the target behavior

In this phase, we first develop a questionnaire to measure the behavior and the behavioral factors, which have now been adapted to the specific context. We also develop a protocol of structured observations of the target behavior. Then, a doer/non-doer analysis is conducted to identify the behavioral factors steering the target behavior. These are later addressed (Phase 3) through behavior change techniques (BCTs) in the design of behavior change strategies.

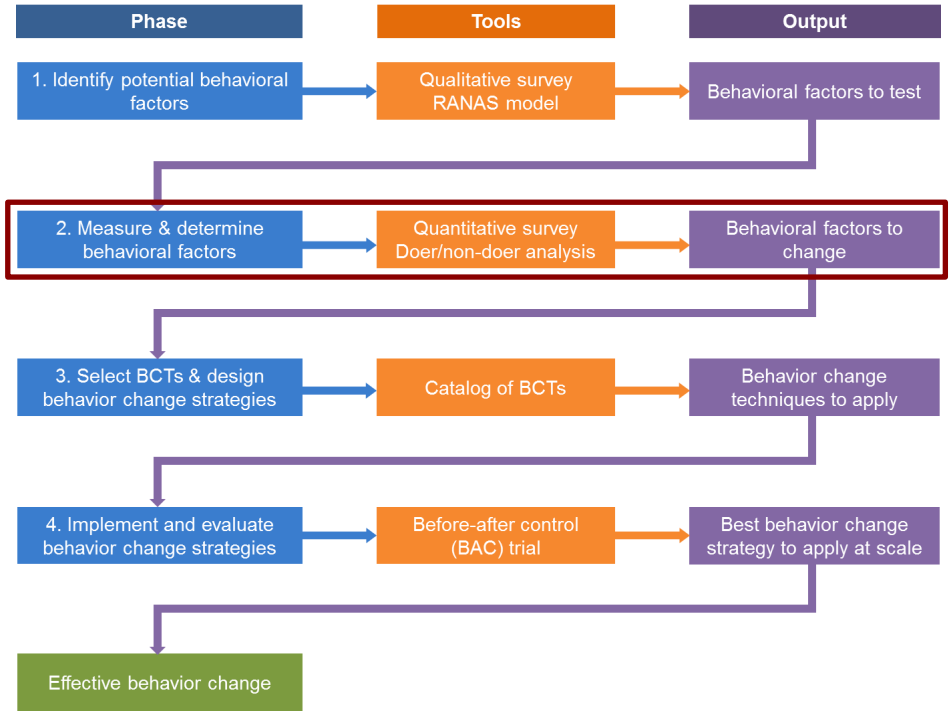


Figure 4: Flow chart of the RANAS approach to systematic behavior change.

Step 2.1: Develop a questionnaire to measure behavioral factors and the behavior and a protocol to conduct observations of the behavior

Overview

Introduction

In this step, we develop a survey tool to measure the target behavior and the behavioral factors. To measure the behavior, we have three options: direct observation, spot checks, and self-reports (i.e. questionnaires). For the psychosocial factors, we have only one option, a questionnaire. The same is true for some of the contextual factors (e.g. a respondent's age) while others are also observable (e.g. distance of the water source) or measurable by spot checks. The survey tool is prepared using, first, the outputs from Step 1.1; the target behavior defines the behavior that we want to measure, and the population group defines the participants we want to survey. Second, we build on the output from Step 1.3, the list of psychosocial and contextual factors adapted to the local context. The resulting RANAS survey can be understood as an extended or improved knowledge, attitudes, and practice (KAP) survey. Box 2.1.1 provides a comparison between RANAS surveys and KAP surveys.

Note that this is a crucial step; it requires rigor, time, and skills. It may be advisable to seek assistance from an expert for this essential step.

Key actions

Develop a questionnaire

For the behavior and for each psychosocial and contextual factor, we formulate at least one and often several questions. A high-quality questionnaire contains questions and response options that have been formulated according to psychological methods. Tool 2.1.1 explains the different question formats; Tool 2.1.2 presents general rules for formulating meaningful questions and response options. However, it may still be helpful to have an expert prepare or review your questionnaire.

Further, the questions have to be comprehensible to the specific local population. Therefore, it is essential that local people are involved in the questionnaire's development. If the questions cannot be directly prepared in the local language (e.g. because the main investigator does not speak the local language), we have to translate them in the next step (see Step 2.2).

Box 2.1.1: Comparing RANAS surveys to KAP surveys

Most behavior change interventions in the water, sanitation, and hygiene (WaSH) sector are preceded and followed by a knowledge, attitudes, and practice (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, the existing scientific evidence has proven that knowledge and attitudes are neither the only nor even the most important determinants of behavior. Accordingly, the RANAS surveys include a much broader range of behavioral factors: (1) risk factors (similar to knowledge); (2) attitude factors; (3) norm factors; (4) ability factors; and (5) self-regulation factors.

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 psychosocial factors and behavioral outcomes have been defined precisely (see 1.3). This allows the consistent formulation of survey questions. Reliable survey questions maximize the comparability between surveys.

The RANAS survey is only one step in the RANAS approach to systematic behavior change. Accordingly, additional important differences exist between the RANAS approach and KAP surveys. These are explained in the ESI 2.1.

Example 2.1.1 presents questions for behavior, all RANAS psychosocial factors and some contextual factors for water treatment with chlorine. Please bear in mind that these are sample questions and not a complete ready-to-use questionnaire. The questions have (1) to be adapted to the specific behavior and population group (Step 1.1) and (2) to be adapted and extended based on the specific local conditions (Step 1.3). In most cases, you will need more questions than the sample questions presented in this chapter. In particular, more contextual factors have to be considered in most cases.

Further, we have to retrieve the same households and target persons surveyed at baseline for the follow-up survey. Therefore, we need questions that collect sufficient information to unambiguously identify an individual person even one or two years later. Which information is pertinent depends on the context; we often need to ask for the name of the participant and the name of her/his father.

When all the questions have been formulated, we can compile the questionnaire. First, we have to put all the questions into a meaningful sequence. Box 2.1.2 provides some rules for arranging the questions. Second, we have to include an introduction to the household that briefly explains the general purpose of the survey, the importance of the respondents' participation, who is responsible for the survey, a statement guaranteeing confidentiality, and a section obtaining informed consent (see Example 2.1.2). Third, we include instructions and information for the participants wherever necessary. As illiteracy is often high among the participants of development projects, we suggest that you collect data through face-to-face interviews (see Step 2.2) and thus prepare your questionnaire accordingly. That means that we include instructions and information for the interviewers: instructions on household selection, definition and selection of the target person in a household, and reminders about question types (see also 2.2).

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).

Develop an observation protocol

As mentioned before, we can measure behavior not only by self-reports but also through direct observation and through spot checks. Examples of direct observations would include observing where a person goes to defecate or whether a person washes hands with soap after defecation. Direct observations are usually very time-consuming and thus costly. However, they are thought to be more objective than self-reports. In other words, there is always a tradeoff between precision (direct observation) and practicality (self-reports).

Spot checks measure the behavior indirectly; they measure antecedents of the behavior (e.g. soap and water at the handwashing station to measure handwashing) and outputs of the behavior (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, 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 to observe and how to observe it and a checklist to record the observations. You find examples of direct observations and spot checks in Examples 2.1.3 and 2.1.4 respectively. Usually, spot checks can be included in the same document as the questionnaire; for direct observations, it is preferable to prepare a separate manual.

Key resources and information

- Results from 1.1: the specified target behavior and population group.
- Results from 1.3: the list of psychosocial and contextual factors adapted to the local context.
- Knowledge and experience in questionnaire design.
- Sample questions, see Tool 2.1.4.
- Locally knowledgeable person.

Typical challenges

- To formulate questions according to predefined standards (see Tool 2.1.2).
- To formulate questions that are comprehensible to the specific local community.
- To formulate questions and develop spot checks and direct observations that measure the target behavioral outcomes as precisely as possible while remaining cost effective.
- To convince stakeholders that the local population is able to answer questions with rating scales (rather than simple yes/no questions).

Outputs

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

Tools and examples

Tool 2.1.1: Question formats

Open questions		
Description	**Examples**	**Further information**
The interviewer reads the question. The participant answers in his/her own words. The interviewer writes the answer(s) down. For multiple-response questions: If the participant keeps silent after a response, the interviewer asks 'Anything else?' Only when the participant responds 'No' does the interviewer proceed 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 gain the participants' own answers • Allows exploration of the range of possible themes arising from an issue, including those which we had not anticipated • Can be used even if a comprehensive range of response options cannot be compiled Disadvantage: • Effortful and time-consuming for the participant and the interviewer • Answers are difficult to compare • Effortful and time-consuming for the data processing, as the responses have to be categorized • Open multiple-response questions: Difficult to analyze

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 'No' does the interviewer proceed 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? 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 88 ☐ Other…….	Advantage compared to the previous format: Responses are pre-categorized to facilitate data gathering, entry, and processing Prerequisite: knowledge about likely responses. Disadvantage of open multiple-response questions: Difficult to analyze

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? 0 ☐ Not tiring 1 ☐ A little tiring 2 ☐ Quite tiring 3 ☐ Tiring 4 ☐ Very tiring *Bipolar:* How difficult or easy is it to collect all your drinking and cooking water at the arsenic safe well? -4 ☐ Very difficult -2 ☐ Difficult 0 ☐ Either difficult or easy 2 ☐ Easy 4 ☐ Very easy	Advantage: • Precise and explicit responses • Easy and quick to gather • Easy to compare and analyze • Easy to report Disadvantage: unknown responses or aspects are not detectable.

Filter(ed) questions

Description	Examples	Further information
Based on the response to question A, the interviewer asks questions B and C if the answer was 'Yes' or skips questions B and C if the answer was 'No'.	A: Has anyone in your household had diarrhea over the past 14 days? 1 ☐ Yes 0 ☐ No B: *If yes to A:* How many people? …… C: *If yes to A:* Who was it? ☐ Male under 5 years ☐ Female under 5 years ☐ Male between 5 and 15 years ☐ Female between 5 and 15 years ☐ Male above 15 years ☐ Female above 15 years	Filter questions help to select the appropriate responses for certain questions. This is important to avoid asking meaningless questions.

Tool 2.1.2: General rules for formulating meaningful questions and good and bad examples

Requirements for the questions		
Requirements	**Examples**	**Explanations**
Simple	"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?" "How much do you think that washing hands with soap before eating is time-consuming or not time-consuming?"	While the meaning of the two questions is essentially the same, the first is formulated more long-windedly while the second is more straightforward.
Short	"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?" "How much do you think that drinking untreated water is disgusting or not disgusting?" "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?" "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 or unconfident are you to start washing hands with soap and water before handling food again?"	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).
Concrete	"Do you wash your hands?" "Do you wash your hands with soap and water before eating?"	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.

Requirements for the questions (continued)		
Requirements	**Examples**	**Explanations**
Precise	"In the past few weeks, how often did you fetch water at the safe source?" "In the past two weeks, how often did you fetch water at the safe source?" "In the last 14 days, how often did you fetch water at the safe source?"	In the first question, the time frame is very imprecise. For one participant, "past few weeks" might mean the last two weeks; for another, it may mean the last four weeks. In the second question, the time frame is still imprecise as one person might understand it as the two weeks before this week and another as "the last 14 days". In the last question, the time frame is precise; i.e. the last 14 days.
Unidimensional, without "and" or "or"	"How much do you like or dislike the temperature and the color of the water?" -4 ☐ Dislike it much -2 ☐ Dislike it 0 ☐ Either like or dislike it 2 ☐ Like it 4 ☐ Like it much	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 rating of that one aspect which is more important to the participant.
Without negation	"How much is handwashing something you do without thinking?" 0 ☐ Not at all 1 ☐ A little 2 ☐ Quite 3 ☐ Much 4 ☐ Very much "How much is handwashing something you do attentively?" 0 ☐ Not at all 1 ☐ A little 2 ☐ Quite 3 ☐ Much 4 ☐ Very much	Negations as applied in the first question tend to confuse participants. In particular, the meaning of the response "not at all" might be difficult to understand; it implies "I DO wash my hands WITH thinking". If possible, it is advisable to omit negations and use positive wordings.
Without double negation	"How much is handwashing something you do not without thinking?" 0 ☐ Not at all 1 ☐ A little 2 ☐ Quite 3 ☐ Much 4 ☐ Very much	Double negations are even more confusing than negations; we risk receiving wrong answers due to misunderstandings. Double negations have to be omitted in any case.
Without expressions unfamiliar to the target population	"Have you ever suffered from abdominal typhus?"	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.

Requirements for the questions (continued)		
Requirements	**Examples**	**Explanations**
Not suggestive	"Do you agree that drinking untreated water is disgusting?" "How much do you think that drinking untreated water is disgusting or not disgusting?" 0 ☐ Not disgusting 1 ☐ A little disgusting 2 ☐ Quite disgusting 3 ☐ Disgusting 4 ☐ Very disgusting	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.
Careful regarding sensitive topics	"Where do you go to defecate?" "Where do you go to poop?"	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".
In line with the response options	"Do you like or dislike the temperature of the water?" -4 ☐ Dislike it much -2 ☐ Dislike it 0 ☐ Either like or dislike it 2 ☐ Like it 4 ☐ Like it much	While the question is formulated as a yes-no question, the response option is a rating scale.

Requirements for the 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 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	The answer options of the first question are very broad. Therefore, we cannot gain much information. 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.

Requirements for rating scales		
Requirements	**Examples**	**Explanations**
The grades should be of a consistent breadth.	Example with a consistent breadth: 0 ☐ Never 1 ☐ Seldom 2 ☐ Sometimes 3 ☐ Often 4 ☐ Always Example with inconsistent breadth: 0 ☐ Never 1 ☐ Sometimes 2 ☐ Often 3 ☐ Very often 4 ☐ 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: 0 ☐ Never 1 ☐ Often 3 ☐ Always Example with 5 grades: 0 ☐ Never 1 ☐ Seldom 2 ☐ Sometimes 3 ☐ Often 4 ☐ Always Example with 7 grades: 0 ☐ Never 1 ☐ Very seldom 2 ☐ Seldom 3 ☐ Some-times 4 ☐ Often 5 ☐ Very often 6 ☐ Always	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 response options and the degree of differentiation.
The scale should be unipolar or one sided (i.e. 0 to 4) if it represents an increase from “nothing” to “much”.	0 ☐ Not tiring 1 ☐ A little tiring 2 ☐ Quite tiring 3 ☐ Tiring 4 ☐ Very tiring	Use unipolar scales if the rating is of a dimension with a natural zero point or if the antonym is, in the specific case, meaningless.
The scale should be bipolar or symmetric (i.e. -2 to 2) if it represents a two-sided increase starting from a neutral middle grade.	-4 ☐ Very difficult -2 ☐ Difficult 0 ☐ Either difficult or easy 2 ☐ Easy 4 ☐ Very easy	Use bipolar scales if the rating is of a dimension from “negative” to “positive”, i.e. when the antonyms are both meaningful.

