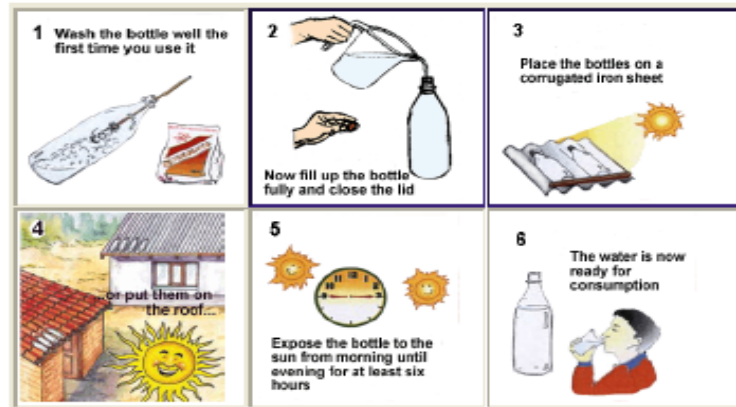


## Diffusion and Adoption Factors of Solar Water Disinfection

### Introduction:

Solar water disinfection (SODIS) is a pro-poor household based water treatment system. Plastic bottles are filled with water and exposed to the sun for at least six hours. This process makes the water potable. SODIS can prevent diseases, reduce garbage and save money, time and resources.



Against expectations, SODIS is not a self-disseminating method. Given its benefits, its uptake could be faster and more widespread. Therefore, these questions have been researched and recommendations will be given from results about how to disseminate SODIS and how to enhance its adoption.

### Outline

The following results and recommendations can be split in three parts. The first part outlines different promotion activities that have been researched and which of these were successful. The second part deals with the adjustment of promotion to given circumstances and how this adjustment can be shaped and achieved. Finally, the third part explains certain adoption and diffusion factors in more detail. At the end, a short conclusion is given.

### 1) PROMOTION STRATEGIES

#### Starting a SODIS Campaign:

Liaising with the local government and administration is crucial for introducing SODIS into a community. The process of introduction needs the support of respected people from the community to be accepted by the wider majority.

#### Information Event:

With the help of influential or prestigious individuals, information events can be initiated. This can be an important step for launching a SODIS campaign, but by itself only creates about 10% of users. Up to 60% of people who take part in an information event may start with SODIS, however, only a small percentage of the whole population can be reached with such an event and without any further interventions, even this 60% users out of the attendants will shrink rapidly.

Such an information event should include explanation of the relation between hygiene and health, presentation of water treatment as one hygiene measure, explanation of how and why SODIS works and a practical demonstration of how to prepare SODIS. If people are asked to bring a plastic bottle to the event, they can join the practical part. The event

should allow a lot of space and time for questions and people should be encouraged to answer each others questions.

**Promoters:**

Personal household visits done by SODIS promoters have proven to be the most effective method of disseminating SODIS into the community. Some issues should be considered:

- Promoters who are perceived as knowledgeable, who are similar to the potential user, who are liked and looked up to, create more users than promoters who do not possess these attributes as strongly. Thus, promoters should be living in the community, should have a good status within the community (e.g. health-workers / nurses, elected representatives) and should be well trained and educated about SODIS, health and hygiene.
- A good promoter training should be profound (background material on how waterborne diseases develop, where they come from, how they can be prevented) and adapted to the needs of the promoters (education level, preferred system of learning, including pictures). If possible, there should be more than one training event; enough time should be given for each training event and there should be space and time for questions and discussion
- To change the water situation alone can reduce diarrheal diseases by 21%, improved hygiene by 35% and both together by up to 45%. Therefore, SODIS education should be combined with education about food and personal hygiene (hand-washing, etc.), sanitary hygiene and health background knowledge (e.g. what are bacteria, where do they come from, how do they create diseases, what can I do about it).

**Bottle Centers:**

If the bottle availability is low (if people of the target population indicate that they do not own enough bottles and that it is hard to get them), bottle centers can be of help.

Motivated and mobile individuals have to be identified as well as sources for bottles (e.g. used bottles from hotels, restaurants, bottle collectors or from a donor like a PET bottle manufacturer). The future bottle center leaders are introduced to the donor of the bottles (and maybe a contract is set up), educated in SODIS, integrated into the SODIS campaign and need to receive a business training. Such a business training should contain the basics of how to set up and lead a small business, about keeping a business running successfully long-term and about accounting practices.

