

# Increasing Safe Water Consumption in Bangladesh and Ethiopia

**Behaviour change interventions that best support people in collecting safe water are a burning issue among practitioners and researchers in developing countries. This article provides a systematic approach to changing water collection behaviour in Bangladesh and Ethiopia.** Alexandra Huber<sup>1</sup>, Jennifer Inauen<sup>1</sup>,

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To mitigate water-borne diseases, safe water options for households and communities are currently being implemented in developing countries. However, most research is conducted on technical performance of mitigation options and little attention is paid to continuous use of safe drinking water by the risk-prone populations. To successfully promote safe drinking water options, it is important to investigate psychological determinants influencing their use.

## Systematic behaviour change approach

Our research group is developing a methodological approach to allow purposive behaviour change. We first present a conceptual behaviour model based on sound psychological evidence and theory, as well as behaviour change interventions targeted at changing the described behavioural determinants. An analytical tool is then depicted that quantitatively identifies the key behavioural determinants to be changed.

## Conceptual behaviour change model

The model is divided into three distinctive components: the targeted behaviours (new behaviour and alternative behaviour), the behavioural determinants and the corresponding behaviour change interventions. The behavioural determinants are derived from the **Theory of Planned Behaviour** [1], the **Health Action Process Approach** [2] and research on habit development [3].

To form habitual behaviour, five groups of determinants – risk beliefs, attitudinal beliefs, normative beliefs, ability beliefs, and self-regulation factors – have to become favourable towards the new behaviour:

- Risk beliefs entail perceived vulnerability and severity of contracting an illness, and factual knowledge on the possibility of being affected by potential contamination. Information interventions

increase people's risk beliefs (i.e. educational interventions).

- Attitudinal beliefs comprise instrumental beliefs about costs and benefits of the behaviour, as well as affective beliefs, i.e. feelings arising when thinking about the behaviour. Positive attitudes can be induced by persuasive interventions (e.g. highlighting benefits of the behaviour).
- Normative beliefs include descriptive norms (behaviours typically performed by others), injunctive norms (behaviours typically approved or disapproved by others) and personal norms (personal standards, what should be done). Norms can be changed by normative interventions (e.g. opinion leaders, enhancing performed behaviours).
- Ability beliefs indicate a person's knowledge to perform a behaviour, the confidence in one's ability to organise and manage the behaviour (self-efficacy), and to deal with possible barriers (maintenance self-efficacy, recovery self-efficacy). Infrastructure and ability interventions help people gain confidence

in their own abilities (e.g. adjusting the time of water collection to the daily schedule).

- Self-regulation factors help to manage conflicting goals and distracting cues when intending to implement and maintain the behaviour. Important determinants are commitment and remembering the behaviour. Planning interventions help to translate goals into actions (e.g. make plans to overcome barriers).

All these factors may potentially influence behaviour. Aside from the target behaviour (e.g. drinking safe water), the alternative is also considered (e.g. drinking contaminated water). The aforementioned factors may also influence other outcomes, such as use of a new technology, behavioural intention and habit.

## Developing behaviour change interventions

The first step in developing successful behaviour change interventions is to identify key behavioural determinants from the pool of potentially influencing determinants depicted in the behaviour change model. Key factors may differ between behaviours (e.g. water collection behaviour versus hygiene behaviour) and target populations. Our approach therefore includes a structured survey to assess the status quo of behavioural determinants in the target population. Behavioural determinants can be measured by face-to-face interviews with a sample population using a structured questionnaire. Interviews are conducted in each household with the person responsible for water collection. Questions asked to assess the injunctive norm are for example: "Do people of your community rather approve or disapprove that you collect water from the arsenic-safe well?" Respondents are offered a nine-point rating scale ranging from "They strongly disapprove" to "They strongly approve". More examples are given in [4].



Photo 1: Promoter installing a prompt on an arsenic-contaminated tubewell.