Example 2.1.1: Sample questions for water treatment with chlorine

Sample questions for water treatment with chlorine – behavioral outcomes	
Behavioral outcomes	**Question example with response scale**
Behavior (frequency)	How much of your household's drinking water do you chlorinate? 0 ☐ (Almost) none (0%) · 1 ☐ Less than half of the water (25%) · 2 ☐ Half of the water (50%) · 3 ☐ More than half of the water (75%) · 4 ☐ (Almost) all of the water (100%)
Intention	How strongly do you intend to chlorinate all your drinking water? 0 ☐ Not at all · 1 ☐ A little · 2 ☐ Quite · 3 ☐ Much · 4 ☐ Very much
Habit	How much do you feel that you chlorinate your drinking water habitually or not habitually? 0 ☐ Not habitually · 1 ☐ A little habitually · 2 ☐ Quite habitually · 3 ☐ Habitually · 4 ☐ Very habitually

Sample questions for water treatment with chlorine – psychosocial factors	
Psychosocial factors	**Question example with response scale**
Health Knowledge	"I will present you some potential causes of diarrhea. Could you please tell me for each whether it is a cause of diarrhea or not?" Eating contaminated food: 0 ☐ No · 1 ☐ Yes · 9 ☐ Do not know Mosquito bite: 1 ☐ No · 0 ☐ Yes · 9 ☐ Do not know Walking in the sun for a long distance: 1 ☐ No · 0 ☐ Yes · 9 ☐ Do not know Drinking contaminated water: 0 ☐ No · 1 ☐ Yes · 9 ☐ Do not know
Vulnerability	How high or low do you feel is the risk that your child under the age of five years contracts diarrhea? -4 ☐ Very high · -2 ☐ High · 0 ☐ Either high or low · 2 ☐ Low · 4 ☐ Very low
Severity	Imagine your child under the age of five years contracted diarrhea, how much do you think would that be severe or not severe? 0 ☐ Not severe · 1 ☐ A little severe · 2 ☐ Quite severe · 3 ☐ Severe · 4 ☐ Very severe

Sample questions for water treatment with chlorine – psychosocial factors (continued)	
Psychosocial factors	**Question example with response scale**
Beliefs about Costs and Benefits	How much do you think that chlorinating all your drinking water is time-consuming or not time-consuming? 0 ☐ Not time-consuming 1 ☐ A little time-consuming 2 ☐ Quite time-consuming 3 ☐ Time-consuming 4 ☐ Very time-consuming How much do you think that chlorinating all your drinking water is costly or not costly? 0 ☐ Not costly 1 ☐ A little costly 2 ☐ Quite costly 3 ☐ Costly 4 ☐ Very costly
Feelings	How much do you like or dislike the taste of chlorinated drinking water? -4 ☐ Dislike it much -2 ☐ Dislike it 0 ☐ Either like or dislike it 2 ☐ Like it 4 ☐ Like it much
Others' Behavior	How many people of your community chlorinate all their drinking water? 0 ☐ (Almost) nobody (0%) 1 ☐ Less than half of them (25%) 2 ☐ Half of the them (50%) 3 ☐ More than half of them (75%) 4 ☐ (Almost) all of them (100%)
Others' (Dis)Approval	People who are important to you, how much do they approve or disapprove chlorination of drinking water? -4 ☐ They disapprove of it much -2 ☐ They disapprove of it 0 ☐ They either approve or disapprove of it 2 ☐ They approve of it 4 ☐ They approve of it much
Personal Importance	How strongly do you feel personally obliged or not obliged to chlorinate all your drinking water? 0 ☐ Not obliged 1 ☐ A little obliged 2 ☐ Quite obliged 3 ☐ Obliged 4 ☐ Very obliged
How-to-do Knowledge	Can you please tell me all the different steps to correctly chlorinate your drinking water? If water is turbid, filter the water through a clean cotton cloth. 0 ☐ Not mentioned 1 ☐ Mentioned Add the needed amount of chlorine to the water 0 ☐ Not mentioned 1 ☐ Mentioned Cover the storage container 0 ☐ Not mentioned 1 ☐ Mentioned Wait at least 30 min until drinking the water 0 ☐ Not mentioned 1 ☐ Mentioned

Sample questions for water treatment with chlorine – psychosocial factors (continued)	
Psychosocial factors	**Question example with response scale**
Confidence in Performance	How confident or unconfident are you that you can chlorinate your drinking water? -4 ☐ Very unconfident -2 ☐ Unconfident 0 ☐ Either confident or unconfident 2 ☐ Confident 4 ☐ Very confident
Confidence in Continuation	How confident or unconfident are you that you can continuously chlorinate all your drinking water? -4 ☐ Very unconfident -2 ☐ Unconfident 0 ☐ Either confident or unconfident 2 ☐ Confident 4 ☐ Very confident
Confidence in Recovering	"Imagine you have stopped chlorinating your drinking water for several days, for example because there was no chlorine available. How confident or unconfident are you to start continuously chlorinating all your drinking water again?" -4 ☐ Very unconfident -2 ☐ Unconfident 0 ☐ Either confident or unconfident 2 ☐ Confident 4 ☐ Very confident
Action Planning	Do you have a plan when during the day to chlorinate your drinking water? 0 ☐ No 1 ☐ Yes *If yes:* Can you please specify when? …… Do you have a plan how much water to chlorinate per day? 0 ☐ No 1 ☐ Yes *If yes:* Can you please specify how much of your drinking water you plan to chlorinate? ……
Action Control	How keenly do you try to chlorinate all your drinking water? 0 ☐ Not at all 1 ☐ A little 2 ☐ Quite 3 ☐ Much 4 ☐ Very much
Barrier Planning	Do you have a plan how you can treat all your drinking water even if there is no chlorine at home? 0 ☐ No 1 ☐ Yes *If yes:* Can you please specify how? ……
Remembering/Forgetting	How often does it happen that you intend to chlorinate your drinking water but then forget to do it? 0 ☐ (Almost) never (0%) 1 ☐ Less than half of the times (25%) 2 ☐ Half of the times (50%) 3 ☐ More than half of the times (75%) 4 ☐ (Almost) always (100%)
Commitment	How much do you feel committed or not committed to chlorinating all your drinking water? 0 ☐ Not committed 1 ☐ A little committed 2 ☐ Quite committed 3 ☐ Committed 4 ☐ Very committed

Sample questions for water treatment with chlorine – contextual factors	
Contextual factors	**Question example with answer format**
Age of the respondent	How old are you? …… years
Education	How many years of formal education did you attend? …… years
Household's income	What is the monthly income of your household? …… Kenyan Shilling
Price of chlorine	What is the price to buy chlorine? …… Kenyan Shilling for what kind of product?
Availability of chlorine	On how many days in a month is chlorine available in a nearby shop? …….days/month

Example 2.1.2: Sample introduction for a handwashing study in Ethiopia

Please note: The specific purpose of this study, handwashing, was not disclosed. Instead, only the general purpose was mentioned, routine domestic practice and child care. This was necessary to minimize any potential influence of the introduction on subsequent questions. In addition, the introduction served to identify the interview's target households, those with a child under the age of 5 years, and target participants, the person responsible for childcare and food preparation.

Hello, my name is ……., and I work for Eawag, the Swiss Federal Institute of Aquatic Science and Technology. We are conducting a research study on routine domestic practices and child care. Is there a child under 5 years in your household?

Interviewer: If yes, continue. If no, thank the household for their time; explain that the household is not eligible for the study and leave.

I would like to speak with the person of the household that is responsible for childcare and preparing food.

Interviewer: If the target person has not been present before, repeat your introduction to her/him.

Informed consent:

If you don't mind, I would like to interview you. It will take about an hour.

Other households in your community and other communities in Ethiopia are being interviewed as well. Your participation in this study will help us better understand domestic practices and child care in your region. You may leave the interview with a better understanding and appreciation of your routine domestic practices and child care.

During the interview, I will ask you several questions about your routine domestic practices and child care. You will be asked to give your thoughts and opinions. There are no correct or wrong answers, and we are not interested in any particular answers, just in the answers that really represent your opinion.

All the information you provide is confidential. Your name will not be disclosed anywhere and the results will be treated anonymously.

Participation in this study is voluntary. You don't have to answer any question you don't want to. If you decide not to participate, there will not be any negative consequences.

Do you have any questions? Do you agree to participate in this study? If so, could you please sign this form?

Example 2.1.3: Direct observation example

Household observations can be used to directly observe handwashing behavior together with defecation practices. Here, a trained observer watches and records all or some household members' handwashing at key times. Household observations last for approximately two to seven hours and should ideally start in the early morning when many critical behaviors occur, such as morning defecation, food preparation, and eating. The observer records each key event (e.g. food preparation, defecation) in an observation manual, along with information on the actor (primary caregiver, grandmother, father, sister etc.), whether hands are washed or not, and if so, whether soap is used.

Here is an example of one observation record of the key event feeding/breastfeeding in a 2.5h household observation. Corresponding sections have to be prepared for all other key events.

Which child was fed?

1 ☐ Index child: the youngest child in a household
2 ☐ Sister of the index child
3 ☐ Brother of the index child
9 ☐ Other: ……

Who fed/breastfed the child?

1 ☐ Primary caregiver
2 ☐ Mother of the index child
3 ☐ Sister of the index child
4 ☐ Grandmother of the index child
9 ☐ Other: ……

Immediately before feeding/breastfeeding did the person . . .

0 ☐ Not clean hands
1 ☐ Wash one hand with WATER ONLY
2 ☐ Wash both hands with WATER ONLY
3 ☐ Wash one hand with SOAP and water
4 ☐ Wash both hands with SOAP and water
5 ☐ Wash hands in soapy water
6 ☐ Take a bath/wash body parts
9 ☐ Other: ……..
99 ☐ Unable to see

Where did water for handwashing come from?

0 ☐ Hands not cleaned at all
1 ☐ Hands cleaned without water
2 ☐ From a container near the toilet facility
3 ☐ From a container near the cooking place
4 ☐ From a container elsewhere in the compound
5 ☐ From a container elsewhere in the house
6 ☐ Laundry water
9 ☐ Other: …….
99 ☐ Unable to see

Where did soap for handwashing come from?

0 ☐ No soap used
1 ☐ Soap kept near water source
2 ☐ Soap distant from water source
9 ☐ Other: ……
99 ☐ Unable to see

What was fed and how was it fed?

1 ☐ Breastfeeding
2 ☐ Food served with hands
3 ☐ Food served with eating utensils
9 ☐ Other: ……..
99 ☐ Unable to see

Immediately after feeding/breastfeeding did the person . . .

0 ☐ Not clean hands
1 ☐ Wash one hand with WATER ONLY
2 ☐ Wash both hands with WATER ONLY
3 ☐ Wash one hand with SOAP and water
4 ☐ Wash both hands with SOAP and water
5 ☐ Wash hands in soapy water
6 ☐ Take a bath/wash body parts
9 ☐ Other: ……..

Example 2.1.4: Spot-check examples

Water treatment – solar water disinfection (SODIS)

Interviewer: Observe the following:

Are there any PET bottles placed outside the house?

[1] ☐ Yes [0] ☐ No

How many? ……

Where? ……

Are they in the sun?

[1] ☐ Yes [0] ☐ No

Water container maintenance

Can you show me the container in which you store your drinking water?

[1] ☐ Yes [0] ☐ No

Interviewer: Observe the following:

Does the storage container have a cover?

[1] ☐ Yes [0] ☐ No

If yes: Is it presently fully covered?

[2] ☐ Yes, fully covered
[1] ☐ No, only partly covered
[0] ☐ No, not covered at all

Does the storage container have a tap or an additional narrow opening (<5cm) to pour out water?

[2] ☐ Yes, a tap
[1] ☐ Yes, a narrow opening (<5cm)
[0] ☐ No, neither a tap nor a narrow opening

Is the inside of the storage container clean?

[1] ☐ No dirt visible inside [0] ☐ Dirt visible inside

Is the outside of the storage container clean?

[1] ☐ No dirt visible outside [0] ☐ Dirt visible outside

Is the storage container in an elevated position?

[1] ☐ Yes [0] ☐ No

Open defecation and latrine use

Interviewer: Observe the following:

Are there any human excreta inside the house?

[1] ☐ Yes [0] ☐ No

Are there any human excreta outside but in close proximity to the house?

[1] ☐ Yes [0] ☐ No

Are there any human excreta in the wider surrounding of the house?

[1] ☐ Yes [0] ☐ No

Do you have access to a latrine for defecation?

[1] ☐ Yes [0] ☐ No

If yes: Can you please show it?

[1] ☐ Yes [0] ☐ No

What is the material of the slab?

[1] ☐ Concrete
[2] ☐ Wood
[3] ☐ Bamboo and clay
[9] ☐ Other: ……

Are there any cracks or holes in the slab?

[1] ☐ Yes [0] ☐ No

Is there a lid to cover the slab opening?

[1] ☐ Yes [0] ☐ No

Is the slab opening presently covered?

[1] ☐ Yes [0] ☐ No

Is the slab even?

[1] ☐ Yes [0] ☐ No

Is the slab easy to sweep?

[1] ☐ Yes [0] ☐ No

Which devices are present to clean the latrine?

0 ☐ None
1 ☐ Brush
9 ☐ Other: ……..

Cleanliness of the latrine

2 ☐ Clean, no dirt, no excrements
1 ☐ Quite clean, some dirt but no excrements
0 ☐ Dirty, dirt and excrements

Does the latrine smell (fecal odors)?

1 ☐ Yes 0 ☐ No

Are flies present?

1 ☐ No flies present at all
0 ☐ Flies present

Which devices are present for anal cleansing?

0 ☐ None
1 ☐ Water
2 ☐ Leaves
3 ☐ Paper
9 ☐ Other: ……

Handwashing

Does your family have a designated place for handwashing?

1 ☐ Yes 0 ☐ No

If yes: Can you please show me the place?

1 ☐ Yes 0 ☐ No

Interviewer: Observe the following:

Where is the hand washing place located?

1 ☐ Inside the house 2 ☐ Outside the house

Is the place within 10 paces of the cooking place/fire?

1 ☐ Yes 0 ☐ No

Is the place within 10 paces of the latrine/defecation place?

1 ☐ Yes 0 ☐ No

Which water device is present for handwashing?

0 ☐ None
1 ☐ Running water with tap
2 ☐ Container with tap
3 ☐ Tippy tap
4 ☐ Kettle
5 ☐ Mug
9 ☐ Other: ……

Is it possible to wash both hands WITHOUT assistance?

1 ☐ Yes 0 ☐ No

Is water present?

1 ☐ Yes 0 ☐ No

Is soap present?

1 ☐ Yes 0 ☐ No

Which other handwashing agents are present?

0 ☐ None
1 ☐ Ash
2 ☐ Sand
5 ☐ Other: :……

Experiences of an implementing NGO

Gains

Because developing the questionnaire was a key step in the approach, greater attention was given to this task than in other surveys. The elaboration of the questionnaire in a group has built up know-how and created awareness of the importance of formulating questions in a precise way in our WaSH teams in Mali, Benin, and Mozambique. Additionally, it has allowed experimentation with new methods of data collection using mobile phones.

Challenges

The most challenging aspect was formulating the questions in such a way that they elicit the information to be collected with all its nuances but are clear and short in the local language. A key issue was to find answer categories for the scale questions that can be translated into the local languages.

Questions regarding behavior like defecation are very personal and touchy. In Mali, we had long discussions about how cleaning a baby's behind and how defecating should be formulated in the local language so as not to offend the interviewee. Questions for the behavior and the risk factors were already familiar, but questions regarding norms and self-regulating factors are new and need more reflection on the part of the team.

In the first pilot country, Mali, the questionnaire on handwashing was still rather long. The challenge in the other countries was to reduce the questionnaire without losing the added value of the RANAS approach.

Coping with Challenges

The most efficient way to develop the questionnaire was to work in a small group consisting of the project manager, the person responsible for the survey and data analysis, and a representative of the field staff who speaks the local languages and knows the communities well. This helped to formulate the questions in a simple and culturally sensitive way. At the same time, the project staff became familiar with the questionnaire, which is of great help for the translation and the interviewer training. In our first pilot in Mali, we developed the questionnaire before giving it to the project team, but this is not advisable. A lot of additional discussions were necessary to create a common understanding of the questionnaire with the team and the interviewers afterwards. The first time this is done, external support in the field or by Skype is advisable, but the development of the questionnaire has to be done jointly with the team right from the beginning.

As an NGO, we do not want to publish scientifically, so the questionnaire should be as short as possible for its purpose. It helps to define the maximum number of questions you want to ask per factor. Another option was chosen in a project in Pakistan that did not have the capacity to conduct a full RANAS study. There, we integrated some RANAS questions in a KAP survey questionnaire.

Depending on how the data will be collected, whether with questionnaire on paper or using a mobile-based system, special attention must be paid to the formulation of the question and answer categories. Open questions have to be reduced to a minimum, as entering such answers on a mobile phone can be tiring.

Step 2.2: Conduct a baseline survey

Overview

Introduction

The next step is to conduct the baseline survey to gain a more detailed understanding of the situation in the population. Based on the data, we then derive behavior change techniques in Phase 3. It is important to survey a relatively large sample of the population to receive a clear picture of the frequency of the behavior and the psychosocial factors. The sample of individuals selected in this step is surveyed again in Phase 4 after the intervention. Thus, we can follow their changes in behavior and psychosocial factors over time.

The key actions presented here do not all need to be executed sequentially; some can occur in parallel.

Key actions

Translate the questionnaire 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.

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. To verify the quality of the translation, it should be 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.

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 survey a sample. To receive a high-quality sample, two aspects are relevant: first, the sample size and second, the selection procedure. Tool 2.2.1 gives instructions on both aspects.

Schedule the field phase, 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 field phase and define the number of data collectors to be employed. It is necessary to know the approximate daily capacity of a data collector. 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 for handwashing:

- Duration of one interview: 45–90 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):
  - 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.

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 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.

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
- Well educated
- Socially competent
- Good communication skills
- Neither arrogant nor lecturing

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.

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.

We also have to organize the printing of the questionnaire (if not using electronic tablets or mobile phones) and transport, food, and accommodation for the data collection team.

Train the data collectors

The collection of high-quality data 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 essential step, especially when applying the RANAS approach for the first time.

Good training lasts for at least 5 days, including 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. In the latter case, at least 7 days of training are needed, including a pretest on the final day. The training includes these topics, which are discussed in more detail in the ESI 2.2:

- 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 (day 1)
- Question-by-question discussion of the questionnaire, including potential translation of key words (day 2 to day 5)
- Exercise on household selection procedure and introduction to households (e.g. day 3)
- Exercise on challenging situations in the field (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)
- Role plays to practice the interview (e.g. day 6)

It may be helpful to ask the team to complete a short evaluation form every evening to detect any difficulties in understanding the training content.

All organizational aspects for the training are listed in Tool 2.2.2.

Pretest of the survey instruments in the field

The training ends with a pretest day in the field. It is conducted in households which are not part of the sample but which share the key characteristics of the study households (e.g. their situation is also rural). They could be from community clusters not selected for the survey (see Tool 2.2.1 for selection of communities and clusters). 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 target population understands 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 spot checks, and the direct observation manual. Bear in mind that when you change questions, the new formulations have to be translated as well.

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 Tool 2.2.3. 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: RANAS survey.
- Information on the population figures of the project region and the communities.

Typical challenges

- To find a skilled translator that speaks the local language/dialect.
- To find skilled data collectors who speak the local language/dialect.

- To obtain adequate information on the population figures.
- To standardize the way in which the data collectors ask the questions and conduct the spot checks and direct observations.
- To convince the data collectors that some questions are possible to ask, even though they may at first think they are not.

Outputs

Survey data from a sample of the target population group.

Tools and examples

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

Sample size calculation

To define the sample size, we first have to obtain information on population figures in our 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.

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.

Note: True random sampling is the best sampling strategy. However, complete household lists are rarely available in developing countries.

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.

