Learning Document

Household Water Treatment and Safe Storage (HWTS) in India

solaqua

Development Alternatives

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Supported by	:	Solaqua Foundation, Switzerland

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1. INTRODUTION

This learning document covers main learnings of work done on Household Water Treatment and Safe Storage (HWTS) implementation by Development Alternatives in last eight years' time span. Attempts have also been made to include the learnings of few other organisations in India, which have worked closely on HWTS. The objective of preparing this document is to bring the learning experience on HWTS at one place, so that the learnings can be used as base information for organisations that are working on similar areas; help them effectively take their work forward; to facilitate a space for exchange of ideas; and enable reach out of learnings related to HWTS intervention initiatives to masses. The document has also built its reference from the government initiatives keeping the scale of intervention in mind.

The process adopted was to go through the reports of all the three earlier phases and draw connections as what were the challenges, what was done to mitigate the emerging problems and what could have been done to improve results. This was followed by internal discussions with the teams working on the subject so as to capture the experiences which would have been missing in the documents. Once this information was analysed and compiled in the frame work of the learning document, visits were made to the identified people/agencies working on HWTS since last few years and with whom DA has been in touch in the last phase of the project. These one to one meetings have helped a lot in finalising the document by adding their inputs as experiences, and having discussions on the way ahead as partners and collaborators.

In a nutshell, the scope of the work mentioned here is mainly Delhi and NCR. Few other organisations whose work is included here are from different metro cities of India.

2. Drinking water crisis in India – A challenge

Drinking water crisis has been increasing throughout India since last many years due to lack of legal frameworks and citizens irresponsible behaviour coupled with factors like growing population, crumbling infrastructure, pollution, global warming leading to drought and flood in the country which has resulted into poor management of the water resources. The data shows that India accounts for only 9 per cent storage of its annual rainfall in reservoirs while developed nations store 25 per cent. India relies excessively on groundwater resources which makes it necessary to focus on surface water supply. But the river pollution due to discharging of untreated sewage, agricultural runoff, and unregulated small-scale industries makes the quality of water worst. Due to these reasons and similar issues the drinking water scarcity in India is increasing at alarming proportions.

At the time of Independence, the per capita availability of water in India was 6,008 cubic metres a year. It came down to 5,177 cubic metres a year in 1951 and to 1,820 cubic metres a year in 2001. According to midterm appraisal (MTA) of the 10th Plan, per capita availability of water is likely to fall down to 1,340 cubic metres in 2025 and 1,140 cubic metres in 2050[1]. The concretization in urban areas has choked the groundwater resources. The addition of sewage and industrial waste into water bodies is constricting the availability of drinking water. Also, the migration of people towards urban areas due to unemployment has also overloaded the cities which results in access of poor quality of water. The

[2] http://www.yourarticlelibrary.com/essay/essay-on-water-scarcity-in-india-1113-words/20871/

pollution of the water resources has made civic bodies unable to supply the clean water with low budgets.

Basic education and awareness among people can help to overcome these problems to a good extent. For instance, minimizing the habit to keeping the water running; taking appropriate steps to avoid any water leakage; being proactive in informing and regulating infrastructure damage leading to mixing of sewage into supply pipelines and developing the habit of treating the water at point of use. On the other hand, the civic bodies should use low-cost technologies to wastewater and recycle it for non-drinking purposes.

3. HWTS: Emerging Need towards Providing Safe Drinking Water to the Bottom of Pyramid population

Access to safe water is one of the major issues facing the world today. Nearly one billion people - one in eight persons in the world - lack access to safe water supply. Over 3.5 million people die each year from water-related diseases; In India, progress in access to improved drinking water sources has been equity neutral. The majority of the richest quintile however continues to use piped water on premises, whereas an increasing number of the poorest rely on boreholes with hand pumps (UNICEF and WHO 2011).

The household treatment and safe storage technologies is the solution to overcome bacteriological contamination and improve the quality of water for consumption within the home. It becomes more important especially where water handling and storage is necessary and recontamination is a real risk between the point of collection and point of use. Access to a distant source, unreliable piped supplies and reliance on rainwater are all situations that make household storage a necessity. Living conditions in natural and manmade disasters also call for effective HWTS technologies. These are cost effective and it can remove bacteriological contamination up to 99.99 per cent.

Studies have shown that through HWTS technologies, the diarrhoeal illness can reduce up to 30 per cent. An understanding of household preferences for HWTS products can be used to create demand