It is of advantage if the bottle center leaders receive a larger stock of bottles in the beginning of setting up their business as a support for kick-off. They also should be accompanied for at least some months with regular meetings and the possibility for support in case of any unforeseen problems.

## **2) ADJUSTMENT OF PROMOTION**

**Monitoring change:**

Some (structured) interviews with the target group and (possible) SODIS users will provide information about living circumstances and the status of the users\*. In the course of the campaign, it is important to know how people's situations change and what kind of

problems they are faced with. Different stages of the uptake and dissemination process require different promotion strategies. In the attachment, an example for a structured monitoring tool.

According to the results of such an evaluation instrument, the promotion strategies can be shaped. Memory aids help if habit is low, public commitment changes the social attitudes, a pass-on-task enhances communication and an implementation intention contract integrates SODIS into the daily routine. This systematic approach is explained in more detail in the following section.

Each used promotion strategy should be discussed with the promoters. It is important that the material is understandable for and perceived as good-looking by the target group (problems can be for example illiteracy or that the people in the picture are not of the same culture as the target group). The acceptance is higher if the material is shaped to the target group.

\* To have an objective rating of how much SODIS people are using, it is important to make observations, so that one does not only rely on the self-reported behaviour.

### **Supplementation of Promotion:**

The work of the promoters should be completed by certain tools. Which of the following tools should be used, depends on the state of the users:

- If the overall social attitude could be more positive, public commitment posters can be used. Publicly displayed posters (e.g. over the door of the house) are saying: “Here we do SODIS because we are healthy”. Alternatively or additionally, SODIS users can be asked to display their bottles in a well-visible spot when they lay them in the sun. In case schools or public institutions are preparing SODIS, their bottles can also be displayed publicly.
- If bottles are not easily available, this is a limiting factor. The solution to this can be bottle centers (see below for more information).
- If there is a certain percentage of users, but the exchange and communication about SODIS is low and regions beyond the direct influence of the promoters shall be reached, a pass-on-task can be used: Tokens (vouchers for a bottle at the bottle center for half price) are given to possible users. Each person coming to the bottle center then receives another token with the request to pass it on to someone else and explain about SODIS. This strategy can be upgraded to a pass-on-competition by indicating the name of the person who is to pass on the token on the back of this token. When someone else redeems this token, it is added to a tombola. Individuals who talk more about SODIS and thus pass on and receive more tokens have a higher chance of winning. The pass-on-task itself should not be used alone, but supplementary to promoters or as a competition.
- If the forgetting of preparing SODIS is high, the building of habit can be supported with simple memory aids: a sticker / small poster / picture (so called prompt) in a prominent spot serves as a constant reminder. A prompt should be close to where SODIS is usually being prepared or the first (raw) water of the day is being consumed. Next to a picture (e.g. the bottles in the sun), the prompt should display an invitation for the targeted behaviour like: “Are the bottles in the sun yet?”.
- If individuals indicate that it is difficult for them to integrate SODIS in their daily routine, an implementation intention contract can be used: a promoter fills in a

contract with the person, in which the person has to indicate, when and where exactly SODIS shall be prepared and how regularly (e.g. “I will lay my bottles on my roof at 8 a.m. each morning in the week.”). This contract is signed and can be hung on the wall, where it serves as an additional reminder.

- Especially in the first year, it is important for the campaign not to be inactive for too long. People might lose interest, might not feel supported enough or view SODIS as not serious, when the campaign and the promoters withdraw too soon (except habit is strong and the social opinion very good - then the users are supporting each other). Public posters, wall-paintings, a strong bottle center and promoter activity keeps SODIS in the public eye and gives it a good image.

### **3) PARTICULAR ADOPTION AND DISSEMINATION FACTORS**

#### **Adoption Factors: Knowledge and Attitude:**

Knowledge about SODIS is necessary but not sufficient for SODIS use. Background knowledge about health and hygiene is also important, but alone not enough for most people to adopt SODIS as a regular behaviour.

Especially when SODIS is being introduced, people have to be convinced of this method, next to receiving the relevant information. Thus, the advantages of SODIS should be explicitly named and explained.

Once people are convinced of the benefits of SODIS (which happens relatively fast), still presenting those to them might be counterproductive, particularly if the problems lay somewhere else: having sufficient knowledge and a positive attitude about SODIS and still not using it regularly can indicate a lack of habit (high forgetting), a negative social attitude about SODIS or structural problems (like bottle unavailability or not having identified the right space and time for the preparation of SODIS).

