Water Resource Quality (WRQ)

Geogenic Contamination Handbook

Addressing arsenic and fluoride in drinking water

**WHO Collaborating Center
for Sanitation and Water
in Developing Countries**

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Cover Photo:

Women collecting fluoride-treated water at the community filter in Wayo Gabriel, Ethiopia, implemented by Eawag, Oromia Self-Help Organization (OSHO) and Swiss Interchurch Aid (HEKS)

8 A guide to behaviour change

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Fig. 8.1   *Woman collecting water from an arsenic-contaminated tubewell in Bangladesh*

It is not sufficient to provide people at risk of consuming contaminated water with safe water facilities. For various reasons, they might not use these facilities properly or regularly, or they might not use them at all. Consumers have to be motivated to use them. They will change their habits if they, for example, are convinced of the positive health effects of these filters, like the taste of the water, perceive the price as reasonable, think that others approve, think that it does not require too much additional effort etc..

The key to persuading people to change their behavioural habits and to use a safe water source is to understand their motivations. Once we understand these, we can carry out targeted campaigns to change their behavioural habits. This process is called "behaviour change". This is an evolving field and it is important to note that the dignity, participation and choice of the participants should always be respected. Furthermore such techniques should be applied only when viable and sustainable solutions (e.g., for the provision of safe water) are available and with active support and participation of responsible institutions.

A general procedure for **behaviour change** consists of 9 steps:

1 Define the target population and the desired behaviour (i.e. continual use of a safe-water source).
2 Obtain an impression of the conditions that favour or hinder this behaviour.
3 Catalogue all possible factors that determine the behaviour.
4 Develop a questionnaire to measure the importance of behavioural factors.
5 Conduct a representative survey (baseline survey).
6 Use the survey results to determine the factors that steer the target behaviour.
7 Define and design campaigns (interventions) to change peoples' perceptions of these factors.
8 Define suitable communication channels.
9 Evaluate the effectiveness of the behaviour change techniques and their long-term effects.

> **Training courses and guideline**
>
> Behaviour change is a crucial step in the mitigation of the geogenic contamination of drinking water and other water-, sanitation- and hygiene-related issues. It requires skills and time. People and institutions interested in applying this approach are strongly recommended to participate in Eawag training courses courses and to make use of the guideline 'Systematic Behaviour Change in Water Sanitation and Hygiene. A practical guide using the RANAS approach' which can be retrieved from http://www.eawag.ch/en/department/ess/empirical-focus/environmental-and-health-psychology-ehpsy/.

8.1 Define target population and behaviour

So that human and financial resources are not wasted, it is important to define **who** exactly should change **which** behaviour.

Note that at this point, the technically and institutionally most suitable option(s) should already have been determined, and the aim is to define which behaviours potential users need to adopt or change in order to install, use and maintain these options.

Target population

Defining the target population is crucial. Different actions will be required depending on whether the behaviour that needs to be tackled is that of children, men, women or adults of both sexes. The target individuals are the ones who make the decisions. For example:

- The head of the household is the target individual if he/she decides where a young daughter collects the drinking water.

- The landlord is the target individual if he/she has to give permission to the tenants to dig an additional tubewell if the one they are using is contaminated.
- If people share a facility, then the group needs to take the decision for change. The whole community may be involved in this process.

The main questions that need to be answered are:

- Who are the decision-makers? E.g. head of household, a housewife, community leader, religious leader, head of neighbourhood union etc.
- Who are the people who perform the target behaviour? Are they the women, girls or men or a group of people?

Target behaviour

Defining exactly the behaviour to be changed is a crucial first step in the behaviour change process. In order to do this, it is necessary to take a closer look at the daily routine of the potential water users. Important questions that should be asked are:

- Which safe-water option should be used? E.g. a community filter, a household filter or a neighbouring well?
- What tasks does use of the safe-water option require? E.g. fetching water from a public community filter, regularly filling a private household filter or contacting a neighbour to use his/her well?
- Which new habits are crucial for the target population? E.g. is it important that women also cook with safe water, and do they do so, or is the safe water only intended for drinking?

What we want to achieve is a change in habits. The most important outcome is to build up a long-term habitual change in behaviour in the majority of the target population in favour of the safe drinking-water option.