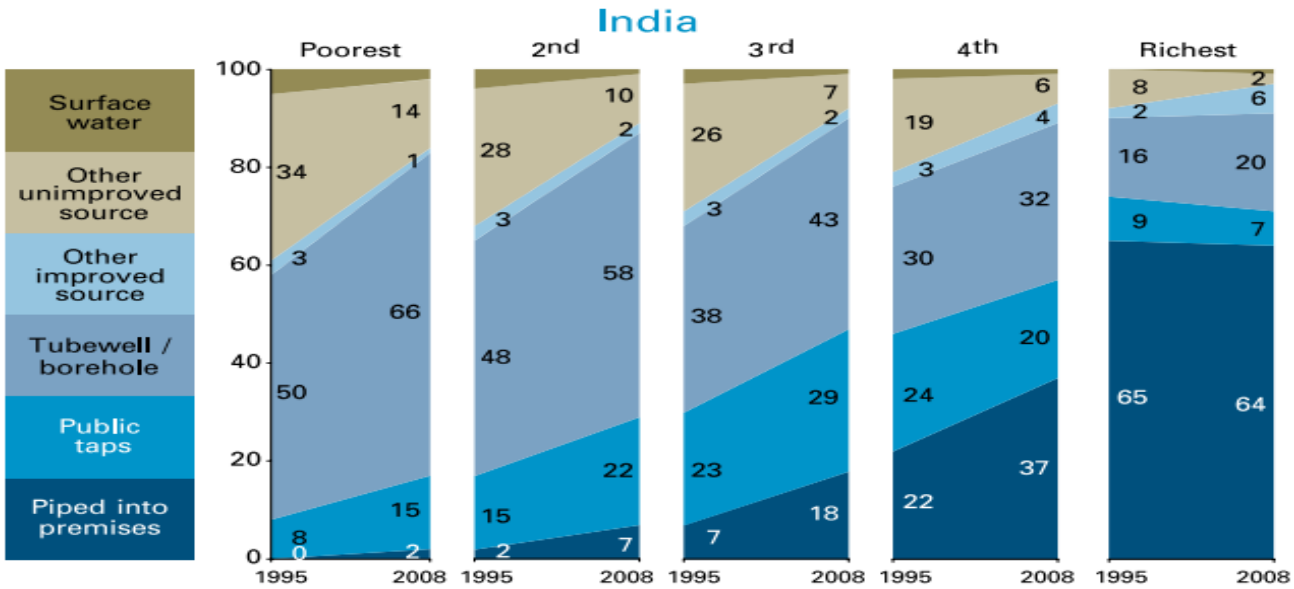

Figure 1: Progress in access to improved drinking water sources (Source UNICEF and WHO 2011 report on Drinking water Equity and Safety and Sustainability)

through effective product positioning and social marketing, and ultimately improve and ensure commercial sustainability and scalability of these products (Poulos C, 2012). Growth in purchase power, non-availability of clean potable water, and the introduction of innovative, affordable chemical/resin-based products have given the Indian point-of-use (POU) water treatment systems market a significant boost. The residential water treatment systems market is in the growth stage in India as urban lifestyles evolve in tandem with increasing globalization and the rapid pace of development of the Information technology industry. Extensive marketing efforts by product suppliers have helped expedite awareness on the detrimental effects of water contamination. New analysis from Frost & Sullivan - Strategic Analysis of the Point-of-Use (POU) Water Treatment Systems Market in India, finds that the market earned revenues of over INR 16,500 million in 2008 and estimates this to reach INR 50,758 million in 2013.

This schematic analysis indicates that many households with the poorest drinking water quality and most in need of HWTS do not use such technologies. The rationale behind this may be a combination of economic, social, educational and geographical reasons (UNICEF and WHO, 2011).

Bacteriological Contamination

In slum and poorly organized densely populated locations, the communities have poor hygiene and sanitation practices, and so the bacteriological contamination in drinking water usually increases. Groundwater gets contaminated by the practice of open defecation and through bad drainage where rainwater carries contamination from the surface into the ground. Due to this reason the water borne diseases proliferate just after the beginning of monsoon. Surface water can similarly be contaminated at any time by open defecation within the catchment area and drainage discharges into the surface water storage. Bathing and clothes washing, cleaning cattle and vehicles in surface waters can all introduce contamination, much of which is bacteriological.

Drinking water taken from these unprotected sources can therefore become the source of diseases. Even if a source is protected and known to be pure, there are chances that water consumed from such a source also gets contaminated. Bad hygiene practices and poor storage can turn pure water into unsafe water very easily within the home or during collection.

4. Household Water Treatment and Safe Storage Methods: Experiential sharing (2009-2016)

DA had prior experience of working on water purification technologies before it directly started working on HWTS since 2009. In this learning document the experience shared is since 2009. The HWTS project in 2009 had focused only on SODIS where dissemination on the solar disinfection technology was the main task. Based on the learnings of this phase the next phase was written where it was not just SODIS rather other HWTS technologies were also shared with people. The learnings of this phase were used to write the next phase of the project.

a. Phase I: Provision of safe drinking water in slums of Delhi, India through point of use (P-O-U) treatment method – SODIS

Between July 2009 and August 2011, Eawag and Development Alternatives with the help of local partner's organizations implemented the project in the urban slum areas of Delhi. The goal of the project was to improve the health situation in the target communities, children in schools and their families by introducing them to SODIS. Intensive community engagement and mobilisation over the project duration was the key to the success of the project. The focus of the project activities were awareness generation for behaviour change. Based on the initial baseline survey and exhaustive water quality monitoring 18 slums were selected as intervention areas. The target was to sensitize 10,000 households (HH) in these slums.

Experience Analysis

- **Challenges & Limitations**
  a. The behaviour of people changed from time to time during the project and this was the biggest challenge faced by the team is in terms of convincing the communities. A major difficulty standing in the way of progress of SODIS promotion was that peoples are orthodox and have a stringent attitude towards SODIS.
  b. One of the key challenges faced was the low awareness level in the communities of the need to have microbiologically safe drinking water. Many people are not aware of the link between contaminated drinking water and waterborne diseases like diarrhoea.
  c. They are also tradition-bound and do not easily to adopt new technologies. Instead, they are content to drink raw water as that was consumed by their forefathers and all earlier generations.
  d. At the same time, the simple nature of SODIS does not convince many people about its efficacy. People are used to visualize an efficient technology as something that involves the use of sophisticated machinery, filters or chemicals.
  e. In certain areas where Polyethylene Tetrapthalate (PET) bottles were purchased and supplied by the project team, people thought that these were special bottles and only these could be used for SODIS and it took a lot of effort to convince them to use normal soft drink or mineral water bottles.
  f. Besides attitudes, certain physical challenges also stood in the way. Since most of the slum locations are densely populated and are made in an unplanned way, availability of good sunlight for continuous six hours was a problem. In some case both husband and wife are working so it is not possible for them to keep the bottles for SODIS, some households generally forget to keep the bottles in sunlight and most of the time bottles get stolen. For some lack of bottles was also a barrier to use the technique.
  g. Migration for the better livelihood also affected the SODIS usage. This is one of the biggest challenges as for new people the sensitisation was a challenge and the earlier residents who had moved on, tracking and follow up was a challenge.