Tool 2.2.2: Instructions for the organization of the data collector training

For the training, organize:

- A room which is large enough for small groups to work in and with a wall suitable for projection
- Projector
- Computer for presentations and to present the survey instruments
- Sufficient printed versions of the survey instruments
- Writing or clipboards (for a paper and pencil survey)
- Tablets or mobile phones (for an electronic survey)
- Notebooks and pens
- Flipchart and pens
- Printed training schedule
- Printed list with names and phone numbers of the team, including supervisors
- Identity cards for the data collectors
- Copies of the letter(s) of support for all data collectors
- Food and drink for lunch and coffee breaks.

Tool 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.
- 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.

Experiences of an implementing NGO

Gains

Because the survey was of particular importance, greater attention was given to the training of the interviewers, which was of great value for the quality of the data collected. It was important to realize that relatively sensitive questions can be understood and answered by local people.

Challenges

The sample selection can be tricky. In Mozambique, the project is a local government-led project. At the time of the baseline, the local government had not yet defined the future intervention areas. This led to a situation in which the intervention based on the study was not necessarily applied in the study area, which hampered the evaluation of the intervention afterwards.

It is important to take into account the seasonality of households' workloads and local events during the planning of the survey, as well as the composition of the interviewer team in terms of gender. In Mali, the project team first chose only men as interviewers, because they could move around on motor bikes. Realizing that the target interviewees of the questionnaire were women, the composition of the interviewer team was changed. This had an impact on the logistics, because the women could not ride motorcycles or sleep overnight in the villages.

Although the interviewers were trained, it still happened that the answers to the questions were not entered in the same way. If the study supervisors did not react immediately, this led to a lot of additional work in data cleaning later on.

Coping with Challenges

The questionnaires were not fully translated; we only focused on the translation of the main keywords, as most of the data collectors were not familiar with reading the local languages. Translating the questionnaire went well with the interviewers in Mali, because this deepened their understanding of the questionnaire and was part of the interviewer training. In Mozambique, the translation was done with the help of the local partners and the group of staff who participated in the development of the questionnaire, because it had to be translated into different local languages.

The length of interviewer training also depends on the collection mode. More time has to be allocated if a mobile-based data collection system is being used for the first time. We found in Mozambique that using mobile phones to collect data can be a motivating factor for interviewers. In remote areas, however, gaining access to electricity to recharge phones can be a challenge.

To reduce the work and cost, we reduced the sample size to a minimum of 150 households in Benin and Mali.

The survey supervisor has an important role to play and should react immediately if there is an inconsistency in responses. This allows a lot of time to be saved when entering and cleaning data.

Step 2.3: Determine the behavioral factors that steer the target behavior

Overview

Introduction

This step identifies the behavioral factors that should be tackled by interventions to change the behavior. First, the data gathered in the survey are entered into a data file, cleaned, and processed. Then, we conduct a doer/non-doer analysis. A doer/non-doer analysis compares the responses of people who do a behavior (doers) to the responses of those who do not (non-doers). A large difference between doers and non-doers in responses to a question about a behavioral factor indicates that this factor is critical; it steers the target behavior, so the factor has to be tackled by behavior change techniques (BCTs) to induce behavior change. A doer/non-doer analysis involves three steps. First, the sample is divided into doers and non-doers. Second, mean scores are calculated separately for doers and non-doers. Third, the mean scores are compared. The three steps are explained in more detail here.

Key actions

Enter, clean, and process the data

Unless we have collected the data electronically with tablets or mobile phones, we have to enter the data into a calculation program (e.g. Excel). Data entry is a simple but tiring task, and it has to be done very precisely and carefully. Accordingly, it is not only important that the data entry personnel have adequate computer skills but also that they work very precisely. When all data is entered, we have to clean and process it. Tool 2.3.1 gives some instructions for data entry, cleaning, and processing.

Divide the sample into doers and non-doers of the target behavior

For most behaviors, there is no predefined value or cut-off point at which to divide the sample into doers and non-doers. Instead, a cut-off point has to be determined based on the data. For handwashing, for example, we can decide to categorize only people who wash their hands at 100% of key events as doers, and all who wash their hands less than 100% as non-doers. However, 100% handwashing might be an unrealistic cut-off point for many populations. Therefore, a more reasonable cut-off point might be 90% handwashing prior to and after key events. In this case, people who wash hands at 90% of key events and more are doers; people who wash hands at less than 90% are non-doers. When we have defined a cut-off point, we divide the sample into doers and non-doers. In most cases, we divide the sample into doers and non-doers based on one measure; for an example, see Example 2.3.1. However, it is also possible to combine several measures. You find an example in Example 2.3.2.

Calculate the mean scores of each behavioral factor separately for doers and non-doers

For each behavioral factor (i.e. for each question), the mean score in the responses is calculated separately for doers and non-doers. Example 2.3.3 provides a fictional example for three psychosocial factors (*Health knowledge*, *Others' behavior*, and *Action control*) one open multiple-response question on the reasons for chlorinating drinking water, and two contextual factors (age and price of chlorine).

Calculation and interpretation of mean scores is quite straightforward for questions with rating scales or about factors such as age; it simply means the average of responses. For yes/no questions, the mean score equals the percentage of yes responses and should be displayed in Excel as a percentage. For open multiple-response questions, we treat every response option as a separate yes/no question; 'yes' means that that response was mentioned and 'no' means that that response was not mentioned. See Tool 2.3.1 and Example 2.3.1 for the data entry of open multiple-response questions and Example 2.3.3 for the calculation of mean scores for open multiple-response questions.

Compare the mean scores between doers and non-doers to identify the behavior-steering factors

Next, we compare the mean scores of doers and non-doers for each behavioral factor. We calculate the differences between mean scores for doers and non-doers. The critical behavioral factors are those with the largest differences between doers and non-doers. Example 2.3.4 provides an example.

For open multiple-response questions, we have to compare each response option between doers and non-doers. When a question has many response options, this involves a great deal of effort, and one can quickly lose track of the comparisons. Therefore, we recommend measuring as many factors as possible by closed questions with rating scales (see Step 2.1).

In Example 2.3.4, the difference in psychosocial factors between doers and non-doers is smallest in *Health knowledge* (0.08), larger in *Action control* (1.46), and largest in *Perceived others' behavior* (1.54). This means that *Others' behavior* is most critical, followed by *Action control*. When we examine the reasons mentioned for chlorinating drinking water, there is a large difference in reason 2, to be a good mother, which is much more frequently mentioned by doers than by non-doers, and no difference in reason 1, to preserve health. Therefore, *Others' behavior* and action control should be targeted through BCTs as well as being a good mother. In the contextual factors, doers and non-doers differ in age (doers are on average 8.69 years older than non-doers) but only marginally in their households' monthly income (146 Kenyan Shilling). Of course, we cannot change participants' ages. However, we can tailor our interventions to the critical age group, in this case young adults.

Note that a doer/non-doer analysis was essential to determine the critical behavioral factors; a simple calculation of the mean scores in the population would have yielded other, potentially misleading, results. In this instance, examining the mean scores in the population could have led to the conclusion that *Health knowledge* was the most critical to target, as *Health knowledge* is quite low (see cell G32, bordered in violet in Example 2.3.1). However, the doer/non-doer analysis shows that doers and non-doers differ only marginally in *Health knowledge* (see cells bordered in violet in Example 2.3.4). In other words, *Health knowledge* cannot explain why some people chlorinate their drinking water (doers) while others do not (non-doers). Thus, *Health knowledge* is not a critical behavioral factor and should not be prioritized in an intervention.

Key resources and information

- Result from 2.2: collected data.
- Skilled and trained data entry personnel.
- Skilled and trained data analysis personnel.

Typical challenges

- To find people with computer skills appropriate for data entry.
- To find people with knowledge appropriate for data analysis.
- To define a meaningful cut-off point between doers and non-doers.
- To decide which factors are most important in steering the behavior.

Outputs

The behavioral factors steering the target behavior are determined. These are the factors that we want to tackle through our interventions.

Tools and examples

Tool 2.3.1: Instructions for data entry, cleaning, and processing

Data entry

Prepare an Excel sheet as follows.

- One row = one participant: see row 15, bordered in green in Example 2.3.1.
- One column = one question (exception: open multiple-response questions): see column I, bordered in orange in the Excel sheet on the next page.
- One cell = the response of one person to one question: see cell H8, bordered in red in Example 2.3.1.

For single-response questions with response options, enter the data as follows.

- Enter the number next to the selected box.
- If no response option is selected, enter -99. When we clean the data in the next step, we will not have to go back to the questionnaire to verify whether there is a value entered in these cells; we already know that the question was not answered.

For open questions without response options or the response option “other”, enter the data as follows.

- Enter the responses.
- If no answer has been written, enter -99 (this does not apply for “other”).
- Try to find recurring responses and define categories.
- Attribute numbers to the response categories.
- Add an additional column to the Excel sheet.
- Enter the number for each response in the new column.

For open multiple-response questions, enter the data as follows.

- One column = one response option: see column K, bordered in blue in Example 2.3.1.
- Enter the value 1 for each selected response and the value 0 for all other responses.

Data cleaning

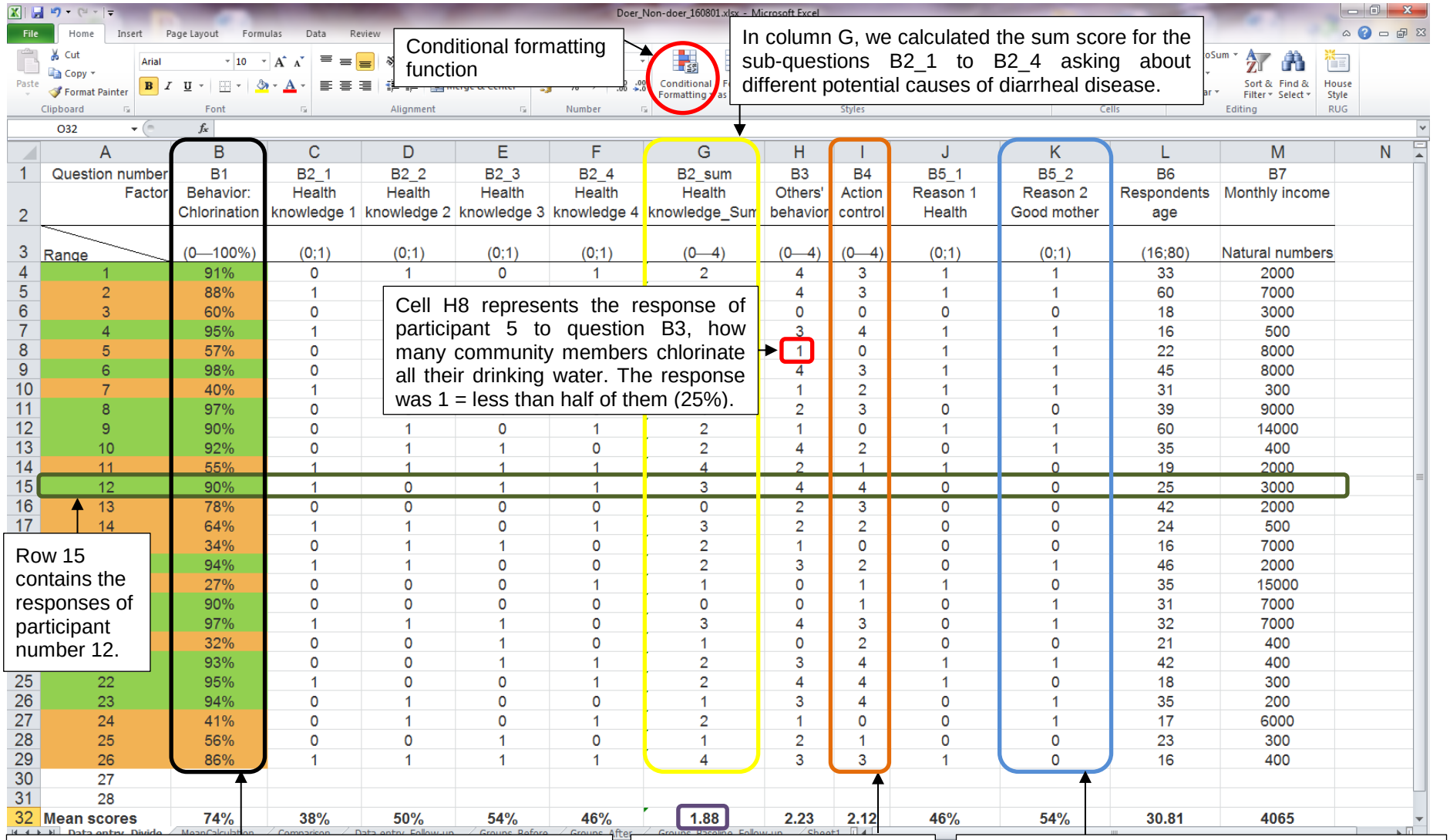
Before proceeding, we have to check whether the data was correctly entered and if necessary correct it. Of course, we cannot check every single value. However, we can check (1) whether there are any missing values, namely empty cells, and (2) whether there are questions with values outside the possible range of response options. The conditional formatting function in Excel is a helpful tool for this: see function circled in red in Example 2.3.1. If we find empty cells or values outside the possible range of response options, we have to go back to the questionnaire to find the missing or correct values.

Data processing

Sometimes, it is necessary to combine the responses to some questions or to some question parts before analyzing the data. Here are some examples.

- To calculate the mean value of the responses to all questions measuring self-reported handwashing at different key times separately for each participant.
- To sum the responses to the questions on health knowledge separately for each participant: see column G, bordered in yellow in Example 2.3.1.

Example 2.3.1: Data entry and division of the sample into doers and non-doers



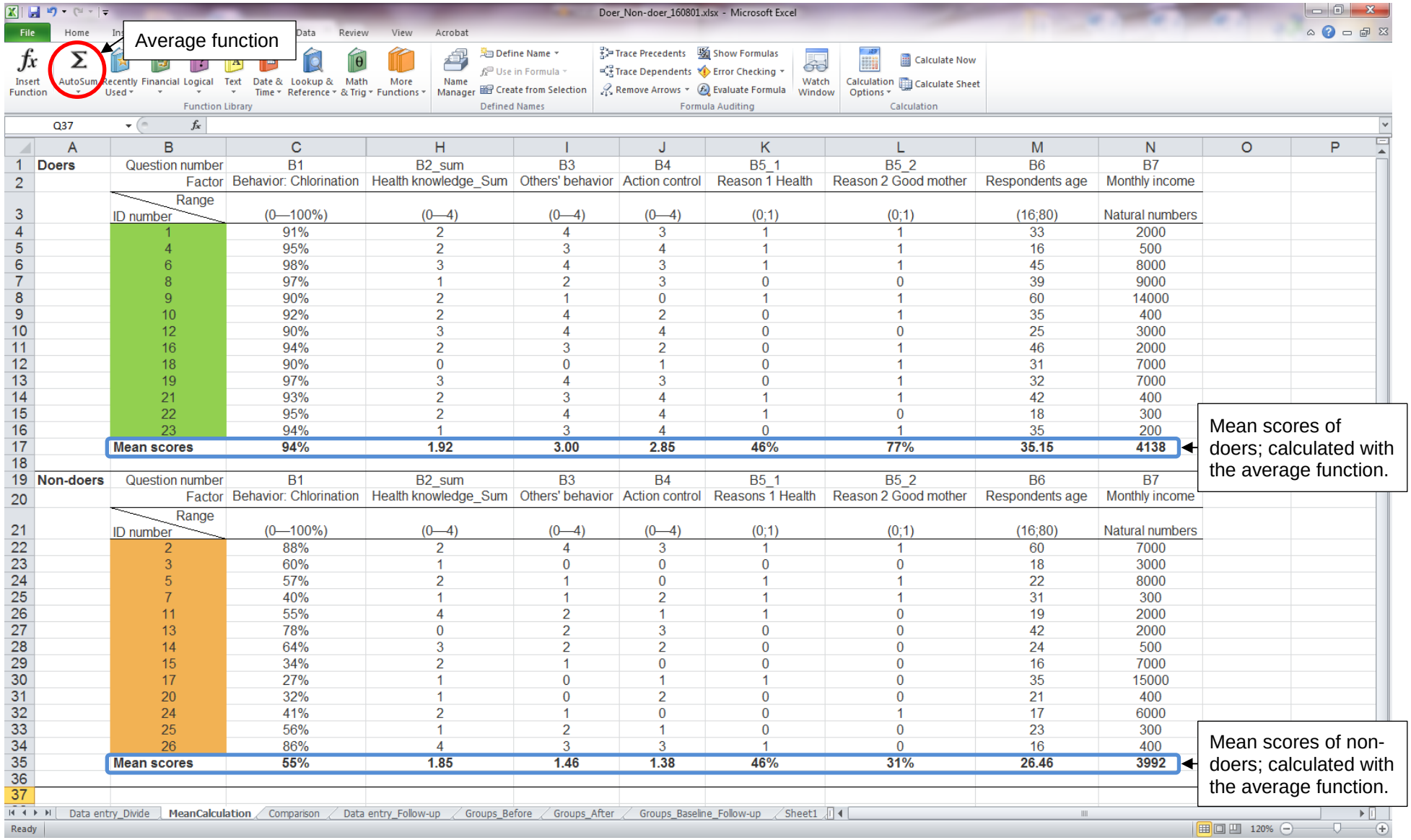
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Question number	B1	B2_1	B2_2	B2_3	B2_4	B2_sum	B3	B4	B5_1	B5_2	B6	B7
2	Factor	Behavior: Chlorination	Health knowledge 1	Health knowledge 2	Health knowledge 3	Health knowledge 4	Health knowledge_Sum	Others' behavior	Action control	Reason 1 Health	Reason 2 Good mother	Respondents age	Monthly income
3	Range	(0—100%)	(0;1)	(0;1)	(0;1)	(0;1)	(0—4)	(0—4)	(0—4)	(0;1)	(0;1)	(16;80)	Natural numbers
4	1	91%	0	1	0	1	2	4	3	1	1	33	2000
5	2	88%	1					4	3	1	1	60	7000
6	3	60%	0					0	0	0	0	18	3000
7	4	95%	1					3	4	1	1	16	500
8	5	57%	0					1	0	1	1	22	8000
9	6	98%	0					4	3	1	1	45	8000
10	7	40%	1					1	2	1	1	31	300
11	8	97%	0					2	3	0	0	39	9000
12	9	90%	0	1	0	1	2	1	0	1	1	60	14000
13	10	92%	0	1	1	0	2	4	2	0	1	35	400
14	11	55%	1	1	1	1	4	2	1	1	0	19	2000
15	12	90%	1	0	1	1	3	4	4	0	0	25	3000
16	13	78%	0	0	0	0	0	2	3	0	0	42	2000
17	14	64%	1	1	0	1	3	2	2	0	0	24	500
		34%	0	1	1	0	2	1	0	0	0	16	7000
		94%	1	1	0	0	2	3	2	0	1	46	2000
		27%	0	0	0	1	1	0	1	1	0	35	15000
		90%	0	0	0	0	0	0	1	0	1	31	7000
		97%	1	1	1	0	3	4	3	0	1	32	7000
		32%	0	0	1	0	1	0	2	0	0	21	400
		93%	0	0	1	1	2	3	4	1	1	42	400
25	22	95%	1	0	0	1	2	4	4	1	0	18	300
26	23	94%	0	1	0	0	1	3	4	0	1	35	200
27	24	41%	0	1	0	1	2	1	0	0	1	17	6000
28	25	56%	0	0	1	0	1	2	1	0	0	23	300
29	26	86%	1	1	1	1	4	3	3	1	0	16	400
30	27												
31	28												
32	Mean scores	74%	38%	50%	54%	46%	1.88	2.23	2.12	46%	54%	30.81	4065

Example 2.3.2: Divide sample into doers and non-doers based on the cut-off points of several handwashing measures

In this example, we divide the sample into doers and non-doers based on several measures. Only if a participant is above the cut-off point for all measures is she or he a doer. In all other cases, the person is classified as a non-doer.

