

# SODIS - WATER QUALITY IMPROVEMENT AT HOUSEHOLD LEVEL

## A CASE EXAMPLE FROM TAMIL NADU, INDIA

### SUMMARY

In Tamil Nadu, about 72% of the population has no access to clean drinking water. Gastrointestinal diseases are therefore widespread. To improve this situation, LEAD, a local women organisation, promotes SODIS for the treatment of drinking water at household level. LEAD makes use of its existing network of sangams (women self-help groups) for the dissemination of SODIS. In addition, teachers and students of local schools are trained in the application of SODIS. For the supply of PET-bottles, a scheme has been installed and synchronised with the micro-credit system. The SODIS-bottles are given to sangam members on credit to be paid back in small installments.

Over a project period of 2 years, 41'450 families have been trained in improved hygiene practices and the application of SODIS. More than 111'000 PET bottles have been sold to the users. 48% of the trained people regularly and 45% irregularly use SODIS for the treatment of their drinking water.



### THE CONTEXT

In Tamil Nadu, about 72% of the population has no access to clean drinking water. All natural water sources are highly contaminated, which results in vast spread of gastrointestinal diseases and occasionally even in cholera epidemics.

Groundwater is the main source of drinking water in the project area. This water, provided by the government, is stored in large local overhead tanks and finally distributed to the households. Other common sources for drinking water are private hand or motor pumps or in a few cases pond water. The water tests revealed that all the sources are highly contaminated with faecal bacteria. 90% of all the samples tested contained bacteria counts of 100 to 1000 colonies per 100ml.

Several factors account for the serious water contamination. Insufficient hygienic infrastructure and poor hygiene practices by the population lead to water contamination. In fact, all drainage water is discharged unprocessed into rivers. Since most households, especially in rural areas, do not have proper toilet facilities, faeces are disposed of in the open environment. During rainfall pathogens are washed into the groundwater. Furthermore, the sites of water collection are often very dirty and shared with cattle and other animals. This situation leads to a devastating health situation, a vast spread of gastrointestinal diseases and occasionally even cholera epidemics.

To overcome this situation, LEAD, a local women's organisation, dedicated its efforts to the promotion of Solar

Water Disinfection, SODIS, a simple, low-cost method for the improvement of drinking water to be used at household level.

To disseminate the information about SODIS, LEAD had the great advantage to be in charge of a network of Sangams. Sangams are women self-help groups, formed among low income communities, that had been established through a micro credit system. Approaching the groups, SODIS promoters found easy access and an established structure for the dissemination of the information on SODIS.



Fig. 1: SODIS is used to improve the quality of drinking water in Tamil Nadu.

## THE PROJECT

Based on the experiences gained during the first phase of the project, that is funded by the SOLAQUA Foundation, the objectives of the second phase were to increase the number of the families trained in the application of SODIS and conduct an acceptance study. All activities were concentrated on five districts along the Cauvery Basin: Trichi, Erode, Perambalur, Karur and Pudukkottai.

To broaden the area of influence, LEAD established the collaboration with 4 local NGO's, all of them having their own network of existing Sangams. From each NGO, one supervisor and four animators were trained and incorporated into the SODIS project team.

### Actors

The supervisors are responsible for the field activities in their area, supervise the animators and they are accountable to the project coordinator. They train new animators, local volunteers, organize cultural programs and create new sangams.

The animators - all female - are the major task force in the field. They take care of about 10 sangams per month, check SODIS implementation, are involved in bottle supply and coordinate with the local volunteers. The animators give SODIS training at Sangam and Federation Meetings.

The local volunteers are local women helping in the SODIS dissemination in their village, check for the correct application of SODIS and take care to the bottle distribution.

### SODIS promotion through Sangams

Central to the promotion of SODIS are the monthly Sangam meetings. Sangams are self help groups of women of low



Fig. 2: The information on SODIS is disseminated during Sangam Meetings.



Fig. 3: Students are playing a theater on SODIS.

income communities established through a micro credit system. A Sangam counts between 12 and 20 members. The motivation of a member to join the group is the option to receive a credit for some income generating activities.

SODIS staff use the monthly meetings of the Sangams as a platform to promote SODIS. Occasionally they also create new Sangams themselves. During the meetings awareness is created on different transmission paths of diseases, different methods for water treatment are explained and SODIS is described in detail. The steps of the preparation procedure are practically demonstrated and the audience has to repeat the procedure. Interactive training methods were found to be very effective. Directly after the training, bottles are supplied as people are curious and motivated to apply the new technique.

### Promotion through schools & cultural programs

With the consent of the headmaster, the animators select and train a small team (about 5-15) of motivated, volunteering students to form a SODIS group. The promoters teach them short theatre performances on hygiene promotion and SODIS training. After several training sessions spread over a few weeks, the theatre is performed in front of the entire school. After the introduction of SODIS, the headmaster usually arranges the bottle distribution to the students.

The children SODIS groups also perform at central places to a mixed audience from the local population. Next to the theatre performances, puppet shows and dances, the program often includes talks from local opinion-leaders. They significantly can increase people's interest in the performance and add weight to the message.

## ACHIEVEMENTS AND FACTORS OF SUCCESS

One of the difficulties while disseminating the information on SODIS is that people hardly believe in the presence of bacteria when they cannot see them. Only when the effect of the water treatment on the bacteria is visualized, they realize the importance of treating their drinking water. The performance of water tests directly demonstrated in front of the users therefore is an important element of the sensitization process and probably the most effective method to convince people of the SODIS' efficiency.