Strategies Adopted

The key strategies adopted in order to bring about behaviour change among the target communities were:

a. Door to door engagement of community anchors to reach more people within a short time. Greater impact due to interpersonal interactions was observed and interpersonal communication included message sending and message reception between two or more individuals.

b. Intensive mobilization of the community through channels like local leaders, women and youth professionals, mass media communication, appropriately formed SODIS trainers, SODIS promoters and SODIS users.

c. Street plays (Nukkad nataks) organized by the NGO partners for the promotion of SODIS was effective and it was successful in creating large scale awareness on safe drinking water and hygiene.

d. Checking drinking water quality at source level and at household level. Aqua checks vials were given to communities to check the water quality of raw water and after treatment of raw water from SODIS method, to show them visible impact of SODIS treatment.

e. Engagement of health professionals who have been working in their respective areas for a long time for the promotion of SODIS method as the slum inhabitants usually listen to these professionals.

f. Reaching to the school children of the nearby areas was effective as they were taking interest and they were the main agent of impact in the communities.

Lessons Learnt

a. Peer pressure works well in increasing the user base. People are influenced by their neighbours and friends using the technique. This is an effective tool for larger dissemination of the technique.

b. Health benefits derived by user motivate them to continue the practice and spread the word to their friends and neighbours.

c. Children feel motivated as they enjoy the status of being valued as a stakeholder in the entire process and become very enthusiastic.

d. The community mainly feels motivated when they are able to see direct benefit between expenditures on health costs as compared to the efforts put in to use SODIS.

e. There is a need for constant engagement with the communities as it is a new technique. There was a roll back when SODIS anchors visits got reduced, which showed that there was a need to get the message continuously.

f. The entry point for SODIS advocacy should be skits and plays as this has had a great impact on the slum households in adopting SODIS as a treatment. The other modes of advocacy such as incentivising people through gifts, painting competition etc. did not have the desired impact.

g. Promotion through schools and teachers was effective. Pupils learn much better and easier than their parents and they are more flexible to change habits. SODIS Anchors got a more friendly entry to those houses whose children were studying in the school. Children recognized them as Water or SODIS people.

h. Approaching people in groups enhanced their interest towards the uptake of the technique. The groups tapped included sewing centres, ASHA centres, health workers, MCD teachers, Anganwadis etc.

i. In order to promote SODIS on a large scale the Delhi Jal Board suggested that a third party certification of the SODIS process should be carried out by accredited laboratories. Delhi government mentioned that they would be comfortable with such as a National Accreditation Board for Testing and Calibration Laboratory (NABL) certified lab.

b. Phase II: HWTS Advocacy Strategy among the Bottom of the Pyramid in India with a focus on Delhi National Capital Region (NCR)

This project had a goal to reduce diarrhoea related child mortality and morbidity through further scaling up the application of HWTS/SODIS among end users and policy makers in NCR. Unlike the last phase, where DA had promoted only SODIS as a method, in this phase DA had promoted basket of low cost water purification methods which included boiling, SODIS, chlorine tablets and liquid chlorine.

The clear objective of the project was to scale up promotion and increase visibility of appropriate HWTS options through a participatory approach. The duration of the project was 21 months (October 2011 - July 2013). The project focused on end users residing in slums of NCR, stakeholders (mainly NGO's as partners) working on water issues and the decision-makers. With help of CSOs partners, the active people from the community (i.e. community mobilisers) were identified and were trained on Household Water Treatment options and on the concepts of safe storage. Out of the trained community mobilisers, 20 community anchors were selected for carrying out awareness activities in slums. A well thought out communication strategy was formed to reach the target audience effectively. The project was implemented through four CSO partners: Ashadeep Foundation, Forum for Organized Resource Conservation (FORCE), GMR Varalakshmi Foundation (GMRVF) and Ehsaas Foundation, who were working on similar issues and were in the same geographies.

For increasing visibility of the project, a network of stakeholders working in Water sector was formed which included professionals from CSOs, Networks, and members from the Government Departments etc. The aim of this group was to understand the current policy perspectives with respect to drinking water quality. From this network, a core working group was formed to develop a document on policy and programme recommendations for scaling up HWTS.

Experience Analysis

- **Challenges & Limitations**

To avoid duplication, efforts have been made to only include the challenges which were new and mainly were pertaining to this phase, though some are still mentioned as they were pertinent.

a. Most of the people residing in the slums of NCR had migrated from other parts of the country for earning more money. In majority of the slums the men and women were working and it is very difficult to tap them during day time as they come back home late in the evening. Community anchors selected in the project were mostly women and young girls and it was not feasible for them to go out in the evening for creating awareness.

b. Availability of resources appeared as one of the key parameters for adoption; the chlorine tablets which were provided in slums by ASHA workers were only distributed during the summer and monsoon season. Once people have got the chlorine tablets for free they were not interested in buying them and hence they keep drinking the untreated water during rest of the months. In many cases it was observed that the dosage of the chlorine usage was not very clear in minds of people and so either the efficacy was getting compromised or the taste was getting bitter due to over dosage.

c. In most of the slum areas the source of drinking water was water tanks, community taps and household connections. Most of the people perceive that the water obtained from these sources was provided by Municipal Corporation of Delhi and is safe for consumption. They won't consider that the water can also get contaminated while transportation, collection and storage.

d. Providing safe drinking water at the door step of slum people was an upcoming business which had just initiated in few slums of NCR. The business was run and managed by the local entrepreneur who treats raw water through a Reverse Osmosis (RO) filter and sells it at their location or get it distributed through distribution channels. The people were ready to pay INR 10 every day for getting twenty litres of treated water rather than treating their water at household level as they believe that the RO filter water is safer and this is which most of the affluent and educated people do to treat their water (aspirational aspects). So creating awareness in these areas for simple low cost HWTS options was no easy for the team.

e. Knowledge versus Behaviour Change was one of the biggest challenges faced by the team, as mostly all the people in the community have had knowledge about HWTS method, but when it comes to adoption lot of people get dropped out as they were not ready to take steps to put their knowledge into action. The reasons shared by them apparently were shortage of time and resources.

f. DA in the project duration was not able to do much of the work in this direction to tap media professionals, except facebook updates on project activity. DA tried to reach few of the media group such as WASH Media-South Asia but nothing much fructified as they wanted to work only through paid promotion mode.

g. Tapping Government stakeholders was very problematic as they were busy with their own work and most of the time their priorities are also different. Water being a state subject also put forth lot of problem. In most of the cases each ministry was holding other ministry responsible for water quality issues.

h. Most of the slums have open drainage and only few household have toilets in their houses. Most of the people defecate in open or in community toilets which were not maintained properly. This lead to unhygienic conditions which was a major reason of secondary contamination of water.