> **Step 1: Tasks**
> → Interviews with experts and/or
> → Interviews with local partners and/or
> → Interviews with community and opinion leaders
> → Focus group discussion

> **Example**
> A rural village in Ethiopia has elevated fluoride concentrations in all its accessible water sources. To prevent the intake of excess fluoride, a fluoride removal community filter was installed. The filter is located in the centre of the village next to the main raw water source. The community can now purchase water from the new community filter. However,

the treated water is more expensive than the unsafe raw water. The price was set by the local water committee to assure financial sustainability for the filter. After the filter was installed, the research team held interviews with their local partner NGO to complete step 1. The target behaviour was identified as fetching water from the community filter, which was not very different from the alternative behaviour, fetching water from an unsafe well. Both are public and require the effort of carrying water to the home. Through the interviews, the research team also found out that the decision-makers are the heads of the households (mainly men) but that the ones who perform the task are mainly women and younger girls.

Note: The examples provided in the boxes are fictional but are based on the experience gained in several projects carried out by the authors.

Fig. 8.2   *Young woman fetching water at the community filter, Ethiopia*

8.2 Gain a first impression of conditions that favour or hinder the target behaviour

In this second step, a small number of the target population are questioned in depth about their daily routines. We are interested in finding out what motivates them to perform certain tasks related to the target behaviour. For example, they may be asked about the effort of collecting water, about costs, or about cultural habits such as the importance of what

others do or how important it is to serve guests safe, uncontaminated water. It is also important to understand the behaviour under different situational conditions. For example, do people have to access safe water in the fields or at school?

In addition to the interviews, the daily routines of randomly selected households are observed to find out when and where people perform the behaviour (or do not). For example, when is a household filter filled, and which incidents hinder the filling?

Step 2: Tasks

→ In-depth interviews with a small number of the target population
→ Observation of randomly selected households during a whole day

Example

The research team conducted in-depth interviews with five different households and spent a whole day observing five women who are responsible for fetching water. From the interviews, the research team learned that culturally, it is very common to have guests for a coffee ceremony. So this would be an important moment to use filtered water instead of raw water. Because of this finding, the research team decided to consider the importance of having guests and serving them safe water as a possible factor favouring the targeted behaviour.

Fig. 8.3   *Coffee ceremony in a rural household in Ethiopia*

8.3 Catalogue all possible behavioural determinants

Having gained a superficial understanding of daily routines and the underlying motivations of, and influences on, actions related to the target behaviour, the next task is to start preparing an in-depth quantitative questionnaire (this section and Sections 8.4, 8.5 and 8.6) to better understand the motivations in psychological terms.
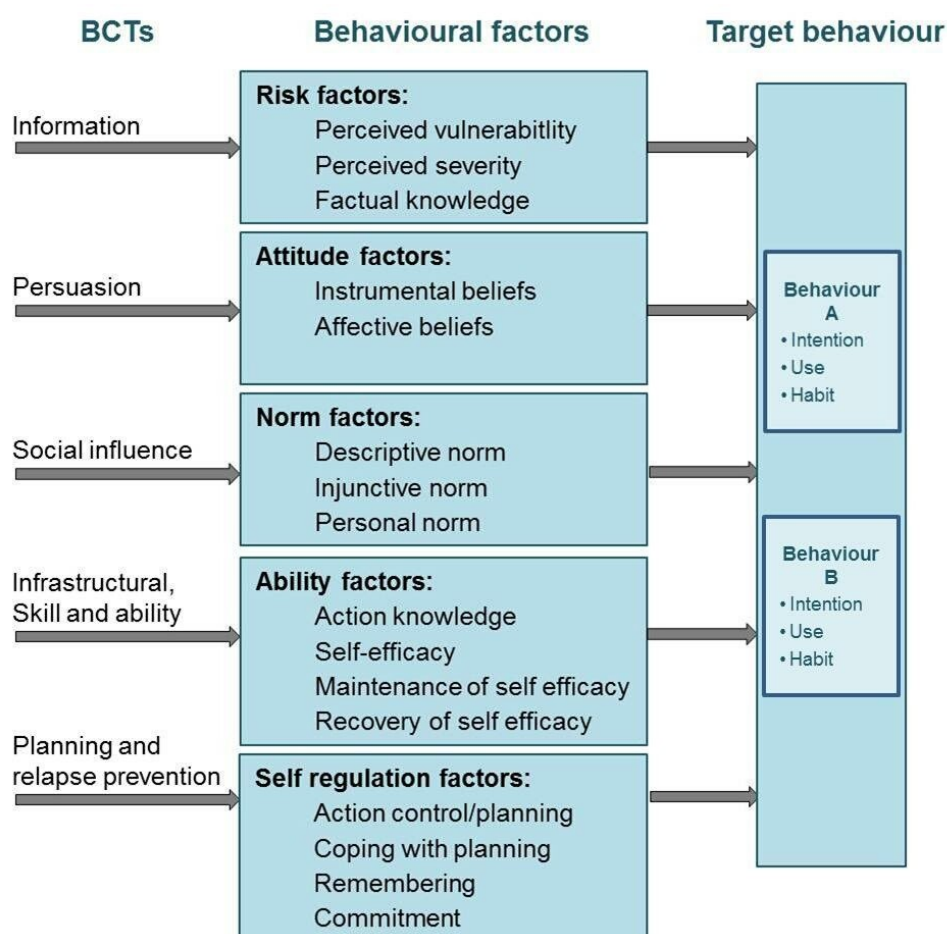
Fig. 8.4   *The RANAS Model (Risk, Attitudes, Norms, Abilities and Self-Regulation) of behaviour change. It shows the target behaviours, the factors that affect behaviour and behaviour change techniques (BCTs)*