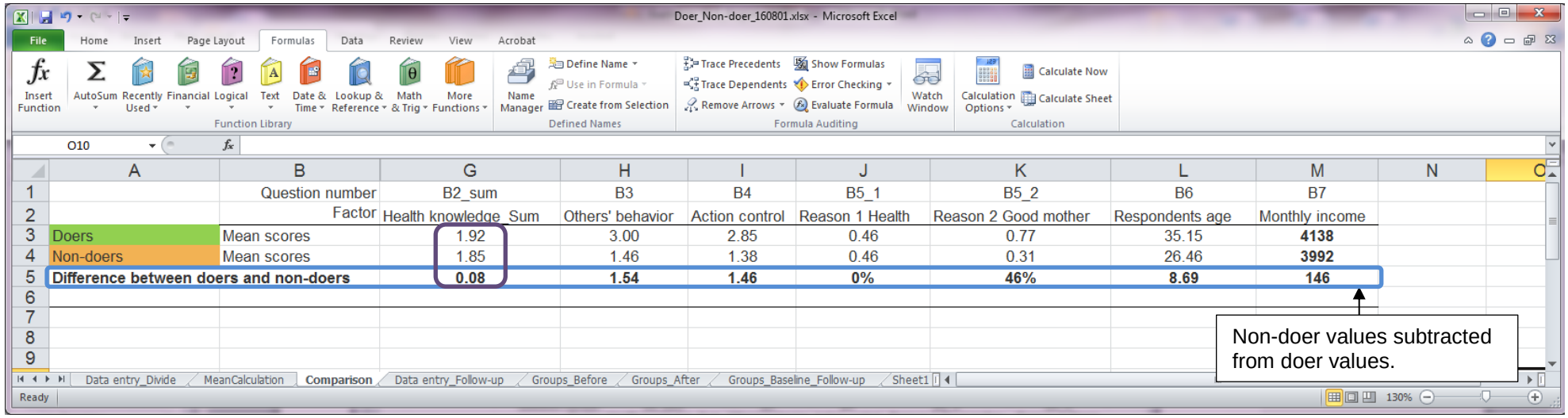
Cut-off points of several handwashing measures		
Measures	**Response option above cut-off**	**Response options below cut-off**
Behavior: “Imagine that you have just returned from your morning work (looking for firewood, going to the fields etc.) and your baby is hungry. Please describe in as much detail as possible what you do between returning home and feeding your baby.”	[2] ☐ Handwashing with SOAP mentioned	[0] ☐ Handwashing not mentioned [1] ☐ Handwashing with WATER mentioned
Behavior: “Before eating, how often do you wash your hands with soap and water?”	[4] ☐ (Almost) always (100%)	[0] ☐ (Almost) never (0%) [1] ☐ Seldom (25%) [2] ☐ Sometimes (50%) [3] ☐ Often (75%)
Spot check: Is water present at the place designated for handwashing?	[1] ☐ Yes	[0] ☐ No
Spot check: Is soap present at the place designated for handwashing?	[1] ☐ Yes	[0] ☐ No

Example 2.3.3: Separate calculation of mean scores and percentage of mentions of behavioral factors for doers and non-doers



	A	B	C	H	I	J	K	L	M	N
1	**Doers**	Question number	B1	B2_sum	B3	B4	B5_1	B5_2	B6	B7
2		Factor	Behavior: Chlorination	Health knowledge_Sum	Others' behavior	Action control	Reason 1 Health	Reason 2 Good mother	Respondents age	Monthly income
3		Range / ID number	(0—100%)	(0—4)	(0—4)	(0—4)	(0;1)	(0;1)	(16;80)	Natural numbers
4		1	91%	2	4	3	1	1	33	2000
5		4	95%	2	3	4	1	1	16	500
6		6	98%	3	4	3	1	1	45	8000
7		8	97%	1	2	3	0	0	39	9000
8		9	90%	2	1	0	1	1	60	14000
9		10	92%	2	4	2	0	1	35	400
10		12	90%	3	4	4	0	0	25	3000
11		16	94%	2	3	2	0	1	46	2000
12		18	90%	0	0	1	0	1	31	7000
13		19	97%	3	4	3	0	1	32	7000
14		21	93%	2	3	4	1	1	42	400
15		22	95%	2	4	4	1	0	18	300
16		23	94%	1	3	4	0	1	35	200
17		**Mean scores**	**94%**	**1.92**	**3.00**	**2.85**	**46%**	**77%**	**35.15**	**4138**
18										
19	**Non-doers**	Question number	B1	B2_sum	B3	B4	B5_1	B5_2	B6	B7
20		Factor	Behavior: Chlorination	Health knowledge_Sum	Others' behavior	Action control	Reasons 1 Health	Reason 2 Good mother	Respondents age	Monthly income
21		Range / ID number	(0—100%)	(0—4)	(0—4)	(0—4)	(0;1)	(0;1)	(16;80)	Natural numbers
22		2	88%	2	4	3	1	1	60	7000
23		3	60%	1	0	0	0	0	18	3000
24		5	57%	2	1	0	1	1	22	8000
25		7	40%	1	1	2	1	1	31	300
26		11	55%	4	2	1	1	0	19	2000
27		13	78%	0	2	3	0	0	42	2000
28		14	64%	3	2	2	0	0	24	500
29		15	34%	2	1	0	0	0	16	7000
30		17	27%	1	0	1	1	0	35	15000
31		20	32%	1	0	2	0	0	21	400
32		24	41%	2	1	0	0	1	17	6000
33		25	56%	1	2	1	0	0	23	300
34		26	86%	4	3	3	1	0	16	400
35		**Mean scores**	**55%**	**1.85**	**1.46**	**1.38**	**46%**	**31%**	**26.46**	**3992**
36										
37										

Example 2.3.4: Comparing the mean scores of doers and non-doers



	A	B	G	H	I	J	K	L	M
1		Question number	B2_sum	B3	B4	B5_1	B5_2	B6	B7
2		Factor	Health knowledge_Sum	Others' behavior	Action control	Reason 1 Health	Reason 2 Good mother	Respondents age	Monthly income
3	Doers	Mean scores	1.92	3.00	2.85	0.46	0.77	35.15	**4138**
4	Non-doers	Mean scores	1.85	1.46	1.38	0.46	0.31	26.46	**3992**
5	**Difference between doers and non-doers**		**0.08**	**1.54**	**1.46**	**0%**	**46%**	**8.69**	**146**

Experiences of an implementing NGO

Gains

The data analyses can be done with Excel and do not need any statistical knowhow. Doing the whole data analysis on our own allowed us to build up capacity for data managing in the team. This is also helpful for further monitoring and evaluation work.

Challenges

- The cleaning and analysis of the data is a full-time job involving several days' work for one person. The time needed should not be underestimated; this work cannot be done in one or two hours besides all the other daily tasks.
- In Mozambique, data collection was done with mobile phones for the first time. This reduced a lot of the work of data entry, but some of the answer categories were not well defined, which led to additional work during the data cleaning process.
- Finding a person who has knowledge of Excel and likes to play with numbers is not always easy.
- With the RANAS approach, you calculate the difference between doers and non-doers and not the percentage of a certain factor in the whole population, for example percentage of people who like the smell of soap. This is new, and it took time for the team in Benin and Mozambique to understand the logic.
- The analysis can be tricky. High score and high difference do not necessarily mean that this factor has to be tackled, but it has to be looked at individually and linked to the question. For example, in Benin the non-doers had a high score compared to the doers regarding the question about *Perceived vulnerability* in relation to their actual behavior. The first reaction was that we should address *Perceived vulnerability*; it was only on closer examination that we realized this was telling us that the non-doers already had enough knowledge about the risk they were taking.

Coping with challenges

- A color code for the different types of question is of great help and reduces mistakes if the data is entered into Excel manually.
- Although one person does the data analysis, it is important to have a second person who has some basic knowledge and can act as a sparring partner by taking a critical view. This is especially important for the work of coding open questions.
- The definition of the cut-off level between doers and non-doers should be discussed in the project team and not simply decided by the data analyst. Adaptations can then be made in the case of too low a level of doers or non-doers.
- A clear and step-by-step instruction for the data cleaning and analysis were developed for all pilot countries. After the data cleaning and the first analysis, the work was crosschecked by another person to eliminate mistakes.
- The result of the analysis has to be discussed in the group. They should bear the corresponding question in mind to avoid misinterpretation. Additionally, it helps to have a good common understanding of the results when developing behavior change techniques in the next step.

Phase 3: Select behavior change techniques (BCTs) and design behavior change strategies

Some behavioral factors have been identified as critical in Phase 2, and the behavior change techniques (BCTs) thought to change these factors have been selected for behavior change strategies. The BCTs have to be adapted to the local context and combined with suitable communication channels, which constitute the mode of delivery of the BCTs. Together, the BCTs and the communication channels form a behavior change strategy (see Box 3.1., Step 3.1, for the distinction between BCTs, communication channels, and behavior change strategies). In behavior change practice, BCTs and communication channels are frequently difficult to separate; it is important to remember that communication channels are the mode of delivery of BCTs.

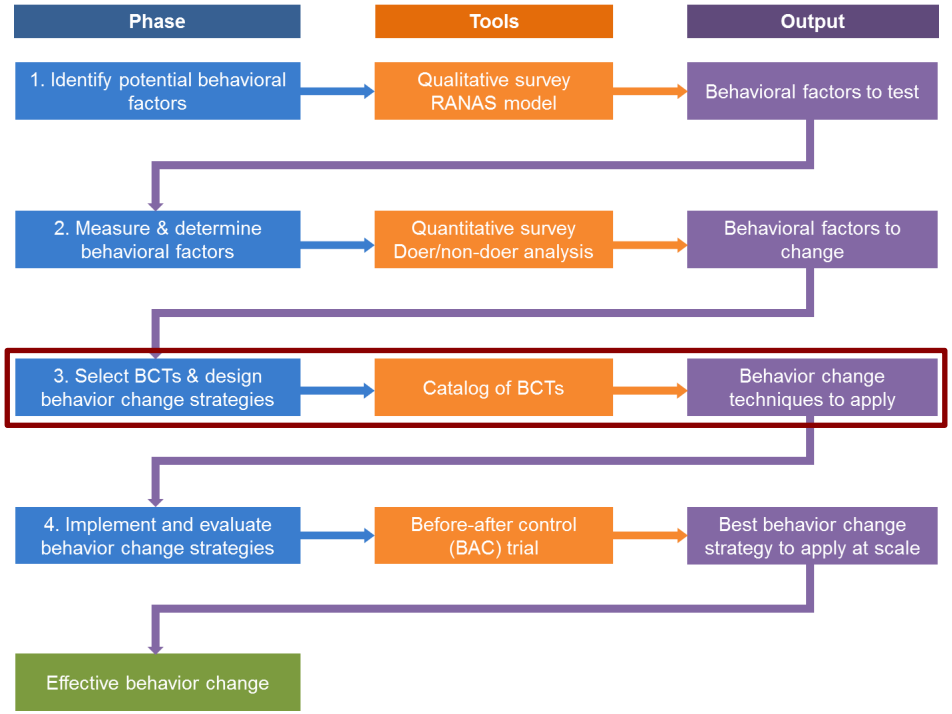


Figure 5: Flow chart of the RANAS approach to systematic behavior change.

Step 3.1: Select BCTs to change the behavior-steering factors

Overview

Introduction

In this step, behavior change techniques (BCTs) are selected to change the determinants identified in Step 2.3. A catalog of BCTs has been compiled to help achieve this. The catalogue lists which BCTs are thought to change which psychosocial factor, based on extensive evidence from environmental and health psychology. The consideration of contextual factors in this phase is also briefly discussed.

Key actions

Select BCTs that correspond to the psychosocial factors according to the RANAS approach

Behavior change techniques (BCTs) are the components of an intervention strategy designed to alter or redirect the processes that regulate behavior (see Box 3.1. for the distinction between BCTs and communication channels). BCTs are observable, replicable, and irreducible, meaning that they cannot be divided into smaller elements. To be most effective, BCTs should correspond with the psychosocial factors that were found to differ between doers and non-doers. For instance, to change *Health knowledge*, we can use two BCTs, *Present facts* and *Present scenarios*; to improve *Remembering*, we may apply *Use memory aids* and *Environmental prompts*.

Each BCT affects a specific predominant psychosocial factor (see the main psychosocial factor listed in the left-hand column below of Tool 3.1.1). However, all but one of the BCTs address more than one psychosocial factor. The exception is *Exploit persuasive attributes*, which means using the persuasive attributes of the information/testimonial source and of the message. Persuasive attributes include the competence, sympathy, credibility, fame, and publicity of the source and the length and number of arguments of the message. As every BCT requires a specific source from which a specific message is sent, *Exploit persuasive attributes* can be applied in combination with every other BCT so as to increase impact. Each BCT is briefly described in Tool 3.1.1, and examples are provided in Examples 3.1.1 and 3.1.2. An extensive description of each BCT with examples can be found in the catalog of BCTs in ESI 3.1.

Box 3.1: Distinguishing BCTs and communication channels, and behavior change strategies and campaigns

Behavior change technique (BCT): the element of an an intervention that is thought to change a behavioral factor

Communication channel: the mode of delivery through which a BCT is brought to the recipients

Behavior change strategy/intervention: the combination of a BCT with a communication channel

Behavior change campaign: several coordinated behavior change strategies

Integrate the contextual factors

BCTs mainly aim at changing psychosocial factors, not usually contextual factors, (e.g. BCT 16 *Provide infrastructure* intends to increase confidence in performance through a change in the physical context, the infrastructure). Even so, the contextual factors that differ between doers and non-doers (see Step 2.3) also have to be considered in the development of the intervention. Some contextual factors may serve to tailor the intervention to the critical group. If, for example, female household members use latrines while male members do not, the intervention should target men (see Step 2.3). Other contextual factors might have to be integrated into the interventions. For example, if households below a certain income level do not treat their water with chlorine while all others do, the non-doers might not be able to afford chlorine, which might thus have to be distributed to these poorest households (BCT 20 *Facilitate resources*). Other contextual factors might have to be

targeted before applying BCTs. If, for example, the infrastructure necessary to execute a behavior is missing or if a product is not available locally, infrastructure or product access first has to be arranged.

Note that some contextual factors, such as laws or the climate, will usually be constant, meaning they will not differ between members of your target group unless the target group contains people from different regions or countries. This also means that you will not find differences between doers and non-doers for these factors. However, these factors might still be decisive for widespread, successful behavior change and might even forestall a planned intervention. To give an obvious example, if it were legally forbidden to construct latrines in a project region, it would not be possible to promote latrine use there. Accordingly, at an early stage of the project, Step 1.2, you should check whether a constant contextual factor forestalls an intervention and thus has to be targeted first, for instance through advocacy. Most factors of the natural environment, such as the climate, are usually constant and cannot be changed. Even so, they may have to be taken into account, for example by organizing appropriate infrastructure (e.g. building latrines that are flood-resistant; BCT 16 *Provide infrastructure*).