- **Strategies Adopted**

  a. Most of the outdoor activities were conducted in evening or on Saturdays so that large number of people can get tapped in one go when the target population is in a holiday mood.

  b. To make awareness effective a communication campaign was designed and the simple message that was communicated through all the awareness material was “safe drinking water is a key for good health and family wellness”. The clean drinking water was linked with family health so that more and more people start adopting water treatment methods (as a caring sign for their near and dear ones).

  c. The project partners were selected keeping in mind that water and health is their priority area of work. This was to ensure sustainability of the project on the ground as once the project activities were over. It was assumed that implementation partners will take the work forward as part of their work.

  d. In the project, a basket of options were promoted to increase the adoption of HWTS options as it was thought that limiting to only one technology restricts the adoption.

  e. To make people realize that they are consuming water that is bacteriologically contaminated aqua check vials were given to community anchors to check the water quality of water at source and at household level so that people start visualising and perceiving that their water is not safe to drink.

  f. Initially the consortium was designed in a way that with long term association with the same set of members the team will be able to take the policy advocacy work at a reasonably good level but it was realized that this was not working. The team changed the design at an early stage and a flexible consortium was organized in which members were not the same rather new experiences and energies were helping in strengthening the policy note (as one of the deliverable which could be used for policy advocacy) and taking the work forward.

  g. As the consortium members were the professionals who have extensive experience of working on the ground, DA decided to pay honorarium so that they take some ownership and give priority to this type of engagement.

  h. In order to reduce the chances of secondary contamination, along with HWTS methods, related aspects as safe storage, personal hygiene and environmental cleanliness were made the part of training of community people. This was both for the awareness generation programs and also for the outdoor campaigns.

In the school awareness the children from Vth to VIIIth standards were targeted (as compared to the earlier phase where third standard onwards all children were targeted to become the change agents) as children are big enough to understand the linkage of water and health. The aim behind school awareness was to provide them information and they provide the information in their houses and take the pride of being ‘safe water agents’.

i. In the slum people have very low literacy rate and to overcome the problem all the awareness material provided to community anchors for creating awareness was pictorial and colourful.

j. The policy note was developed in a strategic way to keep the experts in active loop. Moreover the experts were also selected from diverse areas so that the policy note is enriched in all needed aspects.

Lessons Learnt

a. Instead to taking young girls and young women as community anchors, it is good to take aged and mature women and also men as mobilisers. Their knowledge levels should be consistently monitored and if they drop, immediate attention needs to be given to bring more people in the loops that get adequately trained.

b. For DA's team as an advocacy initiative the availability of resources like chlorine tablets should also become a key area of work.

c. As it is toughest part to tackle people perception that their water can be unsafe, it would have been a good option to have a brand ambassador or a good Doctor talking about this issue with communities.

d. It may be good to focus equally on sanitation issues as talking only about the water issues would not complete the loop. Most of the slums have open drainage and only few household have toilets in their houses.

e. Tapping government officials was not a good solution as they were too occupied and were seen to be tied with their own agendas. Efforts could be put in to go to many more new officials assuming that few of them could be active in providing support.

f. Idea of network could prove good only when the network members are engaged frequently and there are good remunerations, otherwise the networks disintegrate fast. Better option would be to go for one or two partners in an in depth collaborative mode.

g. Working towards a multi stakeholder approach may be a good option as there are set of agencies who have a common target of working towards bringing improvements in slum dwellers life.

c. Phase III: Multi-Stakeholder Approach Towards Awareness and Advocacy of Household Water Treatment and Safe Storage Methods

The approach followed in this (third) phase of the project was multi-stakeholder approach where diverse numbers of stakeholder were engaged for awareness and advocacy. The awareness component focused on bringing a behaviour change so that people start adopting point-of-use HWTS methods. Under the awareness component, NGOs, Schools and Resident Welfare associations (RWAs) were targeted for bringing a change in behavioural patterns of target communities. As per the baseline study and the secondary data, all the selected low income neighbourhoods had a problem pertaining to water availability; quality and handling. While selecting the areas of intervention another important criterion besides water quality was availability of a dedicated partner, who has strong presence among communities and also long term interest in the theme of water-health arena.

Communication strategy highlighting the key message i.e. “Clean water is a key to good health and thus family happiness” was the same as the earlier phase. Based on our learnings and experience of working with communities, interactive tools for influencing behaviour were developed i.e. games, comics and movies. These tools helped in reaching out to community and keeping them engaged more effectively. DA’s experience on bringing behavioural change has shown that this demands high level of engagement on regular and repetitive basis where people could relate to the consequences of not having safe drinking water. As per the reports of this phase though people were seen adopting HWTS methods but the ‘sustainability of the results’ still remains ‘issue of concern’.

Around 50,000 HHs low income neighbourhoods were made aware on HWTS. Of these, 20,000 HHs were reached through direct intervention i.e. door to door awareness and 30,000 HHs through indirect interventions. Main way of indirect intervention was through Gender Resource Centres (GRCs) which were the grassroots NGOs who work closely with communities. These GRCs were brought on board through involving Mission Convergence (Delhi Government initiative).