Several theories of health psychology can be used to explain health behaviour; e.g. the Theory of Planned Behaviour (Ajzen et al., 2007) and the Health Action Process Approach (Schwarzer, 2008). These have been adapted to the RANAS Model (Risk, Attitudes, Norms, Abilities, and Self-regulation (Mosler, 2012). This model is divided into three distinct components (Fig. 8.4, right to left): (i) the target behaviours; (ii) factor blocks that group the

behavioural factors that represent similar issues; and (iii) interventions that represent the corresponding behaviour change techniques (BCTs).

Target behaviours and alternatives

It is important to assess old and new habits or "behaviours". This means, for example, assessing both the new safe drinking-water option (Behaviour A) and the drinking-water option(s) in current use (Behaviour B). In each case, the intention, use and habit need to be part of the survey, and these points must be addressed in the list of "behavioural determinants" described below.

Behavioural factors and intervention strategies

The five groups of factors are defined below.

Risk factors are the perceived vulnerability of contracting an illness, its perceived severity and factual knowledge about the possibilities of being affected by a potential contamination.

Intervention: Information and education are used to increase awareness.

Attitudinal factors consist of instrumental beliefs, which relate to the perceived advantages/disadvantages and costs/benefits of the new or alternative behaviour (A or B, Fig. 8.4). Affective beliefs refer to feelings arising when thinking about the behaviour.

Intervention: Positive attitudes can be induced by persuasion. The idea here is to highlight benefits of the new behaviour.

Normative factors represent different social influences. Descriptive norms are what a person perceives as "what everyone does". Injunctive norms are what an individual perceives as behaviour approved of or disapproved of by others. Personal norms are personal standards; i.e., what should be done. The influence of peer pressure is represented in these factors.

Intervention: Norms can be changed by obtaining approval from opinion leaders, which may be traditional leaders, women's groups etc.

Ability factors represent firstly the knowledge about what to do (action knowledge), secondly the confidence in how to organise and manage the behaviour (self-efficacy), and lastly the confidence in one's ability to deal with possible barriers (maintenance self-efficacy, recovery self-efficacy).

Intervention: Interventions include changes in infrastructure to make the new behaviour easier or more convenient. They also include support in organising and managing confidence in the new behaviour.

Self-regulation factors Planning interventions help to translate goals into actions to get people started, to prevent distraction and to help them to avoid fall-back into old habits. Coping planning helps people to overcome conflicting goals and possible

barriers to the desired behaviour. The commitment to perform a behaviour can be enhanced by making a contract with the person in which she or he obliges her- or himself to perform the behaviour (self-commitment).

Intervention: Goals are translated into actions by planning and by anticipating barriers and making plans for how to overcome these.

Step 3: Tasks

→ Carefully read this section and familiarise yourself with the behavioural determinants

→ If necessary, add more behavioural determinants to the model

Example

The research team noticed that one possible factor was missing in the RANAS model to explain their target behaviour. As was found out during the in-depth interviews and the observations (step 2), having guests for a coffee ceremony is something that had to be surveyed. That is why a new factor was added to the norm factor block of the behaviour change model: the importance of serving filtered water to guests (guest norm).

The RANAS model was used to encourage behaviour change in several case studies: solar water disinfection in Bolivia (Heri and Mosler, 2008) and in Zimbabwe (Kraemer and Mosler, 2010); hygiene behaviour in Kenya (Graf et al., 2008); the use of arsenic-free deep tubewells in Bangladesh (Mosler et al., 2010); and the consumption of fluoride-free water in rural Ethiopia (Huber et al., 2012).