Key resources and information

- Behavioral factors determined in Step 2.3
- Detailed description of BCTs in ESI 3.1

Typical Challenges

To select only those BCTs needed to change the identified behavioral factors and not to apply as many BCTs as possible.

Outputs

Selected BCTs to change the psychosocial factors identified in Phase 2.

Tools and examples

Tool 3.1.1: Psychosocial factors and behavior change techniques

Psychosocial factors and behavior change techniques	
Psychosocial factors	**Behavior change techniques**
Information BCTs – Risk factors	
Health Knowledge	**BCT 1 *Present facts*:** present information about the circumstances and possibilities of contracting a disease and about the relationship between a behavior and a disease.
	BCT 2 *Present scenarios*: present situations in the everyday life of the participant, showing how a certain behavior leads to a disease.
Vulnerability	**BCT 3 *Inform about and assess personal risk:*** present qualitative and quantitative assessments individually for each person in such a way that the person realizes that his/her health is at risk.
Severity	**BCT 4 *Arouse fear*:** use threatening information that stresses the severity of contracting a disease.
Persuasive BCTs – Attitude factors	
Beliefs about Costs and Benefits	**BCT 5 *Inform about and assess costs and benefits*:** provide information about costs and benefits of a behavior (omission) and conduct a cost-benefit analysis.
	BCT 6 *Use subsequent reward*: reward the person each time she/he has performed the desired behavior or achieved the behavioral outcome.
	BCT 7 *Prompt to talk to others*: invite participants to talk to others about the healthy behavior in question.
Feelings	**BCT 8 *Describe feelings about performing and about consequences of the behavior*:** present the performance and the consequences of a healthy behavior as pleasant and joyful and its omission or an unhealthy behavior as unpleasant and aversive.
Norm BCTs – Norm factors	
Others' Behavior	**BCT 9 *Inform about others' behavior*:** point out that a desired behavior has already been adopted by other persons.
	BCT 10 *Prompt public commitment*: Have people commit to a favorable behavior and make their commitment public, thus showing to others that there are people who perform the behavior.
Others' (Dis)Approval	**BCT 11 *Inform about others' approval/disapproval*:** point out that important others support the desired behavior or disapprove the unhealthy behavior.

Psychosocial factors and behavior change techniques (continued)	
Psychosocial factors	**Behavior change techniques**
Personal Importance	**BCT 12 *Prompt anticipated regret*:** bring people to imagine the concerns and regret they would feel after performing undesired behaviors which are not consistent with their personal norms of living healthily and caring for their children.
	BCT 13 *Provide a positive group identity*: describe people already engaged in the behavior in an attractive way, for example as modern and up-to-date, so as to increase the attractiveness of the behavior itself.
	BCT 14 *Prompt identification as role model*: ask participants to set a good example (e.g. for children) by engaging in the desired behavior so as to influence others' behaviors by one's own behavior.
Infrastructural, skill and ability BCTs – Ability factors	
How-to-do Knowledge	**BCT 15 *Provide instruction*:** convey knowhow to improve a person's knowledge about how to perform the behavior.
Confidence in Performance	**BCT 16 *Provide infrastructure*:** prompt and support the community or households to set up infrastructure.
	BCT 17 *Demonstrate and model behavior*: demonstrate a behavior and prompt participants to pay attention to others' performing the behavior and its consequences in their everyday life.
	BCT 18 *Prompt guided practice*: train participants in behavior enactment by giving instructions, demonstrating the behavior, letting him/her practice and giving feedback about the correctness of the performance.
	BCT 19 *Prompt behavioral practice*: prompt participants to practice the new behavior in their daily life.
	BCT 20 *Facilitate resources*: provide financial help. It may be unconditional or conditional, meaning the recipient has to contribute (e.g. with manpower) to obtain the resources.
	BCT 21 *Organize social support*: prompt participants to seek practical or emotional support from neighbors, friends, acquaintances, or relatives and/or to initiate social support groups.
	BCT 22 *Use arguments to bolster self-efficacy*: convince participants that they will be able to perform and/or maintain the desired behavior.
	BCT 23 *Set graded tasks/goals*: prompt participants to learn difficult behaviors including several tasks step by step.
Confidence in Continuation	**BCT 24 *Reattribute past successes and failures*:** prompt participants to attribute failures to a temporary lack of skill or adverse circumstances instead of to his/her deficiency and successes as personal achievements.
Confidence in Recovering	**BCT 25 *Prompt coping with relapse*:** tell participants that lapses are normal when adopting a new behavior and, though discouraging, not a sign of failure.

Psychosocial factors and behavior change techniques (continued)	
Psychosocial factors	**Behavior change techniques**
Planning & relapse prevention BCTs – Self-regulation factors	
Action Planning	**BCT 26 *Prompt specific planning*:** stimulate participants not only to formulate what she/he will do, but also when, where, and how she/he intends to achieve her or his goals.
Action Control	**BCT 27 *Prompt self-monitoring of behavior*:** invite participants to monitor their own behavior by means of recording it (e.g. frequency).
	BCT 28 *Provide feedback on performance*: give participants a feedback on their behavior performance.
	BCT 29 *Highlight discrepancy between set goal and actual behavior*: invite the participant to evaluate the actual behavior performance (e.g. correctness, frequency and duration) regularly in relation to the set behavioral goal.
Barrier Planning	**BCT 30 *Prompt coping with barriers*:** ask participants to identify barriers to behavior change and plan solutions to those barriers.
	BCT 31 *Restructure the social and physical environment*: prompt participants to remove social and physical bolsters of the undesired behavior so as to interrupt habitual procedures.
	BCT 32 *Prompt to resist social pressure*: ask participants to anticipate and prepare for negative comments from others or for pressures towards the undesired behavior.
	BCT 33 *Provide negotiation skills*: prompt participants to reflect on others' perspectives to find compromises that benefit both sides and arguments bolstering them.
Remembering	**BCT 34 *Use memory aids and environmental prompts*:** prompt the participant to install memory aids or to exploit environmental cues so as to help to remember the new behavior and to trigger it in the right situation.
Commitment	**BCT 35 *Prompt goal setting*:** invite participants to formulate a behavioral goal or intention.
	BCT 36 *Prompt to agree on a behavioral contract*: invite the participant to agree to a behavioral contract to strengthen her/his commitment to a set goal.

Example 3.1.1: Persuasive intervention on perceived costs of treated water: Example from a field study in rural Ethiopia

This is an example of applying BCT 5 *Inform about and assess costs and benefits*, to lower *Belief about costs* of fluoride-free water in Ethiopia.

Prior to the intervention phase, ten local health workers (promoters) underwent a 3-day training on persuasion techniques and on the content of the promotion. The promoters visiting households were deployed as the communication channel.

Households assigned to the cost intervention group received a promoter visit, which lasted approximately 30 minutes. The promoter first provided general information on fluoride, fluorosis and the community filter. Additionally, the households received a persuasion sheet on costs (see on the right). Next, the promoter and the head of household together calculated a household water budget (how much water is needed for drinking and cooking per day) to find out how much filtered water that particular households needs to buy at the community filter and how much they would have to spend per week if they consumed only safe water (see next page).

After completing the water budget sheet, the promoter asked for questions or concerns about the issue, and at the end thanked the household and said goodbye.

Intervention sheet on perceived costs

I would like to talk to you about the costs of treated water and find out together with you how much money you would have to spend if you decide to consume filtered water from the Community filter.

Persuasion: costly = better quality

Imagine you grow to different types of teff, the red and the white teff. You take the teff to the market.

- For how much would you sell 1 sack of red teff?
- And for how much would you sell 1 sack of white teff?
- So white teff is much more expensive than red teff?
- Why is it more expensive?
- So you think white teff is better quality teff than red teff? Even though it is both teff?

→ So, it is logical, that white teff is more expensive than red teff, because it's quality is a lot better?

Imagine you cook wat. So you can use butter of oil for cooking wat.

- Which one is better of taste? Butter or oil?
- Which one is better for your health? Butter or oil?
- Which one is more expensive? Butter or oil?
- So at the end, which one is better quality? Butter or oil?

→ So, it is logical that butter is much more expensive than oil, because it is healthier and it's quality is a lot better?

The same it is with water in Weyo Gabriel. There are different water sources. All of the sources contain a lot of fluoride, which is very dangerous for your health. Still you have to pay money for water at any water source. The community filter offers fluoride treated water, which is very good for your health because it prevents you from getting fluorosis. If you compare now for example the Community filter water with water from Shibre or Mesken Sefer water point...

- Which is better for your health?
- Which has better quality?
- Which is more expensive?

→ Even if both are water their price is different (like red and white teff or butter and oil). But it is logical that community filter water is more expensive than untreated water, because it is much healthier and it's quality is a lot better?

Personal water budget for the household

→ Take the **budget sheet** and fill it out with the family!

Personal water budget sheet

How many family members are living in your household? _____people
How many children of yours are under 13 years? _____children

Where do you normally fetch water (if you do not fetch at the Community filter)?
_____

How much does the water cost at this water point? _____Birr per _____liters

	How many cups does one child drink per day?	How many cups does one adult drink per day?	How many jugs do you use for cooking per day (including food, coffee, shai)?
cups/jugs			
liters	**0.2**	**0.2**	**1**
Total liters			
Total per day	Sum of total drinking and cooking:_____liters		
Total per week	Above multiplied by 7 days:_____liters		
Total jerrycans per week	Above divided by 20 liters:_____jerrycans of 20 L		
Total expense per week	Above multiplied by 0.50 Birr: _____Birr		

So if you want that your family only consumes filtered water you have to buy:
_____jerrycans of 20 liters per week at the Community Filter.

This will cost you _____Birr per week.

That is only _____Birr more than if you consume fluoride contaminated water.

All other water you need, for your cattle, animals, for washing and cleaning you don't have to buy at the Community Filter, you can buy untreated water, which is cheaper.

Example 3.1.2: Baseline results and corresponding BCTs to increase the consumption of safe water from safe-water kiosks in Kenya

This project's aim was to develop behavior change strategies to increase the purchase and consumption of safe water from three safe water kiosks in Kenya. A baseline survey determined the behavioral factors that explain the usage of the three Maji Safi kiosks as a drinking water source. The table below shows a summary of the survey's main results, today's situation in the communities (see left column), a description of what we aimed to achieve by means of the proposed campaign, tomorrow's situation (see middle column); and how we proposed to achieve this, the BCTs we selected (see right column).

Overall goal of the campaign: Bring community members to believe in their hearts that buying all their water at the Maji Safi Kiosk is beneficial, pleasurable, socially expected, easily accomplished and a personal key priority.

Today's situation: Currently only a small proportion of people are buying drinking water at the Maji Safi Kiosks.	**Tomorrow's situation:** At least 60% of the population within a distance of 1 kilometre around the Maji Safi Kiosks buy all their drinking water there.	**How we will achieve this:** Through an innovative population-tailored behaviour change campaign.
What non-users and irregular users (compared to main users) think and feel about the Maji Safi Kiosks today:	**What we want the target individuals to think and feel about the Maji Safi Kiosks tomorrow:**	**How we will achieve this (Behaviour Change Techniques):**
Risk factors: User groups do not differ in *Health knowledge*, *Vulnerability* to and *Severity* of diarrhoea.	No changes required.	No interventions required.
Attitude factors: • It is expensive, time-consuming and effortful to buy water there. • The water is salty and not tasty. • It is unpleasant to buy water there.	• To buy all drinking water there is inexpensive and effortless. • The water is very tasteful and not salty. • To buy water there is very pleasant.	• *Inform about and assess costs and benefits.* (BCT 5) • *Describe (positive) feelings* when buying water. (8)
Norm factors: • None of my relatives buy their water there. • Few of the community members buy their water there. • Important people don't expect me to buy my water there.	• Most of my relatives buy all their drinking water there. • Most of the community members buy all their drinking water there. • People expect me to buy all my drinking water there.	• *Inform about others' behaviour.* (9) • *Prompt public commitment.* (10) • *Inform about others' approval.* (11)
Ability factors: • It is difficult to find the time and money to buy all water there. • In light of impediments it would be difficult to keep me buying water there. • After an interruption I wouldn't be able to push me to restart to buy water there.	• It is easy to find the time and money to buy all water there. • No matter what happens, it is easy to keep me buying all water there. • After an interruption it would be easy for me to restart to buy water there.	• *Demonstrate and model behaviour.* (17) • *Use persuasive arguments to bolster self-efficacy.* (22) • *Organize social support.* (21)
Self-regulation factors: • I don't have the goal to buy water there and don't care whether I buy water there or not. • It is not important to me to buy water there. • I don't feel committed to buy water there.	• My goal is to buy all my drinking water there and I control and push myself to follow this plan. • One of my personal priorities is to buy all my drinking water there. • I feel committed to buy all my drinking water there.	• *Prompt goal setting and specific planning.* (35 and 26) • *Agree a behavioural contract.* (36) • *Prompt public commitment.* (10) • *Prompt self-monitoring.* (27)
Additional factors: • Me, my family and the community don't own the Kiosk. • It is not important to drink safe water. • I prefer to treat water at home compared to buying treated water.	• Me, my family and the community are the Kiosk's owner. • It is crucial to drink safe water. • I prefer to buy treated water compared to treating water at home.	• *Inform about others' feeling of ownership.* (additional) • *Inform about benefits of safe water and of buying treated water.* (5)

Experiences of an implementing NGO

Gains

- This step is essential, because it both supports and forces you to define action based on the results of your study and the catalog of BCTs. The catalog of BCTs is enriching and opens up discussion about new intervention options.
- Additionally, it helps to analyze the interventions completed in a project to see if they actually tackle the target factors. Even if no study has been done, the catalog can be used to assess the present intervention of a project and to identify possible gaps.
- It is important for project teams to realize that existing interventions can be used, but the main task is to ensure the right content. For example, in Benin a theater play addressing norm issues about handwashing was developed; beforehand, health risk had been treated as the main issue.

Challenges

- For the project team, it is a challenge to choose the right BCT to target the identified factors. Although we assessed and identified the factors to tackle, we tended to fall into our old behavior and plan interventions as we are used to doing, such as explaining risk. This was the case in Benin and Mozambique when the team was first asked to propose an intervention for handwashing that tackled the norms.
- The choice of BCT has to take into account the project and local resources as well as the area to be covered. It is a difference if, as in Mali, a partner NGO or, as in Mozambique, governmental staff implement the new intervention.

Coping with challenges

It makes sense to take time to identify existing activities and assess them in the light of the study results. There might be some intervention which will need only very little adaptation.

It is important to let local field staff brainstorm possible BCTs and to take time to describe the intervention in detail to ensure correct understanding of the approach. Coaching is needed to ensure quality and to avoid falling back into old patterns of behavior.

Step 3.2: Develop and design behavior change strategies

Overview

Introduction

The behavior change techniques (BCTs) have to be brought to the target population in the most effective way. Therefore, in this step we have to assign a suitable communication channel for each BCT selected in Step 3.1. For example, information about the relationship between a behavior and a disease (BCT 1: *Present facts*) can be presented through three communication channels; radio, personal communication, and leaflet. After the behavior change strategies have been compiled, they have to be designed, meaning that the exact form has to be worked out and written down.

Key actions

Combine one or several BCTs with suitable communication channels to form a behavior change strategy

Several BCTs can be combined, and they are brought to recipients through one or more communication channels, thus forming intervention strategies. BCTs are the "what" of an intervention strategy, whereas the communication channels are the "how". The communication channels can use mass media or be personal (see Box 3.2.1). Talking to people individually (interpersonal communication) better addresses motivations specific to each individual. Interpersonal channels involve one or more people communicating messages to a single person or a group of people. Many studies have shown that interpersonal channels are more effective, but more people can be reached with mass media. However, there are specific forms for using mass media (see Example 3.2.1).

The choice between mass media or personal communication channels depends on potential access to mass media, on financial resources, and on the kind of channels to which people are accustomed.

Box 3.2.1: Communication channels

Mass media communication channels:

- Print media: newspapers, brochures, leaflets, stickers, paintings
- Audiovisual media: radio, television, megaphones
- Songs, folk drama and theatre, concerts, rallies, parades, cinema shows
- Internet

Interpersonal communication channels:

Group communication:

- Community meetings
- Small-group training
- Mobilized social networks

Person-to-person communication:

- Home visits with promoters
- Opinion leaders
- Peer-to-peer communication
- From teachers through children to parents

For many BCTs, both mass media and interpersonal communication channels can be used. For example information about the circumstances under which a disease may be contracted (BCT 1: Present facts) can be presented through print mass media such as brochures, audiovisual mass media such as radio or television, and through interpersonal channels such as community meetings or home visits by promoters.

However, interpersonal channels are more effective for communicating some BCTs. The BCTs that are best communicated through interpersonal channels are those that need personal guidance (see Box 3.2.2).

Design behavior change strategies

When the behavior change strategies are set, then we begin designing these strategies. We have to give the strategies a shape (see Example 3.2.3), for instance by designing slogans (see Example 3.2.2), painting reminders or selecting well known voices for a radio advert. It is most important to adapt the strategies to the local context. For example, public commitment is demonstrated in various ways in different cultures. We recommend working together with a local creative agency, because they know best how to elicit attention and how people can be appealed to. All strategies should undergo a short field test in which they are shown to members of the target population, whose reactions are then noted.