School students of class VIth to IXth standards were engaged as one of the important stakeholders for bringing the change in behaviour of community. The target was to make 26 schools transformed into safe water schools (where students understand the meaning of safe water and its relatedness with health, are aware of the processes needed to be done as HWTS, and are capable of taking the messages further to their homes and communities). Total 104 training sessions were conducted in the schools and 1054 WASH ambassadors were created for mobilizing their community to adopt HWTS methods. This multi-pronged approach was to drive the importance of safe water in people’s mind where they see need to adopt HWTS as a routine process.

Based on the learnings of the similar experiences of DA, where the unavailability of products/supply chains leads to poor adoption, this time service delivery mechanisms were also set into place (Noida Sector 16, 8 and 9 and Sunder Nagri area). Service delivery models were designed for Aqua+ (Sodium Hypo chloride solution) solution, as community people showed interest in this product (ease of usage and its low cost). Multi-level marketing model, Peers/SHG Model and Market based business model was implemented on ground to take the product on ground.

As part of advocacy component of the project, efforts were put into place to scale up HWTS through Government programs and policies. Detailed research on the ongoing Government initiatives pertaining to water quality or health was conducted. Based on this research, DA developed specific policy asks for Ministry of Urban Development, State Government and associated bodies, Ministry of Health and Bureau of Indian Standards. In this phase rather than doing amendments in the policy for scaling up HWTS, DA leveraged on the few of the ongoing initiatives of Delhi Government towards sustainability.

The policy perspective on HWTS was widely shared at various national as well as international forums for dissemination and strengthening it. The policy perspective was also shared on a quarterly basis through Development Alternatives newsletter.

A National workshop was organised in November 2014 to share the learning of the project with wide number of stakeholder and also strengthening the policy asks. The conversations helped in understanding the common barrier which hinders the scale-up of HWTS. The stakeholders feel that there is a need of developing a common platform for cross-sectorial dialogue on HWTS and sharing learnings and major breakthrough. The workshop opened doors to work with National Environment Engineering Research Institute (NEERI) for developing doable water quality standards that can be made mandatory.

Experience Analysis

- **Challenges & Limitations**

The key challenges faced by team were as follows:

a. Traditional Practices and awareness levels – Traditional practices related to personal hygiene and sanitation proved to be the biggest hindrance in motivating the students to adopt safe hygiene practice. Therefore, various tools were used for reiterating the same message for the children and community members to understand that the practices that they are adopting are incorrect.

b. Discontinuity of the Anchors: 7 anchors trained by DA team at the initiation of the project left the assignment in the middle which brought a halt in the awareness process as identification training and rapport development with the community require a good amount of time.

c. Despite efforts DA team was unable to get mature people as anchors. All the anchors selected were very enthusiastic but when it came to mobilise community to adopt good behaviour the anchors of this age group were not taken seriously by the community people.

d. NGO Capacity to market goods: The NGO partners lack capacity to market the products on the ground, so establishing the service delivery channels was very difficult. For generating demand of water treatment products, activities like meetings and street plays were conducted by DA team directly, whereas the assumption was that partners' presence on ground would prove effective.

e. Support of teachers from Government Schools: In Government schools, teachers were not interested in awareness activities. As majority of them would keep getting transferred to a new school after every two years. The DA team had to spend quite a lot of time in motivating the teachers, as they are an integral part of the system. Since teachers have the maximum ability to influence the students; more time needs to be planned in design of the program in building their capacities.

f. Negative rumours about the product branding form local RO shopkeepers and other cheaper water sources: Prior to the pilot roll-out of service delivery model, filtered canned water was available to the residents from a local RO supplier. After introducing AQUA+ in the low income neighbourhoods, RO supplier started creating negative rumour within community that affects general flow of delivery model and product acceptance.

- **Strategies Adopted**

To overcome this situation, following steps were adopted as strategies,

a. On-site water quality testing through H2S vial and output water quality testing (after Aqua+ dosing). During H2S vial testing few RO bottled water also shown bacterial contamination that incident opened up the eyes of community and they are insisting on treatment of water before consumption.

b. Entrepreneurial Challenges: Discovering and nurturing entrepreneurship is not an easy task, more so in areas where most people were accustomed to the idea of a fixed monthly salary. Commission based and target driven work was outside their comfort zone. This can in part be

attributed to the lack of confidence and risks involved in reaching out to communities and creating enough demand for the business to be profitable. In one location, the roll out of the model has shown results even in shorter span of the on-field activity due to the involvement of Pradhan of the area with on-field support provided by his assistant. This support essentially helped in strengthening engagement with the community and building up their confidence for the on-going activity in the area.

c. Identification of Relevant Government Officials: It was realized that for doing policy advocacy with relevant Government officials that hold the power and willingness to take forward the work should be identified.

d. Repeated meetings with Government Officials: The Government departments had numerous level of hierarchy and multiple meetings need to be carried out with officials at different levels for getting things done. For instance for conducting training of GRCs more than 7 meetings were organised with Mission Convergence team at their office for getting approvals, though it was their mandate also to get these GRCs trained and equipped.

Lessons Learnt

The key learnings of the project are as follows:

a. Refresher Training of community anchors–In the due course of the project it was realized that the training of anchors should be more extensive as lot of interpersonal skills are required while dealing the community people. Refresher training for strengthening the concepts related to water treatment, water quality and safe storage is required to be conducted on a quarterly basis. In the project we have done one training and one refresher training of the anchors but the frequency of this training needs to be increased.

b. Infotainment component in Activities - While interacting with community during meetings and door to door awareness it was realized that awareness should have some infotainment component. Creating awareness using flipcharts and interaction would not motivate people to start adopting certain behaviours. To solve this problem, street plays were conducted on a regular basis in the targeted areas. Around 3-4 street plays were conducted in each of the location for creating awareness. For strengthening this component, movie, game and comic were also created in this phase of the project.

c. Performance incentives to Community Anchors - It was realized that performance based incentives should be provided to anchors to perform better and for achieving targets. As few of the anchors who were performing really well and in order to boost their performance these incentives should be set into place.