8.4 Develop a questionnaire to measure behavioural factors

A questionnaire, aimed at measuring the behavioural factors identified in the previous section, is now developed. The factors and example questions used for their quantification are listed in Table 8.1. This is a crucial step that requires much time and effort.

Table 8.1 *Example questions about drinking arsenic-contaminated water versus arsenic-safe water. The factors are specific psychological terms.*

	Factor	Item example [response scale]
1	Vulnerability	How high or low do you feel are the chances that you will get arsenicosis when drinking unsafe water? [very low to very high: -4 – +4]

	Factor	Item example [response scale]
2	Severity	If you were to contract arsenicosis, how severe do you think the impact on your life would be? [not severe to very severe: 0 – 4]
3	Factual knowledge	How do you contract arsenicosis by drinking unsafe water? [open-ended]
4	Instrumental beliefs	Do you think that using arsenic-safe water is time-consuming (expensive/healthy/hard work)? [not at all to very much: 0 – 4]
5	Affective beliefs	How much do you like or dislike arsenic-safe disinfected water? [dislike to like very much: -4 – 4]
6	Descriptive norm	How many of your relatives drink arsenic-safe water? [almost nobody to almost all: 0 – 4]
7	Injunctive norm	Do you think that, overall, people who are important to you approve or disapprove that you drink arsenic-safe water? [nearly all disapprove to nearly all approve: -4 to +4]
8	Personal norm	Do you feel a strong personal obligation to consume arsenic-safe water? [Not at all to very much: -4 – 4]
9	Action knowledge	What can be done to avoid arsenicosis and its harmful effects? [Multiple choice answers: 0 for wrong answer, 1 = right answer]
10	Self-efficacy	Are you sure that you can consume as much arsenic-safe water as you need within the next month? [very unsure to very sure: 0 – 4]
11	Maintenance self-efficacy	How confident are you that you can freely consume arsenic-safe water, even if your relatives continue to consume raw water? [not confident at all to very confident: 0 – 4]
12	Recovery self-efficacy	Imagine you have stopped drinking arsenic-safe water for several days. How confident are you that you would be able to start drinking arsenic-safe water again? [not confident at all to very confident: 0 – 4]
13	Action control (planning)	Do you have a plan of when during the day to start collecting arsenic-safe water? [no detailed plan at all to very detailed plan: 0 – 4]
14	Coping planning	Have you made a plan of what to do when you are hindered in collecting arsenic-safe water? [no detailed plan at all to very detailed plan: 0 – 4]

	Factor	Item example [response scale]
15	Remembering / Forgetting	How often do you forget to collect arsenic-safe water? [never to almost always: 0 – 4]
16	Commitment	How committed do you feel to drinking arsenic-safe water? [not at all to very much: 0 – 4]
Behavioural questions		
17	Intention	How strongly do you intend to always drink arsenic-safe water? [not at all to very strongly: 0 – 4]
18	Behaviour	What is the percentage of arsenic-safe drinking water of your total daily water consumption? [%]
19	Habit	Do you go to collect your arsenic-safe water automatically? [not automatically at all to very automatically: 0 – 4]

The questions have to be adapted and developed for each topic and, particularly, for each local condition. They have to be clearly understood by the target population. It is therefore necessary to work closely with local persons. If the investigator does not speak the local language, the items have to be carefully translated into the local language and retranslated back to the original language to unveil translation problems. Finally, the items need to be introduced into a standardised questionnaire and be brought into a meaningful sequence.

Step 4: Tasks

→ Look at the example baseline questionnaires (Tools 1 and 2) and adapt the questions to your target behaviour and target population
→ If necessary, add more questions regarding other behavioural determinants you added to the model
→ Translate and retranslate your questionnaire

Tools

Tool_1: Example baseline questionnaire on fluoride-contaminated water in Ethiopia

Tool_2: Example baseline questionnaire on arsenic-contaminated water in Bangladesh

Example

The example baseline questionnaire for fluoride in Ethiopia is found in Tool 1. We added additional questions to cover the new factor, guest norm. These questions addressed the issue of how important it is for the person being questioned to serve filtered water to their guests and what their guests would think of them if they served raw water instead.

The questionnaire was drawn up in English and then translated into the two languages of the target population in Wayo Gabriel – Amharic and Oromifa – and was retranslated into English. Translation errors were found and corrected.