For the tests a portable DelAqua Field Test Kit from OXFAM is used to do membrane filtration. Tests are conducted especially in sites, where SODIS acceptance is low or where new Sangams have been formed. The results from raw-water and SODIS-treated water are always presented pair-wise, to highlight SODIS' efficiency. Soon after the performance of a water test, the promoters approach the Sangams again in order to provide them with bottles as long as the people's sensibility to hygiene and SODIS is fresh.

In contrast to the strong contamination of the raw water, the tests showed that SODIS treated water contained 0 colonies of bacteria in 71.4% of the samples. In the other cases samples still contained a slight contamination due to very heavy contamination of the raw water, incorrect exposure or mistakes during the testing procedure.



Fig. 4: Presenting the results of the water quality tests to the community (left:raw water, right: SODIS water)



Fig. 5: Conducting water quality tests in front of the community increases acceptance

Another crucial factor for the sustainability of SODIS activities is the availability of PET-bottles. In the project area, an effective bottle supply system has been established through the network Sangams. Bottle. The bottle distribution at the lowest level is done by the local volunteers in the village. They usually keep a stock of about 50 bottles in their house, which allows them to supply bottles any time they are demanded. The stock of these bottles is replenished by Federations of Sangams. They purchase new bottles from the manufacturer, organize the transport and storage of the bottles. At Sangam meetings the members pay their instalments for the bottles to their leader who forwards the payment to the Federations. The price of one bottle is 5 rupees and Sangam member can pay back their bottles in small installments.

In Erode District, the members of one Sangam even organized tours to the city to collect recycled bottles themselves.

During a project duration of 2 year a total of 41'450 households and 99 schools had been trained in the application of SODIS and 111'600 PET bottles had been distributed. The survey on the acceptance of SODIS revealed that from the people trained there are 47.6% regular users, 45.2% irregular users and 7.1% non users. A regular user applies SODIS during more than 26 days per month, has more than 2 bottles per person, and more than 50% of the household members consume SODIS water daily. An irregular user applies SODIS 4 to 25 days per month, has 1-2 bottles per person and less than 50% of the household members consume SODIS water daily.

## THE CHALLENGES

The experiences at user level have shown that careful and repeated training efforts are necessary to establish the correct application of SODIS. The following faulty behaviours frequently had been observed at users level:

- **Mixed water consumption:** Many people don't follow the recommendation to purchase two sets of SODIS bottles. It is obvious that they consume both, SODIS but also non-treated water. A very widespread behaviour is that the SODIS bottles are exposed until noon and then consumed as long as available. When they run out of it in the evening, they drink raw water.
- **SODIS water only for the children:** In many families SODIS water is only prepared for the children.
- **Mistakes at bottle exposure:** Even though the Sangam members are properly trained in the SODIS application procedure, many of them seem to have forgotten about some details. Next to short exposure time, the observed mistakes include the exposing of bottle in the shadow (e.g. underneath trees) and placing bottles with the painted side up.
- **Bottle quality and damages:** The observed damages of used PET-bottles range from scratched surface, holes in the lid, leaky screw threads to the melting of bottles. Melting, however, was only observed in painted bottles. Because dark colour absorbs more energy, the painted side is more probable to shrink. Since February 2004, however, only plain bottles are distributed. Experience has shown that the sold SODIS bottles can be used for at least one year. Recycled bottles, which are thinner and thus less resistant than the distributed SODIS bottles, usually don't hold for longer than 6 months.

Using the large network of Sangams for the dissemination of knowledge on SODIS has proven very effective. Because Sangams are women self help groups formed among low income communities, they perfectly match the target group of the SODIS project. Due to the formation in groups the SODIS animators find an established structure and ready audience for their promotion. The behaviour of the whole Sangam often follows their opinion leader. The whole Sangam can be convinced by only persuading the opinion leaders.

However, as the Sangams are formed within defined communities like casts, religion, streets etc., certain families from minorities are not included and are therefore not approached. In addition, only a fraction of all women from poor families are already organised into Sangam groups.

Regarding the great advantages of Sangams for SODIS promotion, it is clear that this system should be extensively used. However, in order to overcome the disadvantages



*Fig. 6: One Sangam organized tours to the city to collect recycled bottles themselves*

and to achieve a satisfying density of SODIS households, additional promotion paths are necessary such as for example the inclusion of additional NGOs into the SODIS network. In many fields several NGOs are maintaining Sangams and they should be approached. Another strategy that should be included is the training of medical staff and doctors. When people suffer from waterborne diseases and consult medical help, they should be informed about SODIS

Also the promotion through mass media is a tool that will facilitate the further dissemination of SODIS. When people already have heard about SODIS, they will be much easier to approach by SODIS promoters. In India, TV and radio are extremely popular among the urban as well as the rural populations. Advertisement, especially if including TV-stars, could have a massive positive impact on SODIS dissemination. Other options are to represent SODIS at public events by installing stands, spreading pamphlets or performing theatres. Also the placing of advertisement posters at strategic sites should be considered

SODIS has improved the health situation of some communities in Tamil Nadu. In view of the necessity of a simple low-cost method for the treatment of drinking water in India, the collaboration with government programs, especially the public health and education systems will be crucial for the broad dissemination of SODIS in India.

## REFERENCES & PARTNERS

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