d. Women are not decision makers - Women are not traditionally decision makers in the household. However out of necessity, our promotional activity, including the live demonstrations, had to take place during the day. At this time we found that many of the women's husbands were out at work and the activities were therefore being targeted at the wrong people; the women were unable to commit to put budgets for the HWTS products like Aqua+ without consultation and the men, who were largely absent for the promotional drive and demonstrations.

e. Aesthetic aspects – This was mainly in context of the filters. In addition to the parameters such as affordability, effectiveness in treating water and ease of use, adding aesthetic value to filter in term of its looks drives the attraction of BoP customer. Customers care about what they buy; aspirations play a major role. Aesthetics are an important decision making factor and should not be neglected in favour of affordability.

f. Work with government rather than asking them to change - In the advocacy component of the project, it was observed that in order to bring a change/modify Government systems and programs we need to work along with Government. Majority of the Government officials knew the loop holes in the policies and they require support either knowledge/training support to overcome. In advocacy component, DA leveraged on the same and got some success in the advocacy component.

g. Instant realization of Incentives for all the stakeholders in the value chain - It was realized that for establishing a sustainable service delivery channels incentives should be set into place for all the stakeholders in the chain. One more component which is very important is immediate realization of the incentives, as people in the BoP community are majorly daily wage earner and cannot wait for 6-8 months to get incentives. Both the models - Peers and Market based models were designed keeping this in minds and late realization of incentives was the major reason for the failure of Multi-level marketing model.

These experiences laid the foundation of the phasing out phase of the project which was supposed to focus on compilation of learnings and tools for replication and scaling up of HWTS interventions. DA would be advocating the emerging policy asks among the relevant Government and departments for ensuring sustainability of the intervention and the other important focus area was to build the capacity of the communities to become the direct stakeholders.

d. Phase IV: Phase-out Strategy of Household Water Treatment and Safe Storage (HWTS) Intervention in Urban Low Income Communities

The phase out project focused on strengthening of tools developed, building on community level institutions to become responsible citizens and concentrate on advocacy efforts done in earlier phases.

The objectives of this phase out project are as to prepare learning document and develop training packages for set of stakeholders (like NGO practitioners, Community Institutions and Government Organisations etc.) working towards replication and scaling up of HWTS. To form and strengthen community institutions to take up charge of water quality in their areas in a sustainable manner and to strengthen links with Government departments in order to support their efforts for promoting HWTS interventions

The target population for this phase out phase was the same low income neighbourhood of the NCR where interventions regarding awareness generation were initiated in the earlier phases. The field locations of the previous phase were selected for forming and training Jal Samitis. These were Savdha Ghevra A to ‘0’ Block and NOIDA Sector 16 and 8. Both locations have a total population of 15,000 HHs approximately.

Experience Analysis

- **Challenges & Limitations**
  a. Unable to form partnership with Department of Health for training of ASHA workers on WASH as presently the component of WASH training is missing from their training schedule.

  b. Inability to take forward the work done with Gender Resource Centres as they got dissolved due to political reasons and this was a slow irreversible process.

  c. This time the engagement with the communities was the crux of the project and lot of travel was involved. The documentation of the community processes was much needed but this was a major challenge as people who were good at community level work did not have the expertise of good documentation.

- **Strategies Adopted**

  a. Conducting meetings and workshops with stakeholders including practitioners, government officials, civil society agents to share about the learning document and gets inputs on the same in form of their learnings.

  b. Handholding and monitoring of Jal Samiti's on a regular basis in order to ensure that Jal Samiti remain operational.

  c. Shift the focus of Jal Samitis from being just a forum of sharing issues, into a platform that mobilizes members to take action towards improving their water and sanitation situation and steer the processes where communities start taking ownership of water quality issues.

  d. Design and implement strategy for ensuring sustainability of the Jal Samiti initiative on-ground by concretizing simple business models based on water testing, supply of chlorine tablets and other water purification agents etc., that can provide regular income to stakeholders engaged in the process.

  e. Incentivising good community facilitators and good Jal Samitis as this was motivating and encouraging.

Lessons Learnt

a. For the sustenance of the interventions made on ground regarding the behaviour change initiatives, the ownership has to come from the people. Engaging with people in a consistent manner and spending time with them is a high touch process and there is actually no short cut to this.

b. Any type of intervention which is executed externally through outside agencies, the impact is short span, and its retention is very low in the minds of people.

c. Ownership is taken by the communities only when they are convinced that this initiative is for their well-being and the steps/initiative to be taken are not very demanding in terms of time and resources.

d. Instead of building the capacities of external partners and other stakeholders (and spending a substantial amount of budget on their trainings, capacity building, their monitoring and tracking) it is always more paying to invest on building the capacities of community people and motivate them to become leaders and facilitators.

e. Institutional strengthening is a gradual process and team working towards this need to understand human behaviour as well as have patience to silently observe as how institutional processes are taking shape. In project mode normally teams try to work for instant models which is a short term and failing attempt.

f. While selection of facilitators teams have to be very careful as all the trainings may go futile if the selection criterions of candidates are not followed strictly.

g. NGO's located in the project area may be helpful as partners for environment creation but working 'through' them may pose serious issues towards qualitative aspects of work and for the sustenance of efforts.

During last phase DA has prepared a Policy Note with the objective of addressing the risk of waterborne disease from unsafe Drinking water in urban informal settlement. Detailed policy paper has been attached as an annexure with this document.

5. Sharing Experiences of Different HWTS Implementers in India – Delhi, Chennai and Bangalore

Visits were made to the identified people/agencies who are working on HWTS since last few years and with whom DA has been in touch with in the last phases of the project. Experience sharing took place and there was an exchange of ideas pertaining to HWTS.