8.5 Conduct a representative baseline survey

The next step is to conduct the first survey to obtain a general understanding of the situation. This is called the baseline survey. It is important to interview a large sample of the population in order to obtain a representative perspective on the attitudes and behaviour of the population and to identify important subgroups. The following rule of thumb can be applied to determine the minimum number of households to be interviewed: If the number of all households in a village or region is less than or around 200, then 20% of the households should be interviewed; otherwise 10% of the households should be sufficiently representative. It should be noted that once chosen, the same selected group (or panel) of individuals are surveyed in all further surveys and interventions in order to follow their behaviour over time. It should also be noted that for reasons of comparison, different BCTs will be carried out in separate regions, and one control group is also required. Thus, there will be a minimum of two regions. It is also possible to test different BCTs sequentially with one test group, but it should be kept in mind that the BCT "history" will affect outcomes.

Fig. 8.5   *Training interviewers, Bangladesh*

The first vital preparation task is to conduct a thorough interviewer training course, at which interviewers learn how to conduct interviews and how to explain the questions in ways that are understandable to the local population, and then rehearse these interviews. Interviewers need to learn about basic health behaviour theory, facts about the particular contamination (arsenic or fluoride) and safe water options.

The next task is to test the questionnaire. Each interviewer conducts two interviews, the aim of which is to identify questions that cannot be clearly understood or that do not show any variance (i.e. that were answered the same way by all respondents). The identified items need to be reworded or omitted.

The final task is to randomly select households, as the target population is usually too large to conduct interviews with everyone. The selection cannot be left up to the interviewers, because a bias in the results would probably arise (e.g. by selecting only the closest households). Random selection of the respondents (those providing answers to the questionnaire) from a list of the total population would be ideal (e.g. by tossing a coin). If such a list is not available, the random-route method can be applied: the interviewers are sent to randomly selected road intersections that are evenly distributed over the whole study area. From there, they select the households according to a fixed plan (e.g. every third house).

Fig. 8.6   *Interview with a woman responsible for fetching water, Ethiopia*

Step 5: Tasks

→ Recruit a team of local interviewers
→ Train the interviewer team in how to approach households and in interviewing techniques
→ Test your questionnaire in the field (on approx. 20–30 households)
→ Get information on population figures in your project villages
→ Randomly select households for interviews
→ Conduct the baseline survey

Example

In the Ethiopian case study (Tool_1), eight local college students were chosen after a test and personal interview. These students were then trained for four days. The training included: information about the project, fluoride, fluorosis and its prevention; how to approach households; how to handle rejections and difficult situations; interviewing techniques; and questionnaire. After the training, the questionnaire was tested in the field on 20 households. We were informed by the regional office and the community leader that approximately 320 households belong to our project village. The team decided to approach 100 households for interview (as sufficient funds were available). The random route procedure was introduced, and interviewers approached every third household on their route.

8.6 Determine the factors steering the target behaviour

The next step is to determine which factors are most decisive for different behaviours. We can do this based on either basic estimates or statistical analysis. The latter is better but requires some skills in statistics. Basic estimates can be made on paper or with a simple calculation program (e.g. Excel), while the statistical calculation requires a statistics program (e.g. SPSS).

Dividing the sample into non-performers and performers

For a basic estimate, we first have to differentiate between non-performers and performers of the target behaviour. If the behaviour is performed for 0% or for 100% of the time, then the distinction is easy, but values usually range between 0% and 100%. It is therefore necessary to define cut-off values. For example, if there is only an improvement in health when 90% of the drinking water consumed is contaminant-free, then people consuming less than 90% contaminant-free water would be considered as low performers and people consuming 90% or more contaminant-free water as high performers.

Calculate means

Next, we calculate the mean for each behavioural factor for both groups (non-performers and performers). The greater the difference between the means of the two groups, the more important the factor is. Note that for this step, it is important that all variables be on the same scale (e.g. from 0 to 4).

For statistically more reliable results, we recommend regression analysis, but this might require expert support (for a short description, see Mosler, 2012).

Step 6: Tasks

→ Look at the example Excel sheet to understand the procedure
→ Take your data and perform the steps described above

Tools

Tool_3: Example Excel Sheet for calculating means

Example

Our example case is found in Tool_3. For fluoride, it is essential that the total water consumption (drinking and cooking) of a household is fluoride-free. We therefore defined performers as people who consume 100% fluoride-free water and non-performers as people who consume less than 100% of fluoride-free water. We found 50 households to be performers and 50 households to be non-performers (remember, this is a fictional example). For these two groups, we calculated the means of all factors from the RANAS model (including our new factor, "guest norm"). In Tool 3, only 5 factors are shown. Calculating the means of both groups for each factor and then looking at the difference between the two means, we found that the two groups differ most in the descriptive norm ("what others normally do") and commitment towards using the community filter. These two behavioural factors will be most important in steering target behaviour.