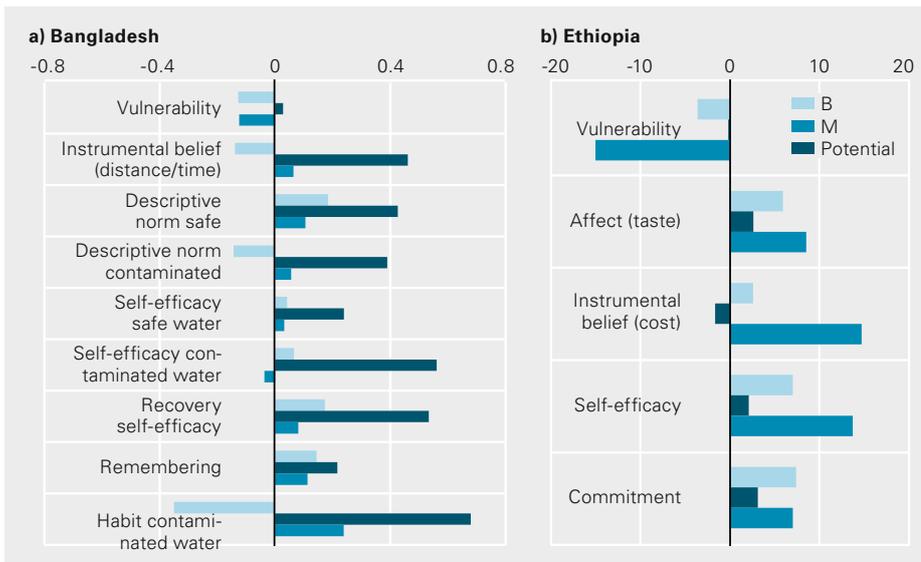


Figure 1: Intervention potentials of determinants for safe water consumption (regression weights (B), means (M) and intervention potentials ((Target-M)\*B)).

To derive determinants with highest behaviour change potentials, the collected interview data is statistically analysed using a method proposed by Tobias [5]. Means and standard deviations are computed to estimate the level of determinants in the target population. Multiple regression analysis on behaviour, in this case water consumption, is then used to identify key behavioural determinants. For each determinant, the sample's mean is subtracted from the targeted value of the determinant. This value is then multiplied by the regression weight of the determinant (B, representing the strength of association between determinant and behaviour). The higher the resulting value for the determinant, the greater the potential impact of a behaviour change intervention targeted at changing this determinant.

The systematic behaviour change procedure is exemplified to increase safe water collection in Bangladesh and Ethiopia.

## Interventions in Bangladesh and Ethiopia

Bangladesh is the most arsenic-affected country in the world. Chronic consumption of arsenic-rich water can lead to severe health consequences, such as cancer. One mitigation option is collecting water from neighbouring arsenic-safe wells.

Structured face-to-face interviews were conducted with 362 households in 16 villages of Manikganj district.

Multiple linear regression revealed stronger habits to use neighbouring arsenic-safe wells for people with higher self-efficacies, higher descriptive norms, who reported using memory aids to re-

mind them to collect safe water, who felt less vulnerable to developing arsenicosis, who found it less difficult to find time and handle the distance to the well, and who had weaker habits to collect water from contaminated wells.

Intervention potentials were computed as described above (Fig. 1a).

Based on these results, several behaviour change interventions were designed and two examples are given below:

- **Prompt on arsenic-contaminated well**

- Goal: break habits of using contaminated wells.
- Content: prompts attached to contaminated wells pointing to harmful water uses (Photo 1).

- **Community commitment**

- Goal: prominently display that other community members also collect safe water.
- Content: people are asked to publicly commit to collecting safe water.

In the Ethiopian Rift Valley, high fluoride concentrations in groundwater and surface water involve potential risks of developing dental and skeletal fluorosis. A fluoride removal community filter using the Nakuru technique (bone char and calcium phosphate pellets) was thus implemented in a rural village in the Rift Valley.

A cross-sectional survey of 180 households was conducted to investigate enhancing and hindering factors of community filter use. Results of the survey revealed that five factors of the behaviour change model significantly influence the consumption of fluoride-free water: perceived vul-

nerability, taste, perceived costs of filtered water, self-efficacy to fetch water at the community filter, and commitment to consuming filtered water. Intervention potentials were calculated (Fig. 1b) for these five factors. Perceived vulnerability and costs were targeted to achieve change. A persuasion campaign with two types of tailored interventions was conceptualised:

- **Perceived costs persuasion**

- Goal: lower people's concern about the treated water costs.
- Content: personal water budget calculation and quality persuasion.

- **Children's vulnerability persuasion**

- Goal: increase people's awareness of the adverse impact of fluoride-contaminated water, especially on children's health.
- Content: personal risk information for each child and consequences for their lives.

In both studies, the interventions described have already been implemented and are currently being evaluated.

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