#### **Adoption Factors: How does someone become a regular SODIS user?:**

- Analysis showed that regular users are different from all other types of users in more than one aspect: their perceived need for water treatment, their attitude towards SODIS, their intention and their habit. It also showed that for a regular user to stop using SODIS, it can be enough that one of these factors decreases. Thus, interventions should cover all these aspects, each one in the point of time in the campaign when they are most important.
- If asked for reasons why someone does not use SODIS, in the beginning of a campaign, people claim mainly that it is too difficult to get bottles, that the amount of water that is treatable with SODIS (i.e. with the amount of bottles they have) is too small and therefore, SODIS is too effortful. Later in the campaign, the social influence becomes stronger additionally to the aforementioned hindrances: That other people do not do SODIS or that someone said SODIS is not a good method also becomes a reason for not using SODIS. People who know about SODIS, but nonetheless decide not to use SODIS, give more reasons with time: Reasons like “the water is clean enough and needs no treatment”, “SODIS does not taste good” or “I do not like SODIS” seem like emotional justifications, while “I am always forgetting to do it” or “I am used to another treatment” point to a (missing) habit.

**Dissemination Factors: Spatial Diffusion:**

To examine the spatial diffusion of SODIS, maps of the intervention areas have been divided into squares. The squares were subdivided into boxes, which are then chosen randomly for each point of survey, so repetitions were avoided. 10 people for each box in 4 points of survey have been interviewed.

This kind of surveying spatially has shown that the most important factor for the density of users in any given area is the number of users in surrounding areas. The risk awareness of unsafe water and the potential to contract waterborne diseases is also important. With more time, it becomes more and more important, how many neighbours and friends (as opposed to official SODIS promoters) talk about SODIS.

Together with results from other survey tools, it can be concluded that it is important to raise the user numbers first with promoter work. Then, a pass-on-competition can be used to get people to talk about SODIS more often, so that more people are being influenced to adopt SODIS as well.

**CONCLUSION:**

Experience and research has shown that it is possible to reach a big number of people with a SODIS campaign and to turn SODIS into a habit, if certain issues are considered. Particularly in regions where other water treatment methods are not available or not affordable, people are very thankful to hear about SODIS and to be able to care for their own health in such an easy way. The care and thought that is required to set up a good SODIS campaign should not be discouraging - instead, developmental projects in general should be implemented with care and thought.

**Based upon:**

The statements of this report are based on literature and data analysis:

Kraemer, S. M. (2007-2009). [Interview responses to psychological and situational variables from inhabitants of high-density areas in Harare, Zimbabwe during the course of longitudinal surveys between April 2006 and June 2009]. Unpublished statistical data.

Kraemer, S. M., & Mosler, H.-J. (in review). Persuasion Factors Influencing the Decision to Use Sustainable Household Water Treatment. *International Journal of Environmental Health Research*.

Kraemer, S. M., & Mosler, H.-J. (in review). Effectiveness and effects of promotion strategies for behaviour change. *Applied Psychology: An international review*.

Kraemer, S. M., & Mosler, H.-J. (2008). *Using methods of environmental psychology to plan a campaign for disseminating solar water disinfection in high-density areas in Zimbabwe*. Poster session presented at the International Conference of Research for Development (ICRD) of the NCCR (National Center for Competence in Research North-South), Bern, Switzerland.

Kraemer, S. M., & Mosler, H.-J. (2008). *Planning a campaign for SODIS as a household based water treatment using psychological methods*. Poster session presented at the Annual meeting of the North-South-Centre, Zürich, Switzerland.

Kraemer, S. M., & Mosler, H.-J. (2008). *How to overcome slow uptake of a sustainable water treatment method in a developing country*. Presentation held at the biannual Conference of International Applied Psychology (IAPS), Rome, Italy.

- Kraemer, S. M., & Mosler, H.-J. (2008). Using the social network: Promoting of SODIS in high-density areas in Zimbabwe. Presentation held at the annual International Conference of Psychology (ICP), Berlin, Germany.
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- For more information and various literature (health impact studies, biological and chemical studies, social scientific studies) about SODIS, please also see [www.sodis.ch](http://www.sodis.ch).

**Attachment: Social Monitoring Tool**