8.7 Define and design interventions to change significant behavioural factors

We now know which behavioural factors are most significant and can now apply the Behaviour Change Techniques (BCTs) that correspond to these. In the following paragraphs, each behaviour change technique is described in detail, and examples from different projects are given. The BCTs are based on Albarracin et al. (2005), Michie et al. (2008), Abraham (2011) and Mosler (2012).

Information BCTs to address risk factors

Information and education are BCTs. Risk perceptions can be influenced by information which people can use to gain an understanding of the health threat.

Presentation of facts / knowledge transfer: Verbal presentation, pictures and/or videos are common techniques used to communicate the circumstances under which a disease can be contracted.

Personal risk information: Individualised messages may focus on cumulative risk effects and on presenting qualitative and quantitative examples to each person individually. It can also be useful to request people to appraise their own susceptibility; this may lead to a discussion of their invulnerability beliefs.

Fig. 8.7 *Women's educational workshop, Ethiopia*

Showing scenarios: Presenting situations in the everyday life of the person where she or he can contract the disease is powerful, scenario-based risk information.

Fear arousal: Graphic illustration of pain, distress, bodily disabilities or even death are more effective in arousing fear than theoretical arguments.

Persuasive BCTs to address attitudinal factors

Instrumental beliefs can be changed by persuasive interventions with strong arguments or peripheral cues.

Persuasive arguments: These use causal explanations, explain technical functionality, present novel and important information and are of high positive expectancy value.

Persuasive peripheral cues: Examples of such cues are competence, sympathy, credibility, fame, publicity and the length and number of arguments in the message.

Talking to others: A person is subject to the self-persuasion they need to generate or reuse arguments in favour of the new behaviour.

Affective persuasion: The new "healthy behaviour" is promoted to be pleasant or joyful, and aversion is associated with the "unhealthy behaviour".

Norm BCTs to address normative factors

BCTs targeting norms aim to change normative beliefs about other people's behaviour and their appreciation of the new behaviour.

Highlighting norms: This BCT focusses on a still infrequent but desired behaviour using positive messages – how others will think well of you. Injunctive normative messages, about how others will disapprove of your behaviour, are also effective, while a message that an undesired behaviour is regrettably frequent (descriptive norm) is counter-effective.

Informing about others' approval/disapproval: Knowing that other people who are considered important (e.g. traditional leaders) support the desired behaviour or disapprove of the unhealthy behaviour is an important motivator to comply.

Public commitment: People make public their commitment to a favourable behaviour, thus showing to others that there are people who perform the new behaviour.

Anticipated regret: People are brought to imagine the concerns and regret they would feel after performing undesired behaviours which are not consistent with their personal norms of living healthily.

Infrastructural, skill and ability BCTs to address ability factors

Infrastructural, skill and ability BCTs help people to gain confidence in their ability to perform a behaviour.

Setting up infrastructure: Having access to the necessary infrastructure (e.g. vessels for water collection, filters for filtering water etc.) is a precondition for performing the behaviour. The infrastructure can be provided externally (e.g. community filters, neighbouring wells) or privately by the household itself, perhaps with some external help (e.g. household filters).

Guided practice: The target behaviour is demonstrated, instructed and enacted, and feedback is given.

Financial resources: Financial support may be given directly to the persons and may be coupled to the condition that some effort be made to obtain some financial resources for remaining costs.

Social help: Neighbours, friends, acquaintances or relatives encourage and support the person with material help and practical advice.

Provide instruction: Skills can be enhanced by conveying know-how.

Modelling: Persons who perform the behaviour and who are perceived as competent and successful serve as role models.

Reattribution of past successes and failures: Self-efficacy is fostered if failures are not attributed to the persons themselves but to adverse circumstances; successes, in contrast, are attributed to the person.

Coping with barriers: Self-efficacy can be improved by identifying barriers to the new behaviour and seeing how these could be overcome.

Coping with relapse: Risky situations, in which a person might fall back into the old behaviour patterns, can be counteracted by planning coping responses and by practicing these responses until they become automatic.

Fig. 8.8   *Public commitment at a women's workshop, Bangladesh*

Planning & relapse prevention BCTs to address self-regulation factors

The focus here is on self-regulation.