Key resources and information

- The BCTs from Step 3.1
- Information about communication channels relevant for health issues
- Local creative agency

Typical challenges

- Not to confound BCTs and communication channels
- Avoiding reverting to one's usual behavior change strategies
- Not to create strategies which are too fancy and overly ambitious

Outputs

A number of behavior change strategies consisting of several BCTs using different communication channels.

Box 3.2.3: BCTs best communicated through interpersonal channels

Information BCTs:

- BCT 2: *Present scenarios*
- BCT 3: *Inform about and assess personal risk*

Persuasive BCTs:

- BCT 6: *Use subsequent reward*

Norm BCTs:

- BCT 12: *Prompt anticipated regret*

Infrastructure, skill and ability BCTs:

- BCT 24: *Reattribute past successes and failures*
- BCT 25: *Prompt coping with relapse*

Planning and relapse prevention BCTs:

- BCT 26: *Prompt specific planning*
- BCT 28: *Provide feedback on performance*
- BCT 30: *Prompt coping with barriers*
- BCT 31: *Restructure the social and physical environment*
- BCT 34: *Use memory aids and environmental prompts*
- BCT 36: *Prompt to agree on a behavioral contract*

Tools and Examples

Example 3.2.1: Three examples of important ways to apply mass media

Mass media role modeling

People are given advice by experts using role-model stories of community members who are perceived as attractive and similar in lifestyle to the viewers or listeners.

Entertainment-education

Popular role models and reinforcements are portrayed in various formats, such as soap operas, popular music, films, and comic books.

Behavioral journalism

Potential role models are interviewed with questions designed to elicit reasons for adopting the new behavior, skills used or acquired in adopting the behavior, and the perceived positive outcomes.

Example 3.2.2: Campaign slogans to promote safe water kiosks in Kenya

This example illustrates how a general campaign slogan, “Fetch water at our all safe water kiosk? Of course!”, can be tailored to specific behavior change techniques that address psychosocial factors in different RANAS factor blocks.

Example of tailored campaign slogans		
RANAS factor block to be addressed	**BCTs applied in the intervention strategy**	**Tailored slogan**
Norms	*Inform about others’ behavior* *Inform about others’ approval*	Fetch water at our all safe water kiosk? Of course! We do it! Do you?
Ability	*Provide models* *Inform about others behavior* *Inform about others behavior*	Fetch water at our all safe water kiosk? Of course! If they can, you can too!
Ability	*Organize social support* *Prompt guided practice*	Fetch water at our all safe water kiosk? Of course! Let’s do it together!
Self-regulation	*Prompt goal setting and specific planning* *Agree a behavioral contract* *Prompt self-monitoring*	Fetch water at our all safe water kiosk? Of course! You will do it!

Example 3.2.3 Intervention strategies to increase the consumption of safe water from safe water kiosks in Kenya

To increase the use of the three safe water kiosks in Kenya (see Example 3.1.2), we proposed four intervention strategies that apply BCTs in different combinations and through different communication channels. While all strategies combine several partly overlapping BCTs and thus target several partly overlapping key drivers, each strategy has a specific focus. The first strategy is a mass-media-based strategy that aims to increase key motivators of the kiosks’ usage such as positive attitudes, feelings, and norms. The second strategy is a community-based empowerment strategy that also targets the participants’ belief in their ability to fetch water at the kiosk and their commitment. The third strategy is a customer-to-customer promotion of the idea that fetching water at the kiosk is pleasurable and easily done. The fourth and final strategy is an individualized empowerment strategy to facilitate enacting the behavior. The four intervention strategies are summarized in the following table.

Intervention strategies		BCTs	BCT description	Communication channels		
				Mass media	Group	One-to-one
1	Mass media motivation	BCT 17: *Demonstrate and model behavior*.	Provide similar (and important) community members who are already buying water at the kiosk as role models.	Poster with picture story or radio play		
		BCT 9: *Inform about others' behavior*.	Point out that others are already buying water at the kiosk.			
		BCT 5: *Inform about and assess costs and benefits*.	Provide information about costs and benefits of buying water at the kiosk and conduct a cost-benefit analysis. This includes also the benefits of safe water and of buying treated water instead of treating water at home.			
		BCT 8: *Describe feelings about performing the behavior*.	Present buying water at the kiosk as pleasant and joyful. Present how others feel as the owners of the kiosk.			
		BCT 11: *Inform about others' approval*.	Point out that important others support buying water at the kiosk.			
2	Community-based empowerment	All five BCTs applied in strategy 1	See above (intervention strategy 1)		Community meeting	
		BCT 22: *Use persuasive arguments to bolster self-efficacy*.	Convince participants that they are able to buy water at the kiosk by emphasizing that similar others have already succeeded.			
		BCT 10: *Prompt public commitment*.	Let people publicly commit to buying water at the kiosk, thus showing to others that there are people who buy water at the kiosk.			
		BCT 19: *Prompt behavioral practice*.	Prompt people to fetch water at the kiosk.			
3	Customer-to-customer promotion	BCT 17: *Demonstrate and model behavior*.	Provide users as role models.			One-to-one at home and at kiosk
		BCT 21: *Organize social support*.	Prompt people to receive practical or emotional support from a user.			
		BCT 18*: Prompt guided practice*.	Prompt people to fetch water at the kiosk together with a user.			
		BCT 8: *Describe feelings.*	Enable people to have a positive experience when fetching water.			
		BCT 7: *Prompt to talk to others.*	Prompt (irregular) users to talk to others.			
4	Individualized empowerment	BCT 5: *Inform about and assess costs and benefits individually*.	Provide information about costs and benefits of buying water at the kiosk and conduct an *individual* cost-benefit analysis. This includes also the benefits of safe water and of buying treated water instead of treating water at home.			Household visits
		BCT 35 and 26: *Prompt goal setting and specific planning*.	Prompt people to set the goal to buy all water at the kiosk and to specify how much water per week they will buy at the kiosk, at which days they will fetch water, at what time, with whom and with which vessel.			
		BCT 36: *Prompt behavioral contract*.	Invite people to agree on a behavioral contract towards this goal.			
		BCT 27: *Prompt self-monitoring.*	Invite participants to monitor their behavior by means of recording at which days they bought how much water at the kiosk and at concurrent sources.			

Experiences of an implementing NGO

Gains

This step shows the full range of possible combinations and obliged the project team to clearly describe the behavior change campaign. In Benin, all these steps were done before a new project phase and were helpful when planning the capacity and resources needed for the behavior change strategy. for the new project.

Challenges

- The choice of communication channel has a strong influence on the sustainability of the intervention. The challenge is to find a good balance between the credibility and effectiveness of the communication channel and locally anchored structures. For example, the question in Mali and Mozambique was whether a local NGO or the governmental structure should be used as interpersonal communication channel.
- Cost is another issue which needs consideration right from the beginning in the choice of the communication channel.
- When introducing a new approach, we expect new and fancy solutions. The first reaction of the project team was disappointment that we ended up with a household visit and a theater play as communication channels after all the effort put in to the analysis and survey.

Coping with Challenges

In all three countries, both interpersonal communication, such as community meetings and household visits, and mass communication, such as theater plays and posters, are used as communication channels in the project. Enough time has to be planned to discuss the different communication channel options. This helped the team to realize what had already been done in the right way and to build on these resources.

The task for the project team was to identify which of these communication channels should be used to apply the BCT identified in Step 3.1 This also helped when estimating the cost, as these were well known activities.

Phase 4: Implement and evaluate the behavior change strategies

The efficacy of the behavior change strategies is verified with a before-after control (BAC) trial, and they are then optimized as necessary. This means that the behavior and the potential behavioral factors are measured with a questionnaire and with observations both before (Phase 2) and after (Step 4.2) implementing the strategies. Further, a control group has to be evaluated; this is to control for intervention-independent changes in behavior.

The differences before and after the strategies' implementation in behavior scores and in behavioral factor scores are calculated and compared to those of the control group. The behavior change strategies have been effective when the before-after differences in behavior and behavioral factors are larger for the group that received the strategies than for the control group. The strategies can be refined if needed. Otherwise, they can be applied directly at larger scales or in other, similar areas, backed up by the evidence that they are effective in changing behavior.

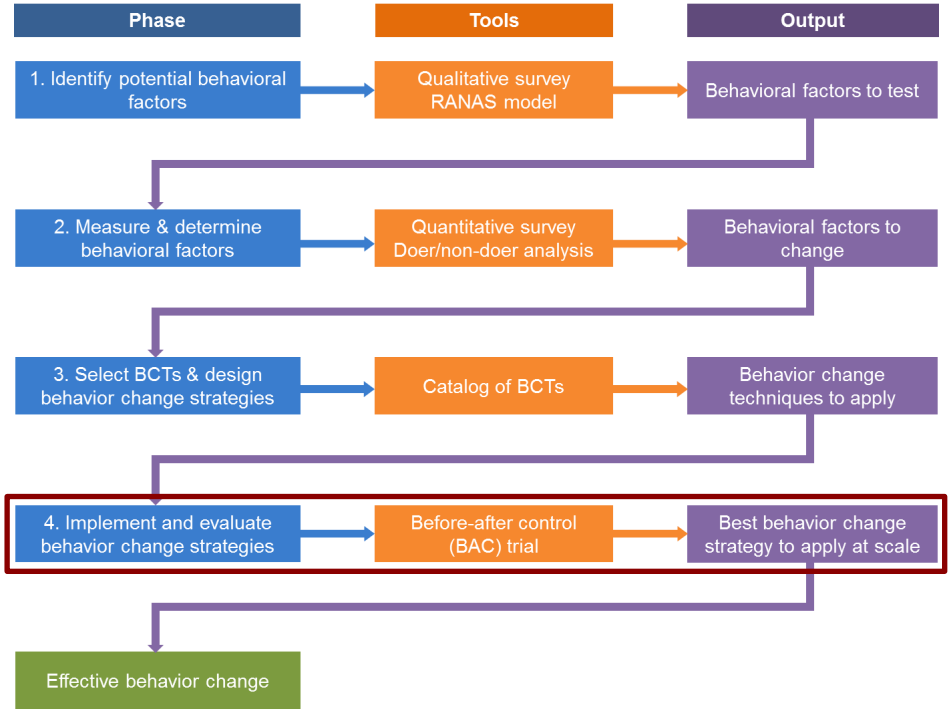


Figure 6: Flow chart of the RANAS approach to systematic behavior change.

Step 4.1: Design an implementation protocol

Overview

Introduction

The behavior change strategies developed in Step 3.2 should now be tested for effectiveness. If you plan to implement a very large project with a large budget, we recommend pretesting different strategies before scaling up. In contrast, if your project is smaller, then you can implement the strategies based on the baseline results. However, in both cases we recommend that you evaluate the strategies as indicated in this chapter, first to be able to prove effective behavior change, second to be able to analyze whether your strategies really changed the psychosocial determinants targeted, and third to be able to make corrections to the strategies. These objectives serve for organizational learning; based on these results, your organization is able to constantly improve its behavior change practice.

Key actions

Assign the strategies to project communities or project groups

To evaluate the strategies, we need to plan how we want to measure their effectiveness. The simplest plan is to measure behavior and determinants before and after the intervention. However, in this case you will not know whether the change you have measured is due to your strategies or because of other events in the country, for instance if a religious leader expressed the importance of having and using a toilet during your sanitation intervention. Therefore, you need a control area in which no interventions are currently being conducted (for ethical reasons this should be done later). You have to define the provinces, districts, villages, and neighborhoods in which you will implement your strategies and where not; these latter are available for control trials. The possibility of transmission between the areas should be excluded. Depending on the goals and resources of your project, you can use different measurement protocols. Tool 4.1.1 presents typical protocols, and Example 4.1.1 provides an example from a handwashing project in Senegal.

Key resources and information

- Behavior change strategies from Step 3.2.
- Data about geographical locations and numbers of households in intervention areas.

Typical challenges

- To deal with tight schedules in projects which impede pretesting.
- To identify comparable areas for the implementation of the different strategies.

Outputs

A detailed plan of where different behavior change strategies are to be implemented and where not.

Tools and Examples

Tool 4.1.1: Measurement protocols

Box 4.1.1: Measurement protocols

Protocol	Interventions	Groups	Comment
Before-after	Intervention A	Only intervention group	Advantage: Simple protocol, most cost-effective Disadvantage: Does not control for other potential influences on WaSH behaviors, such as seasonality or change in socio-economic status
Before-after control – single intervention	No intervention Intervention A	One control group One intervention group	Advantage: Controls for other potential influences Disadvantage: Only one intervention tested, which may or may not be effective
Before-after control – multiple interventions	No intervention Intervention A Intervention B Etc.	One control group Two or more intervention groups	Advantage: Different interventions can be tested against a control and against each other (i.e. intervention A versus intervention B) Disadvantage: The interventions' combined effect is not tested
Before-after control – gradual interventions	No intervention Intervention A Intervention A + B	One control group Two or more intervention groups	Advantage: The additional effect of an added intervention (i.e. intervention B) can be tested Disadvantage: The added intervention's (i.e. intervention B's) separate effect is not tested
Before-after control – crossed interventions	No intervention Intervention A Intervention B Intervention A + B Etc.	One control group Three or more intervention groups	Advantage: • Different interventions can be tested against a control and against each other • The interventions' combined effect can be tested (i.e. intervention A + B) Disadvantage: Complex protocol, least cost-effective

Example 4.1.1: Allocating project areas to intervention groups in the case of the promotion of handwashing in Dakar, Senegal

In a project in Dakar, Senegal, the promotion of handwashing was tested using five different interventions: household visits, film sessions, public commitment after the film, and public commitment at home. To implement the interventions, regional intervention groups were formed (see map of Dakar on the next page). Each group consisted of at least two different project areas (communities), and the areas within a group were geographically close to each other. Every group received a different behavior change strategy or combination of strategies. A local NGO visited all study households before the promotion activities started.

Example of the intervention groups and assigned project areas

Intervention groups	interventions	Number of participants	Assigned project areas and number of participants per area in brackets
Group 1	• Household visits	166	Guinaw Rail Sud (40) Guinaw Rail Nord (74) Djiddah Thiaroye (52) → circled in violet on the map
Group 2	• Film sessions	168	Médina Gounass (72) Wakhinane Nimzatt (5) Ndiarème (7) Tivaouane Diaksao (84) → circled in red on the map
Group 3	◦ Household visits ◦ Film sessions	175	Diamaguène Sicap Mbao (128) Thiaroye Sur Mer (47) → circled in blue on the map
Group 4	◦ Household visits ◦ Film sessions ◦ Public commitment subsequent to the film sessions	112	Keur Massar (103) Yeumbeul Nord (9) → circled in green on the map
Group 5	◦ Household visits ◦ Film sessions ◦ Public commitment in the households	47	Yeumbeul Sud (47) → circled in orange on the map

Map: Communities in Dakar

Experiences of an implementing NGO

To simplify the RANAS approach, we did not make any small-scale pretest of the intervention or a before-after control trial with the promotion activities.

We collected feedback on the behavior change strategy in the field before applying it to all our project zones. An evaluation was planned (see Step 4.3) approximately 6-12 months after starting the implementation.

Step 4.2: Implement behavior change strategies

Overview

Introduction

In this step, the strategies developed in Step 3.2 are set into practice. This step is very important as, even if we have developed the best strategies we can think of, they will not be effective if they are not implemented in the way they should be. It is always difficult to apply new kinds of strategies. There is always a danger that you will revert to promoting health risk awareness, which has been done many times before, even if analysis has shown that this strategy is not effective.

Key actions

Plan the implementation of the strategies

In this step, we fix exactly how the strategies are to be implemented: detailed instructions for group meetings are recorded, where and when the radio adverts are to be broadcast, when, where, and how posters are to be displayed, and so on. The schedule of the implementation of the behavior change strategies has to be planned, material for the strategies (leaflets, posters, jerry cans, soap etc.) has to be acquired and prepared, a detailed instruction for each strategy is written, and documents to monitor the implementation also need to be prepared.

Train promoters in implementing the strategies

Working with promoters typically requires that a standardized procedure be developed so that every promoter applies the strategies in the same way (see Tool 4.2.1). You first have to introduce your organization and the project team, and the promoters should present themselves. Then the current project is introduced: background information, intervention regions, and global and specific project goals (e.g. increasing handwashing with soap before eating; stopping open defecation). After that, the implementation of the behavior change strategies is presented and discussed.

Monitoring the implementation

Monitoring the implementation is important to ensure that the strategies are actually implemented appropriately. For this task, we employ supervisors who are “independent”, that is, whose employment does not depend on the strategies’ success. They monitor the implementation regularly and react promptly if problems arise; they collect and process the monitoring files; they conduct surprise visits when promoters are working (e.g. conducting home visits or group meetings); they conduct qualitative interviews with households that have received the intervention to verify that the behavior change strategies have been correctly implemented and well understood by the community, and they record who has conducted which strategy, when, and where.

Key resources and information

Hiring independent promoters

Typical challenges

- To not revert unconsciously to old and inadequate strategies.
- To realize the intervention as planned.

Outputs

- Detailed descriptions of how the behavior change strategies are to be implemented.
- Documents about how to monitor the implementation.

Tools and examples

Tool 4.2.1: Instruction for promoter training

The instructions for promoter training can take this form.

- Verify that the promoters understand the idea of the behavior change strategies.
- Verify that the promoters understand the strategies' goal (e.g. stopping open defecation) as opposed to the output (e.g. 2,000 leaflets distributed).
- Verify that the promoters understand each single step of the strategies
- Describe the promoters' roles and responsibilities.
- Provide detailed written instructions and prompt individual study of those instructions.
- Train the team how to approach households and how to implement the strategies.
- Detailed discussion of each strategy: Verify that each step is clear, including the material to be used.
- Use role plays to explain the implementation.
- Use role plays to practice the implementation and give feedback.
- Discuss the monitoring files: how to complete them and to whom to hand them.