During sharing the experience to promote HWTS practices (SODIS) in Chennai, Dr. Radha, Chair Person of LEAD (League for Education and Development) elaborated that in 2002, the Solaqua foundation started the project activities for the promotion of SODIS in South India. Starting point were four districts where LEAD already had established its micro finance network through women Self Help Groups (SHGs) also called Sangams. From phase I to III, selected local partner NGOs like HOPE, SUDAR, SCOPE, GRAMALAYA and DBGDS, strengthened SODIS promotion in the mentioned districts and also reached new areas (Pudukottai district).

***Learning from their evaluation issues which has been summarized here*:**

- Without regular follow up usage of SODIS as a practice declines steadily
- Individual capacities of the NGOs were too weak in order to integrate SODIS into their regular activities
- As advocacy was not budgeted so far, LEAD and the partner NGOs were not able to spend additional efforts to achieve concrete results. Neither could a long term collaboration with medial channels be established as access is very expensive
- Impact of the project very much depends on the amount and the capacity of the SODIS Team members

According to Ms. Rikta Krishnaswamy, Quicksand; Bangalore had worked on a similar project with a large NGO called PATH in Seattle, a couple of years ago. Called the Safe Water Project, it was part of a 5 year endeavour to provide access to better HWTS technologies to rural and peri-urban Indians. This Project is working to identify, adapt, and develop appropriate products and business models for HWTS. The goal is to build a sustainable commercial market for HWTS for low-income households. While there are many dimensions to the project, some of the most fundamental questions involve the products themselves: how well do they meet the specific needs of low-income consumers and how can the design of HWTS products more specifically meet the needs and aspirations of low-income consumers?

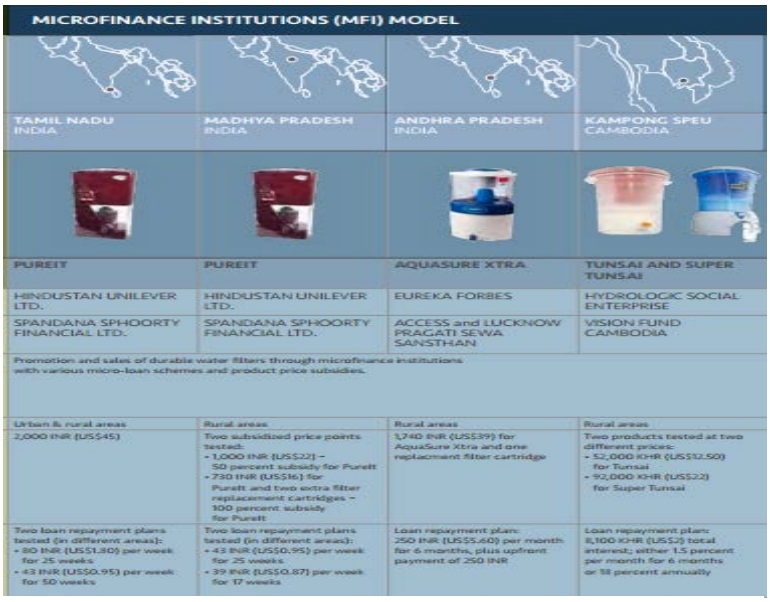

Figure 2: Five commercially available product has been introduced in India through Micro-Franchise model
http://www.path.org/publications/files/TS_swp_perspectives_rpt.pdf)

To gain insights into the needs and preferences of low-income consumers in India, PATH commissioned Quicksand Design to conduct a longitudinal ethnographic study on user experiences with HWTS products in India. They call this study "Extended User Testing (EUT)" because it reflects the depth and breadth of the study characteristics. Researchers observed how households interacted with commercially available water filters and purifiers over a six-month period that captured the full ownership cycle, from purchase, setup, and assembly to ongoing use, maintenance, and repair. And developers of HWTS products need the kinds of insights into user-product interactions that ethnographic research methods can offer if they are to overcome pervasive barriers to the adoption and use of HWTS among low-income consumers.

The project involved user testing of five commercially available water filters over ten months – between March to December 2009 – across rural and peri-urban settlements in Andhra Pradesh, India. Quicksand was subsequently brought in the product development phase to convert the research findings into tangible proof-of-concepts for a low cost, gravity fed, multi-stage water treatment device. The project involved collaboration between Quicksand, as industrial design and user experience experts, and engineering, manufacturing and project management teams based in Seattle.

As part of the User Experience (UX) study, five commercially available, multi stage gravity filters were placed in 20 low-income households as surrogates to understand users' expectations and interactions with HWTS products.

Findings of this project which have been summarized here:

- Treatment: Most study participants recognized the relationship between unclean water and poor health, but they were more likely to attribute illnesses to changes in the weather or the seasons. They also believed that their natural bodily immunity could ward off most waterborne diseases. Participants reported that, because their water was clean most of the year, they had only a transient need for treated water, for example, during the rainy season or while traveling.
- Storage: Drinking water is generally stored in covered steel containers, because steel is easy to clean and durable and its appearance fits in most study households perceive that their water (and the way they handle and store their water) is safe.
- Pricing - HWTS products fall somewhere in the middle of the spectrum of durable goods owned by low-income households: Low-income consumers clearly view HWTS products as aspirational goods, which—like mobile phones, bicycles, televisions, and refrigerators—are calculated indulgences purchased in the hope of improving one's lifestyle. Therefore, their price point should fall midway between purely utilitarian and purely aspirational durable products, somewhere between Rs. 500 and 1,000 (US$11 to 21). Offering a product warranty is also an important part of the pricing strategy for low-income consumers, because it reaffirms their expectations of trouble-free operation without any further investment on the owner's part.
- Service and repair: Training and equipping local repair workers to handle repairs and unscheduled maintenance is an important part of a HWTS product strategy. Designers can anticipate and expedite this process by creating products for low-income consumers that can be easily integrated into the service and repair market that already exists for more expensive HWTS products targeted to affluent households.