Daily routine planning: Planning fosters action control as the person is prompted to plan exactly when to perform the desired behaviour in the course of daily life. Discussions are held with the person about how (and when and where) to integrate the new behaviour into her/his daily routine.

Outcome feedback: Feedback is given on the effects (e.g. on health) that result from the desired behaviour, or the person herself/himself checks for these effects (self-feedback).

Contingency management: The person builds her/his own incentive system so that she/he is rewarded each time the desired behaviour is performed.

Stimulus control: Coping planning can be carried out by removing reminders or cues to engage in old behaviours and adding cues or reminders to engage in the new behaviour.

Prompts: These are cues or reminders that trigger the behaviour in the right situation.

Commitment: Individuals are stimulated to formulate when, where, and how they intend to achieve their goals.

Step 7: Tasks

→ Take your calculation from step 6 and identify which of your behavioural factors has the strongest intervention potential (the biggest difference in means between groups)

→ Link your behavioural factors with the strongest potential to the list above and identify possible BCTs for influencing that factor

→ After identifying possible BCTs, check the examples provided and decide whether these would be applicable in your case, or design new BCTs using the explanations in this section

Examples for BCT designs:

- Design_1: Information BCT loudspeaker rickshaw in Bangladesh
- Design_2: Persuasive BCT in Ethiopia
- Design_3: Knowledge transfer BCT in Ethiopia
- Design_4: Risk information BCT in Bangladesh
- Design_5: Public commitment BCT in Ethiopia
- Design_6: Pledging BCT in Bangladesh
- Design_7 : Coping planning BCT in Bangladesh
- Design_8: Daily routine planning BCT in Ethiopia
- Design_9: Implementation intention BCT in Bangladesh

Example

We have found that the most promising factors to be addressed when attempting to change people's behaviour are the descriptive and commitment norms. That means that we could apply two interventions. Here we focus on the public commitment BCT.

In order to compare the effect of our BCT, we divide our sample into two groups: an intervention group and a control group. The intervention group is made up of 25 randomly selected households that are 100% users of the fluoride-free water source and 25

households who are defined as non-performers (i.e., those who do not use, or only partially use, the safe-water source). All other households are assigned to the control group (and do not receive a BCT).

8.8 Define suitable communication channels

The behavioural interventions have to be brought to the target population in the most effective way. The communication channels can be impersonal (via mass media) or personal. By talking to people (interpersonal communication) we can better address motivations specific to each individual. Many investigations have shown that interpersonal channels are more effective, but more people can be reached with mass media (Albarracin et al., 2005; Mosler and Martens, 2008; Tamas et al., 2009). The choice of whether to use impersonal or personal communication channels will depend on the potential access to mass media, on financial resources and on what kind of channel people are accustomed to. In the following paragraphs, the different channels are briefly described.

Mass media

Mass media can be divided into print media (newspapers, brochures and leaflets), audiovisual media (radio, television or loudspeaker systems on cars) and the internet. In the following, some of the most important uses of the channels are outlined. For an example of a mass media communication channel, see **Design 1**.

Informative report: Information is disseminated about a disease is contracted and what kind of behaviour can prevent this.

Mass media role modelling: The people are given advice from experts using role-model stories of community members who are perceived as attractive and similar in lifestyle to themselves, to increase the adoption of new behaviours.

Entertainment-education: Portrayals of popular role models and reinforcements in various formats, such as soap operas, popular music, films and comic books.

Behavioural journalism: Potential models are interviewed with questions designed to elicit informative reasons for adopting the new behaviour, on skills used or acquired in adopting the behaviour, and the perceived positive outcomes.

Fig. 8.9 *Mass media campaign with loudspeaker rickshaw, Bangladesh*

Interpersonal channels

Using interpersonal channels means that one or more persons communicate messages to a single person or a group of people.

Community meetings: BCTs can be introduced with messages or demonstrations, in a show, quiz or theatre play, open to all community members.

Home visits with promoters: Promoters can be hired and trained for door-to-door promotion of the new behaviour.

Opinion leaders: Persons open to innovation, who are of high social status within a social system (community), can be trained as voluntary social workers to promote the new behaviour within their social network.

Peer-to-peer communication: People are persuaded to do word-of-mouth advertising by talking positively about the new behaviour.

From teachers to children to parents: Teachers are instructed to educate their pupils in behaviour change, and then the pupils transfer the information to their parents.

Small-group training: The new behaviour is introduced and demonstrated to a small group, and the pros and cons of the new behaviour are discussed.

Mobilising social networks: Group members are linked to new networks, for example mentor programmes, buddy systems and self-help groups, that practise the new behaviour.