Experiences of an implementing NGO

Gains

More attention and importance is given to the new strategies during their implementation, as it is not just like business as usual.

Challenges

As these were new strategies, the project staff was not very familiar with the whole process. Enough time should be planned to train and discuss the new strategies before their implementation. The households or the communities can have unexpected reactions that challenge the promoters.

Coping with challenges

What was very useful in Mozambique is that during the first implementation of new strategies, the other promoter teams participated as observers. This helped to provide critical and constructive feedback of the implemented strategies, which guided subsequent adaptation. Additionally it served as a learning event for the observers.

Step 4.3: Develop follow-up questionnaire and observation protocol and conduct survey

Overview

Introduction

In this step, we conduct a follow-up survey to detect changes in behavior and psychosocial factors as a result of the strategies. We study the same households with the same survey to identify differences between before and after the implementation of the strategies. In addition, we examine people's perceptions of the strategies.

Key actions

Develop a follow-up questionnaire and observation protocol

We basically use the same survey instruments as in the baseline, a questionnaire and an observation protocol (Steps 2.1 and 2.2). Additionally, we need questions and observations regarding the behavior change strategies. To evaluate a strategy, it is important to know whether the household received it, how they perceived it, and whether they rate it as likable, persuasive, or inadequate. To improve participants' recall, it is useful to show some pictures of the strategy's implementation.

Conduct follow-up survey

This task largely follows the sequence given in Step 2.2. The main challenge here is to find the same households as in the baseline survey. For this purpose, it is of great importance to have marked the households in the baseline survey clearly and unambiguously, using unmistakable names or addresses, if possible with a GPS position. Names of heads of households have to be recorded in a unique manner; that can be tricky in regions of the world where similar names are common.

A follow-up survey should be carried out at least two months after the implementation of the strategies so that their effects can have time to unfold. To measure long-term effects, the follow-up survey should be conducted 6, 12, 18, or even 24 months after implementation. Each survey can give valuable information about how well the strategies are working and enable corrections to be implemented to ongoing strategies if necessary.

Key resources and information

- Baseline questionnaire and observation protocol from Step 2.1.
- Additional questions and observations regarding the behavior change strategies.

Typical challenges

- To find the same households as in the baseline.
- To facilitate participants' recall of the strategies.

Outputs

Follow-up survey data from the same households as in the baseline survey.

Experiences of an implementing NGO

Gains

We did not evaluate the behavior change strategies in a pretest but immediately implemented the intervention in our projects. This means we conducted the baseline survey, chose the intervention and then switched directly to Step 4.3, the follow-up questionnaire. This step was important and had a strong motivating effect when positive changes were detected. Additionally, it showed the importance of the BCT activities and animated further discussion about the effectiveness of the approach.

Challenges

A big challenge in Mozambique was to find and interview the same households for the follow-up survey. In projects where the local authority leads the intervention, there can be unforeseen changes in defining target areas, which mean that comparison with the baseline survey households is no longer possible.

Coping with challenges

The evaluation questionnaire was simplified in an additional step. For example, behavioral factors which were identified in the first study as unimportant, like risk factors in the Mali study, were left out, or the number of questions was reduced. General information questions were not repeated either, as we assumed that there were no great changes to observe.

The timing of the baseline survey has to be well coordinated and synchronized with the planning procedure of local government and other partners, because the local governtment can change its intervention area based on budget and new priorities. In our case, the baseline survey was done before this took place, and the municipality then changed its priorities. This made it difficult to conduct the follow-up survey, because the intervention had not been implemented in the baseline villages.

Additional information can be collected with the mobile phone, such as photos or geographical coordinates, which helps to find the same household again.

Using the same interviewers was helpful, as they were already familiar with the RANAS questionnaire.

Step 4.4: Estimate efficacy of the behavior change strategies

Overview

Introduction

In this step, we evaluate the promotion strategies, that is, we determine their efficacy. Efficacy refers to whether the strategy has had the desired effects or not: whether the targeted behavior and the behavioral factors changed or not. This criterion is critical to decide which strategy to retain and which to modify or abandon. To do this, we compare the follow-up scores to the baseline scores. In cases where we have applied a control and one or more intervention groups (cf. Step 4.1), we also compare the changes from baseline to follow-up between these groups.

Key actions

Enter, clean and process the data

As in Step 2.3, the data from the questionnaires are entered into a calculation program and cleaned and processed (see Tool 2.3.1 for instructions). Example 4.4.1 presents the entered and processed follow-up data of the same sample that we surveyed in Step 2 to gather baseline data (see Example 2.3.1). In Example 4.4.1, you can see that we applied two groups to test our intervention strategy, a control group and an intervention group.

Calculate mean scores at baseline and at follow-up separately for the control and the intervention group(s)

We calculate the mean scores at baseline and at follow-up. We do that (1) for the behavior measure by which we divided our sample into doers and non-doers (see Step 2.3) and (2) for each behavioral factor. Where we have applied a control and one or several intervention groups, the mean scores are calculated separately for each of these groups. Example 4.4.2a presents the baseline mean scores and Example 4.4.2b the follow-up mean scores separately for the control and the intervention groups.

Calculate change scores from baseline to follow-up separately for the control and the intervention group(s)

To assess whether and by how much the behavior and the behavioral factors changed from baseline to follow-up, we calculate the change scores. Change scores are simply the mean scores at baseline subtracted from the mean scores at follow-up (see Example 4.4.3). Again, we do this separately for control and all intervention groups. In Example 4.4.3, we can see that all change scores for the control group are very small. For the intervention group, in contrast, behavior increased by 24%; now, at follow-up, around 94% of the water is chlorinated. Further, we also find large change scores in the three psychosocial factors that we targeted through our intervention.

Compare change scores between control and intervention group(s)

Where we have applied a control and one or several intervention groups, we also want to compare the change scores between these groups. To do this, we subtract the change scores in the control group from the change scores in the intervention groups. Based on these difference scores, we can verify whether our intervention strategy was indeed effective: whether behavior changed more positively in the intervention group(s) than in the control group. We also inspect the difference scores for the behavioral factors to see whether the behavioral factors that we targeted in our intervention changed as we wanted. In Example 4.4.3, the difference score in behavior between the intervention and the control group is 26%. While the desired behavior stayed constant in the control group, it largely increased in the intervention group. The same is true for the critical behavioral factors; the intervention successfully changed the psychosocial factors that we wanted to change: others' behavior, action control, and being a good mother.

If we had used several intervention groups, each receiving a different intervention strategy, we would also calculate difference scores between these intervention groups. From these scores, we could assess which of the intervention strategies was most effective.

Key resources and information

- Results from 2.3: Data from the baseline survey.
- Results from 4.3: Data from the follow-up survey.

Typical challenges

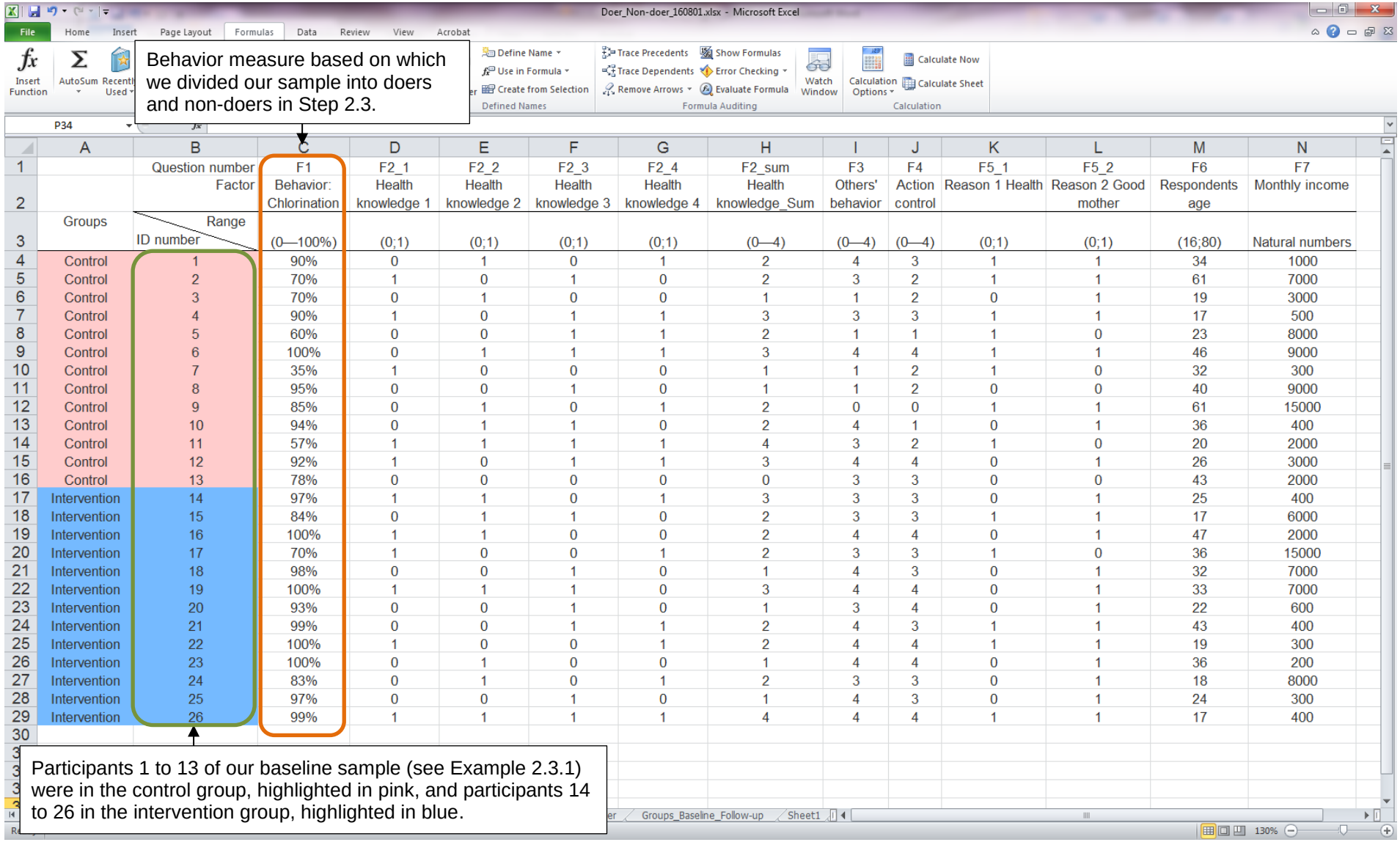
To decide which strategy is most effective if several strategies prove to be effective by different measures.

Outputs

The most effective strategy is identified.