According to Mr Lalit Sharma, Director, Adaptive technologies at SM Sehgal Foundation, Delhi and Ms Sristi Kushwaha, Director at Samhita implementing grassroots NGO, jointly working on HWTS project in Chattarpur, MP; Household water treatment systems are proven, low-cost interventions that have the potential to provide safe water. Uses of water filters at household level are associated with greater reductions in diarrhoea incidence in low and middle income settings. Household Water Treatment (HWT) technology is deployed at the last step, just before the water consumption by the user himself/herself and can be of various types like chlorination, SODIS (Solar Disinfection), ceramic filters and biosand filters. Majority of them struggle with one or another issue like cost intensive, availability issue, need of electricity, recurring costs, contaminant specific, skills etc.

Findings of this project which has been summarized here:

- Limitation of these technologies is the inability to address a combination of prevailing contaminations
- Biosand Filter is one such sustainable HWT technology that can address pathogen, iron, arsenic and turbidity simultaneously. It is potentially a successful tool against water contamination in developing countries as it has been found to be highly effective in reducing diarrhoeal disease occurrence and has high post implementation use levels as compared to other Household Water Treatment technologies
- Women are responsible for water collection; simultaneously they are overburden with other livelihood generated work as well, so treatment of water and all are not in priority for them
- Biological contamination is not an important factor to the community according to them it's a seasonal problem, doesn't require any special attention for the same
- Require consistent community mobilization
- Product need to be customized according to geographical need like in Delhi and Haryana water salinity is the major problem but Bios and Household or SODIS doesn't address that issue

6. Critical Factors for the Success of HWTS in India

From field observations, it is evident that the problem of low adoption of HWTS options is not a result of low awareness of the issues of water contamination at point of use or low awareness levels of the importance and benefits of treating water. It is not a question of illiteracy among people, as is normally assumed. There is an evident lack of effort and priority among people to undertake one or more options consistently, to make their drinking water safe all through the year.

The following perhaps explain this situation in informal settlements of urban cities in India;

- Awareness of drinking water pollution and preference for securing safe treated water is high in those slum areas where ground water is visibly polluted, smelling, contains high TDS or Iron content. These are easy to identify by the inhabitants and they make the effort to obtain safe water from elsewhere.
- Availability of alternate piped water supply and treated RO water supply by private operators has a high correlation to affordability and income levels. Even where income levels are relatively higher, there is a lack of demand for household water treatment options and a readiness to buy RO treated water (if that is easily available). The existing business operation of private RO plants and delivery of RO treated in many slum areas shows that people who can afford to buy RO water, see this as a convenient option instead of water treatment systems including Filtration, Chlorination, Flocculent and SODIS treatment.
- Those who cannot afford to buy treated water and those with access to free tanker water supply by the DJB, exercise this option and end up storing large quantities of water for drinking water purposes inside and outside their houses. The DJB tanker water comes at irregular timing and requires one family member who stays at home, to collect water. It becomes the responsibility of women of the households to secure water from tankers.
- SODIS and Chlorination are seen as time consuming treatment options and are not sustained. Convenience of operation, time spent in treating the water, is often cited as a major barrier to simple water treatment options like SODIS. Many people who have adopted SODIS also reported an improvement in water quality and health outcomes.

- Availability of cheap RO treated water supply by private entrepreneurs in some slums (as low as Rs.5/20KL water cans) and exposure to middle and upper class colonies getting the same kind of bottled water – are powerful drivers for transforming a behaviour change option into an affordability issue. Status and aspiration for a better quality of life, leading to a situation of both purchase of RO water as well as water treatment systems (mainly filters).
- Less preference for chlorination, on account of change in taste and irregular availability of chlorine tablets and solution. Even the perception of water coming is already treated by chlorine as a regular practice goes against using Chlorine as a HWTS option. Many people have access to internet where it says that consuming water that is kept in plastic bottles and left in closed cars during long day hours can be carcinogenic. This leads to disbelief on the solar disinfection technology.

Factors inhibiting adoption of HWTS at SCLAE are;

- Low cost Filters, Chlorine and Flocculants not available locally and on a regular basis
- Perceived poor taste of water, temperature and additional effort required
- SODIS and Chlorination require regular follow up and face to face communication and persuasion to encourage people to use these HWTS methods.
- Low cost HWTS and safe storage is not promoted as an aspirational social and individual behaviour change ideal in a creative way
- Water stored in homes is never tested for quality/contamination.
- Absence of any programme or campaign that promotes HWTS and safe storage. Where this is promoted by ASHA workers who also supply chlorine tablets, it leads to positive BC

Behaviour change communication (BCC) discourse in WASH sector is heavily influenced by practical programmatic considerations. Behaviour change challenges are reduced to simplistic understanding of the problem and reduced to knowledge and awareness generation interventions. In sanitation, Community Lead Total sanitation (CLTS) programmatic approach tends to overshadow any serious attempt to understand why different sections of the rural and urban communities behave and practice open defecation. A programmatic approach of triggering (including name and shame and negative peer pressure) is used as a Behavioural Change and Communication input.

A BCC research in rural Bihar found that rural poor do not practice hand washing with soap because of their self-worth perception that only the upper caste and well off people can be seen to be neat and clean. People's real life context, their perceptions of low self-worth and belief among urban poor that nothing will happen to them if they consume untreated water are often ignored. Awareness generation for the need of HWTS must consider specific problems and constraints as well as deep seated self-perceptions.

Note: Lack of demand for low cost HWTS and Practice is a behavioural issue resulting from low social and individual priority for HWTS promotion, lack of incentives and promotion. Coupled with aggressive promotion of high cost HWTS as aspirational symbols that make low cost solutions look unsafe, unscientific and inferior.

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About Development Alternatives

Development Alternatives (DA) is a premier social enterprise with a global presence in the fields of green economic development, social equity and environmental management. It is credited with numerous technology and delivery system innovations that help create sustainable livelihoods in the developing world. DA focuses on empowering communities through strengthening people's institutions and facilitating their access to basic needs; enabling economic opportunities through skill development for green jobs and enterprise creation; and promoting low carbon pathways for development through natural resource management models and clean technology solutions.

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