Fig. 8.10 *Interpersonal communication: a health promoter talking to the head of a household, Ethiopia*

For many interventions (BCTs), both communication channels can be used. However, interpersonal channels are more effective for communicating some BCTs (Table 8.2). For examples of interpersonal channels, see **Designs 2 to 9**.

Table 8.2 *BCTs that are best communicated through interpersonal channels*

BCT categories	BCTs
Information	Personal risk information Showing scenarios
Norm	Anticipated regret
Infrastructure, skill and ability	Reattribution of past successes and failures Coping with barriers Coping with relapse
Planning and relapse prevention	Outcome feedback Contingency management Stimulus control Prompts Planning the daily routine Commitment

Step 8: Tasks

→ Check the table above (Table 8.2) to see how your planned BCTs can best be communicated

→ Check on financial and human resources and talk to local partners to determine what communication channels are available

→ Implement your BCTs

Example

As we are working in a rather small village, we can reach our target population through interpersonal channels. Having checked our resources, we decide to employ health extension workers from the village to deliver our public commitment intervention (blue flags to highlight which and how many households are already consuming 100% fluoride-free waters) (see **Design 8**).

For ethical reasons, the control group receives the most effective intervention at the end of the field test after the final survey.

8.9 Evaluate the effectiveness of the BCTs and their long-term effects

With this evaluation, we aim to determine how effectively the BCTs have changed behaviour. There may be several consecutive intervention campaigns in one area, and each must be evaluated with an intermediate survey after 1–2 months. A final survey is conducted 6–12 months after the last intermediate survey. During this 6–12 month period, there should be no interviews or interventions in the project area.

An alternative is to carry out BCTs in different areas, including one control area. In such a case, exactly the same questions need to be posed in all surveys in order to analyse how behavioural factors change over time as a result of interventions. Additional questions should be included to check whether the BCTs were delivered as intended. Did the targeted group participate in BCTs? Did people like or dislike the BCTs? What can they remember about the BCTs?

The effectiveness of the BCTs is evaluated by comparing the change in behaviour of groups who received a BCT with groups who did not. The analysis shows whether the targeted behavioural factors were actually changed or not and provides information on how the campaign should be modified.

The final survey is vital in order to evaluate the long-term effects of BCTs. This questionnaire should specifically focus on assessing whether and why people have stopped performing the target behaviour. This information is important for further relapse prevention, so that new or more BCTs can be designed.

Fig. 8.11 *Interviewing a woman responsible for water treatment, Bangladesh*

Step 9: Tasks

→ Tool_4: Intermediate questionnaire, Ethiopia

→ Tool_5: Intermediate questionnaire, Bangladesh

→ Tool_6: Final questionnaire, Ethiopia

→ Tool_7: Final questionnaire, Bangladesh

→ Tool_8: Example Excel sheet for calculating intervention effects

Tasks

→ After the implementation of the BCTs, wait for 1–2 months

→ Prepare your intermediate questionnaire by adding appropriate questions about the BCTs to your baseline questionnaire

→ Conduct the intermediate survey to evaluate the intervention effects

→ After the last survey, wait for 6–12 months and make sure that during this period, there are no activities taking place in the project area

→ Prepare your final questionnaire by adding appropriate questions about the reasons for stopping the target behaviour to your intermediate questionnaire.

→ Conduct your final survey to evaluate the long-term effects of BCTs and design new BCTs for relapse prevention

→ Calculate the short- and long-term effects of BCTs with the help of Tool 8

Example

First we check whether our public commitment BCT had a positive effect on changing the commitment. Using Tool_8 (Sheet 2 in the Excel file) we can now see how people changed their behaviour over time. The group who received a public commitment BCT used more filtered water themselves, perceived an increase in the use of filtered water by others and felt themselves to be more committed. The findings for the control group were similar but less marked. This result is not surprising, given the fact that both groups were living in the same village. The fact that people in the village committed themselves in public to use the community filter must have had an effect on their descriptive norm (what others normally do).

Ten months after the intermediate survey, we conducted our final survey to evaluate the long-term effects of our BCT. The data that we collected can be seen in Tool_8 (Sheet 3). There we added an extra column for entering the data from the final survey. If we now calculate the differences between the means from the final and the intermediate survey we can see the long-term effects in both groups. In our example, we find that the behaviour of the public-commitment-BCT group had stabilised, while that of the control group had decreased over time.

These results indicate that if the new behaviour is not promoted, the initial increase in the use of a new technology can lapse with time.

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