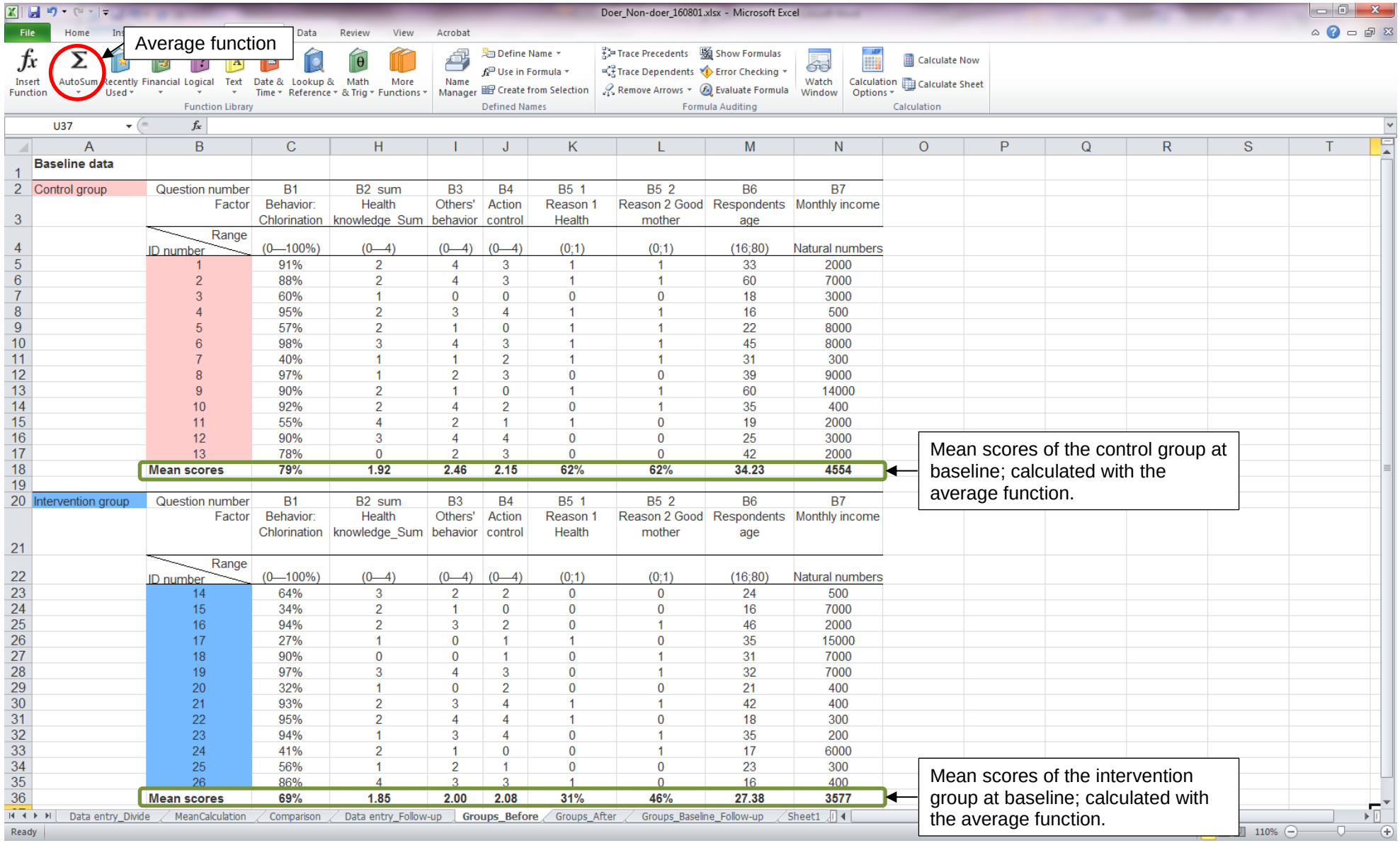
Tools and examples

Example 4.4.1: Data entry and processing follow-up



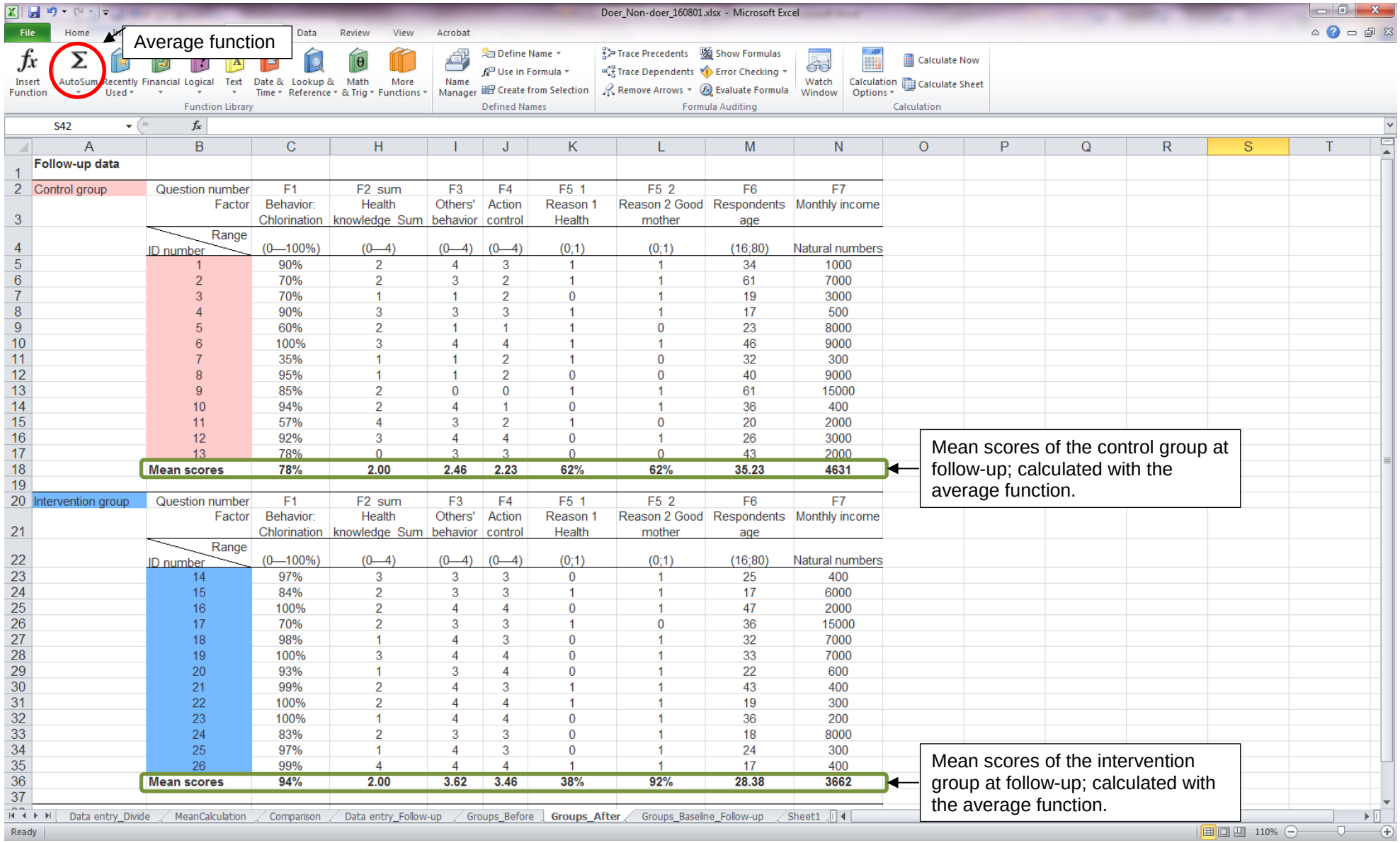
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1		Question number	F1	F2_1	F2_2	F2_3	F2_4	F2_sum	F3	F4	F5_1	F5_2	F6	F7
2		Factor	Behavior: Chlorination	Health knowledge 1	Health knowledge 2	Health knowledge 3	Health knowledge 4	Health knowledge_Sum	Others' behavior	Action control	Reason 1 Health	Reason 2 Good mother	Respondents age	Monthly income
3	Groups	Range / ID number	(0—100%)	(0;1)	(0;1)	(0;1)	(0;1)	(0—4)	(0—4)	(0—4)	(0;1)	(0;1)	(16;80)	Natural numbers
4	Control	1	90%	0	1	0	1	2	4	3	1	1	34	1000
5	Control	2	70%	1	0	1	0	2	3	2	1	1	61	7000
6	Control	3	70%	0	1	0	0	1	1	2	0	1	19	3000
7	Control	4	90%	1	0	1	1	3	3	3	1	1	17	500
8	Control	5	60%	0	0	1	1	2	1	1	1	0	23	8000
9	Control	6	100%	0	1	1	1	3	4	4	1	1	46	9000
10	Control	7	35%	1	0	0	0	1	1	2	1	0	32	300
11	Control	8	95%	0	0	1	0	1	1	2	0	0	40	9000
12	Control	9	85%	0	1	0	1	2	0	0	1	1	61	15000
13	Control	10	94%	0	1	1	0	2	4	1	0	1	36	400
14	Control	11	57%	1	1	1	1	4	3	2	1	0	20	2000
15	Control	12	92%	1	0	1	1	3	4	4	0	1	26	3000
16	Control	13	78%	0	0	0	0	0	3	3	0	0	43	2000
17	Intervention	14	97%	1	1	0	1	3	3	3	0	1	25	400
18	Intervention	15	84%	0	1	1	0	2	3	3	1	1	17	6000
19	Intervention	16	100%	1	1	0	0	2	4	4	0	1	47	2000
20	Intervention	17	70%	1	0	0	1	2	3	3	1	0	36	15000
21	Intervention	18	98%	0	0	1	0	1	4	3	0	1	32	7000
22	Intervention	19	100%	1	1	1	0	3	4	4	0	1	33	7000
23	Intervention	20	93%	0	0	1	0	1	3	4	0	1	22	600
24	Intervention	21	99%	0	0	1	1	2	4	3	1	1	43	400
25	Intervention	22	100%	1	0	0	1	2	4	4	1	1	19	300
26	Intervention	23	100%	0	1	0	0	1	4	4	0	1	36	200
27	Intervention	24	83%	0	1	0	1	2	3	3	0	1	18	8000
28	Intervention	25	97%	0	0	1	0	1	4	3	0	1	24	300
29	Intervention	26	99%	1	1	1	1	4	4	4	1	1	17	400
30														

Example 4.4.2a: Calculation of baseline mean scores separately for the control and the intervention group



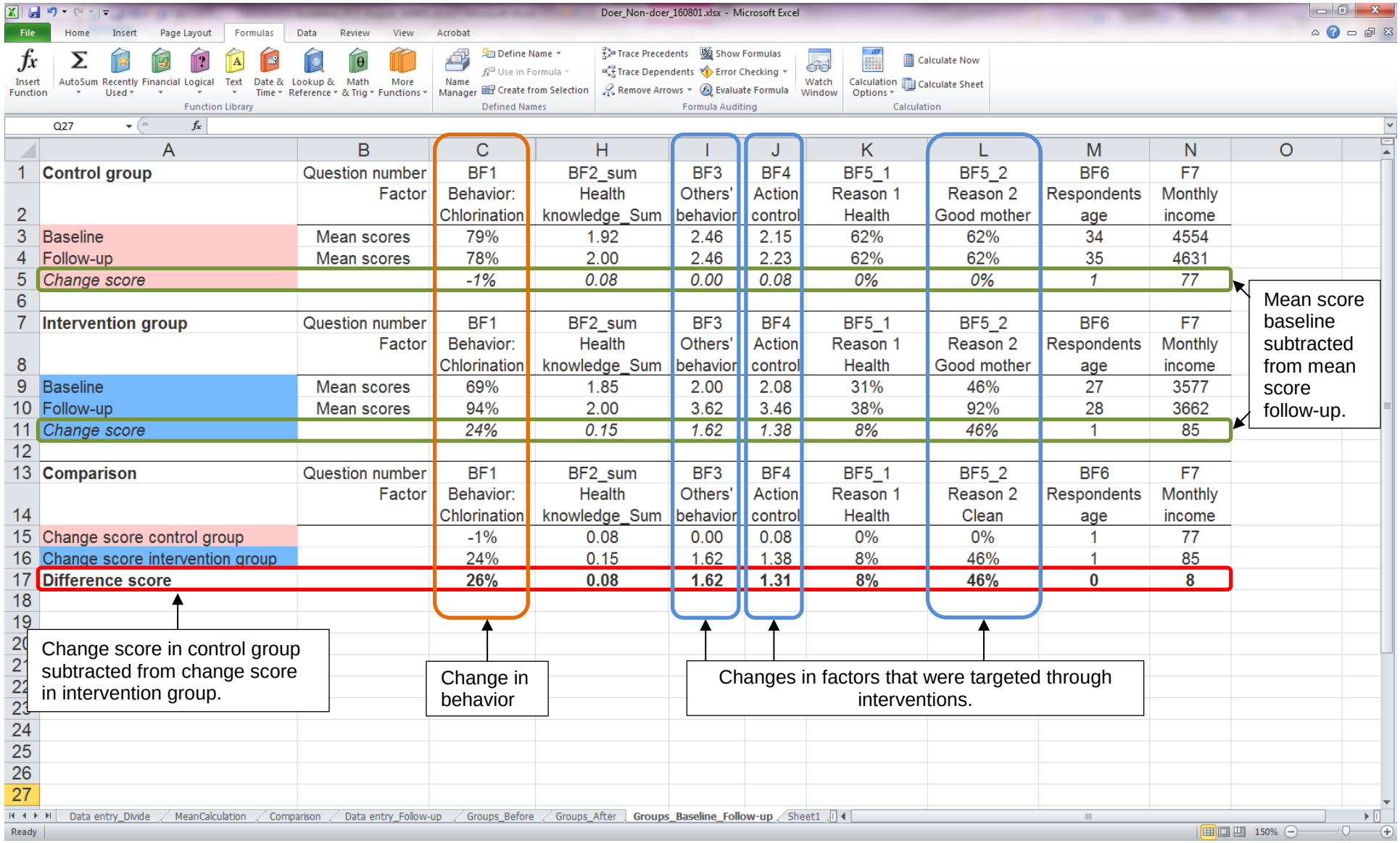
	A	B	C	H	I	J	K	L	M	N
1	**Baseline data**									
2	Control group	Question number	B1	B2_sum	B3	B4	B5_1	B5_2	B6	B7
3		Factor	Behavior: Chlorination	Health knowledge_Sum	Others' behavior	Action control	Reason 1 Health	Reason 2 Good mother	Respondents age	Monthly income
4		Range / ID number	(0—100%)	(0—4)	(0—4)	(0—4)	(0;1)	(0;1)	(16;80)	Natural numbers
5		1	91%	2	4	3	1	1	33	2000
6		2	88%	2	4	3	1	1	60	7000
7		3	60%	1	0	0	0	0	18	3000
8		4	95%	2	3	4	1	1	16	500
9		5	57%	2	1	0	1	1	22	8000
10		6	98%	3	4	3	1	1	45	8000
11		7	40%	1	1	2	1	1	31	300
12		8	97%	1	2	3	0	0	39	9000
13		9	90%	2	1	0	1	1	60	14000
14		10	92%	2	4	2	0	1	35	400
15		11	55%	4	2	1	1	0	19	2000
16		12	90%	3	4	4	0	0	25	3000
17		13	78%	0	2	3	0	0	42	2000
18		**Mean scores**	**79%**	**1.92**	**2.46**	**2.15**	**62%**	**62%**	**34.23**	**4554**
19										
20	Intervention group	Question number	B1	B2_sum	B3	B4	B5_1	B5_2	B6	B7
21		Factor	Behavior: Chlorination	Health knowledge_Sum	Others' behavior	Action control	Reason 1 Health	Reason 2 Good mother	Respondents age	Monthly income
22		Range / ID number	(0—100%)	(0—4)	(0—4)	(0—4)	(0;1)	(0;1)	(16;80)	Natural numbers
23		14	64%	3	2	2	0	0	24	500
24		15	34%	2	1	0	0	0	16	7000
25		16	94%	2	3	2	0	1	46	2000
26		17	27%	1	0	1	1	0	35	15000
27		18	90%	0	0	1	0	1	31	7000
28		19	97%	3	4	3	0	1	32	7000
29		20	32%	1	0	2	0	0	21	400
30		21	93%	2	3	4	1	1	42	400
31		22	95%	2	4	4	1	0	18	300
32		23	94%	1	3	4	0	1	35	200
33		24	41%	2	1	0	0	1	17	6000
34		25	56%	1	2	1	0	0	23	300
35		26	86%	4	3	3	1	0	16	400
36		**Mean scores**	**69%**	**1.85**	**2.00**	**2.08**	**31%**	**46%**	**27.38**	**3577**

Example 4.4.2b: Calculation of follow-up mean scores separately for the control and the intervention group



	A	B	C	H	I	J	K	L	M	N
1	**Follow-up data**									
2	Control group	Question number	F1	F2 sum	F3	F4	F5 1	F5 2	F6	F7
3		Factor	Behavior: Chlorination	Health knowledge Sum	Others' behavior	Action control	Reason 1 Health	Reason 2 Good mother	Respondents age	Monthly income
4		Range / ID number	(0—100%)	(0—4)	(0—4)	(0—4)	(0;1)	(0;1)	(16;80)	Natural numbers
5		1	90%	2	4	3	1	1	34	1000
6		2	70%	2	3	2	1	1	61	7000
7		3	70%	1	1	2	0	1	19	3000
8		4	90%	3	3	3	1	1	17	500
9		5	60%	2	1	1	1	0	23	8000
10		6	100%	3	4	4	1	1	46	9000
11		7	35%	1	1	2	1	0	32	300
12		8	95%	1	1	2	0	0	40	9000
13		9	85%	2	0	0	1	1	61	15000
14		10	94%	2	4	1	0	1	36	400
15		11	57%	4	3	2	1	0	20	2000
16		12	92%	3	4	4	0	1	26	3000
17		13	78%	0	3	3	0	0	43	2000
18		**Mean scores**	**78%**	**2.00**	**2.46**	**2.23**	**62%**	**62%**	**35.23**	**4631**
19										
20	Intervention group	Question number	F1	F2 sum	F3	F4	F5 1	F5 2	F6	F7
21		Factor	Behavior: Chlorination	Health knowledge Sum	Others' behavior	Action control	Reason 1 Health	Reason 2 Good mother	Respondents age	Monthly income
22		Range / ID number	(0—100%)	(0—4)	(0—4)	(0—4)	(0;1)	(0;1)	(16;80)	Natural numbers
23		14	97%	3	3	3	0	1	25	400
24		15	84%	2	3	3	1	1	17	6000
25		16	100%	2	4	4	0	1	47	2000
26		17	70%	2	3	3	1	0	36	15000
27		18	98%	1	4	3	0	1	32	7000
28		19	100%	3	4	4	0	1	33	7000
29		20	93%	1	3	4	0	1	22	600
30		21	99%	2	4	3	1	1	43	400
31		22	100%	2	4	4	1	1	19	300
32		23	100%	1	4	4	0	1	36	200
33		24	83%	2	3	3	0	1	18	8000
34		25	97%	1	4	3	0	1	24	300
35		26	99%	4	4	4	1	1	17	400
36		**Mean scores**	**94%**	**2.00**	**3.62**	**3.46**	**38%**	**92%**	**28.38**	**3662**
37										

Example 4.4.3: Calculation of change scores from baseline to follow-up separately for the control and the intervention group, and comparison of change scores between control and intervention group



	A	B	C	H	I	J	K	L	M	N	O
1	**Control group**	Question number	BF1	BF2_sum	BF3	BF4	BF5_1	BF5_2	BF6	F7	
2		Factor	Behavior: Chlorination	Health knowledge_Sum	Others' behavior	Action control	Reason 1 Health	Reason 2 Good mother	Respondents age	Monthly income	
3	Baseline	Mean scores	79%	1.92	2.46	2.15	62%	62%	34	4554	
4	Follow-up	Mean scores	78%	2.00	2.46	2.23	62%	62%	35	4631	
5	*Change score*		*-1%*	*0.08*	*0.00*	*0.08*	*0%*	*0%*	*1*	*77*	
6											
7	**Intervention group**	Question number	BF1	BF2_sum	BF3	BF4	BF5_1	BF5_2	BF6	F7	
8		Factor	Behavior: Chlorination	Health knowledge_Sum	Others' behavior	Action control	Reason 1 Health	Reason 2 Good mother	Respondents age	Monthly income	
9	Baseline	Mean scores	69%	1.85	2.00	2.08	31%	46%	27	3577	
10	Follow-up	Mean scores	94%	2.00	3.62	3.46	38%	92%	28	3662	
11	*Change score*		*24%*	*0.15*	*1.62*	*1.38*	*8%*	*46%*	1	85	
12											
13	**Comparison**	Question number	BF1	BF2_sum	BF3	BF4	BF5_1	BF5_2	BF6	F7	
14		Factor	Behavior: Chlorination	Health knowledge_Sum	Others' behavior	Action control	Reason 1 Health	Reason 2 Clean	Respondents age	Monthly income	
15	Change score control group		-1%	0.08	0.00	0.08	0%	0%	1	77	
16	Change score intervention group		24%	0.15	1.62	1.38	8%	46%	1	85	
17	**Difference score**		**26%**	**0.08**	**1.62**	**1.31**	**8%**	**46%**	**0**	**8**	

Experiences of an implementing NGO

Gains

Although we did not gather data from control groups with which to compare that from interventions, we could compare the baseline with the follow-up survey data. It was great for the Mali team to see a rise of 33.2 % in handwashing behavior. The comparison showed that there was a great change in the factor Norm, which we had chiefly targeted with our intervention, but it also showed us that we have to adapt our strategy for self-regulation factors further. Questions about how the households liked the different interventions helped us to identify those that doers and non-doers liked most and also indicated whether the intervention had reached everybody. The data and analysis allow us to know what works and what does not, which eliminates a lot of the guesswork and assumptions we had to resort to in the past.

Challenges

The work is not finished when the data has been analyzed. We see it as an ongoing process and want to use the analysis to further improve and adapt our interventions. The end survey and its analysis were easier to conduct for the local teams as they were already familiar with the study design. To be able to follow this up with improved interventions, we need to continue collecting data in future and linking it optimally to our monitoring system.

Coping with challenges

We are still exploring ways to cope with these challenges in future. Having a focal point in the project team and at headquarters is crucial to push the whole process further and to continue developing and adapting the approach.

Conclusions

Having read this far, it is fair to ask what the benefits of the complete RANAS process really are. Your organization gains in several ways from each of the four phases of the approach.

By conducting Phase 1, ‘Identify potential behavioral factors,’ your organization becomes aware of all the factors possibly involved in behavior change. The RANAS model serves as an eye-opener for thinking beyond health risk factors, because attitude, norm, ability, and self-regulation factors are then added to the understanding of behavior-steering factors.

Phase 2, ‘Measure the behavioral factors and determine those steering the target behavior,’ provides your organization with a very much improved knowledge, attitudes, and practice (KAP) survey, because the richness of factors steering human behavior is taken into account when applying a RANAS survey. What is more important, your organization will know which factors really steer the behavior due to the doer/non-doer analysis. The data you gather can be used to tailor promotion activities optimally to the local population and will therefore be more readily accepted by them.

On accomplishing Phase 3, ‘Select BCTs and develop behavior change strategies,’ your organization has a variety of behavior change techniques at hand with which it can operate. Moreover, the tightly focused selection of behavior change techniques, because they fit the behavioral factors that have to be changed, will reduce time and costs and avoid wasted effort. The social costs of promotion activities that are irrelevant or counterproductive for the local population will also be avoided.

Finishing Phase 4, ‘Implement and evaluate the behavior change strategies’, yields valuable information for your organization about whether and how the promotion activities that you have implemented work. With this information, your organization can build on reliable lessons learned, because this evaluation is based on objective calculations.

All in all, organizations using the RANAS approach profit from a well-documented, comprehensive, and therefore systematic methodology which ensures that they make an efficient and effective contribution to development in their fields.