The Watasol Approach For A Sustainable Access To Safe Water¹

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Abstract – Some 783 million people have no access to improved drinking water sources. According to the WHO, «the lack of access to safe drinking water, combined with inadequate sanitation and poor hygiene, is an important contributing factor to the 1.8 million annual deaths from diarrheal diseases». Chlorine is one of the most efficient means of treating water both at household level and in small, medium and large scale water supply systems. Chlorine neutralises the pathogens present in water and prevents against recontamination. However, existing supply chains do not always reach all communities, most of all in isolated areas. The ability to produce chlorine at a decentralised level offers a simple, reliable and low cost alternative to increase access to safe water. The WATA technology created by Antenna allows the local production of sodium hypochlorite for water treatment and disinfection purposes. It targets communities that lack access to a chlorine supply chain or to a supply system of potable water. Antenna has also developed WATASOL to integrate the WATA technology in a comprehensive and sustainable approach.

Keywords – Low-cost technology, global approach, partnership, local production of chlorine, water treatment and disinfection

1. Background

Chlorine eliminates 99% of bacteria and protects water against recontamination. Chlorine is by far the most commonly-used disinfectant in the world, states the World Chlorine Council. It is used to destroy disease-causing organisms in water, an essential step in delivering safe drinking water and protecting public health. Where widely adopted, chlorine has helped to virtually eliminate water-borne diseases such as cholera, typhoid and dysentery. Chlorine also eliminates slime bacteria, moulds and algae that commonly grow in water supply reservoirs, on the walls of water mains and in storage tanks.

Chlorination: The added-value of chlorine as a disinfection agent in drinking water ensures its safety. Among all water treatment solutions, the WHO estimates that chlorination is the most secure, simple and common option. Chlorination is widely recommended by WHO in the systems of household water treatment (HWTS) where there is no alternative to produce drinking water.

Benefits:

• Chlorine is a versatile and low-cost disinfectant;
• Leave a beneficial ‘residual’ level that remains in treated water, helping to protect it during distribution and storage;
• Appropriate for any size water system, whether it serves a remote rural village or a large modern city. Where piped water supplies are not available, chlorine can also be used for treating water in individual households.

The WATA technology, developed by Antenna, uses a simple, manageable process of electrolysis to convert a measure of salt and water into sodium hypochlorite. The resulting solution can be used for drinking water chlorination or as a disinfectant for use in households, hospitals or community clinics.

The WATA is specifically designed for use in the context of communities in developing countries (range of 3 devices). With this system, communities can source locally and quickly available chlorine to protect against diarrheal diseases such as diarrhea or dysentery. Eventually, this system can be a source of income through the sale of chlorine produced.

Even if it is intended for development projects, it can also be used in emergency situations due to its simple and rapid operation.

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WATA benefits:

- **Local production of active chlorine:** Decentralized production is geared to the local demand, thus users are independent from any external chlorine supply and avoid transport and storage problems.
- **Simple:** Just running the device only requires clear water, kitchen salt and any source of electric current (local grid, generator, battery, solar panel...). A short, hands-on training is needed to operate the devices properly.
- **Reliable:** When used correctly, WATA devices produce a regular concentration of active chlorine of 6 g/L. The quality control tools developed by Antenna make it possible to check the concentration reached and the water quality after dilution. Sustainable (long life span): WATA devices are designed to suit field conditions optimally in developing countries.
- **Low cost:** The cost price for one liter of active chlorine concentrate is CHF 0.1 cent. This one liter of concentrated solution is enough to treat 4,000 liters of contaminated water.
- **Adaptable:** Antenna’s range of products allows you to select the device which will fit best to the project needs. It will provide water to a health centre, a small community, a city or a region.

2. **The case study**

Antenna encourages its field partners to integrate WATA technology through a WATASOL programme. This sustainable approach focusing on cost-effectiveness includes:

- Social marketing activities (health education and household water treatment promotion).
- Technical training (use of WATA), by Antenna or its partners.
- Local production of active chlorine.
- Establishing a profitable supply chain for the active chlorine produced. Depending on the local context, partners sell flasks of chlorine, bottles of treated water, or chlorination services.

The Five Steps for introducing the WATASOL approach are:

1. The Demo phase introduces the WATASOL technology and approach
2. The Try-out phase gives hands-on familiarity
3. The Testing phase confirms the viability of local pro-
duction of chlorine
4. The Pilot phase gives options for dissemination and business models
5. The Scaling-up phase aims to replicate successes on a wide scale

2.1. The role of the project

By using chlorine, WATASOL is, thus, a start on the path to safe drinking water. HWTS (Household water treatment and storage) may not be, admittedly, the ideal solution to provide access to safe water and it should not divert us from the objective to achieve a tap in every household. But we must face the real facts here. For the 783 million individuals who are not only far away from any tap of piped water, but are using unsafe and contaminated water, in ‘normal’ or in ‘emergency’ situations, it is a wonderfully important step to improve today’s situation. It is a step towards a healthier, more vibrant society into which, one day, the tap should finally come.

Pilot projects on the field

Thanks to the support of local partners and the financial support of institutions and donors, Antenna and its partners have been testing the WATASOL approach in 16 countries (Bangladesh, Burkina Faso, Cambodia, Cameroon, DRC, Guinea Conakry, Haiti, India, Mali, Mozambique, Nepal, Niger, Togo, Kenya, Bolivia and Pakistan).

The objective is the same: to promote the use of active chlorine for the treatment of household water and to make the production and dissemination active revenue generators.

More specifically, the objectives of the pilot projects are the following:

- To provide an autonomous and sustainable solution for safe drinking water at household level based on local production of chlorine through electrolysis;
- To control the quality of the chlorine produced and of the drinking water after the chlorination;
- To create income generating activities based on the local production and distribution of the concentrated chlorine solution to contribute to the promotion of HWTS;
- To establish methodologies for the implementation, monitoring and evaluation of domestic safe water through the local production and sale of chlorine;
- To document and capitalize these experiences in order to replicate them;
- To prepare a « scaling up-phase » based on the know-how and lessons learned.

These zones of intervention have the advantage of representing a large spectrum of different situations: urban, rural and suburban settings. One of the objectives of the project is precisely that of documenting the feasibility of the local production of chlorine for HWTSs in diversified contexts.

The options of running a business with WATASOL

Depending on the local context, partners sell the chlorine produced in flasks, bottles of chlorinated water, or home chlorination services.

The giving away, free of charge, or subsidisation of Point-of-Use (POU) water treatment systems such as chlorine has not only distorted the market; it has also created an expectation that POUs are goods which are better to wait for than to buy. Thus, Antenna does not distribute the WATA, but sells it at an affordable price and reinvests the income in research and manufacturing.

Marketing players

The success of projects with chlorine depends very much on the people and institutions involved in the dissemination. We have identified that schools, health centers and women are important players in raising awareness on safe water and in spreading the right messages on chlorine.

Schools programme as an example

Through our partnerships with local NGOs (KWAHO in Kenya, Foundation SODIS in Bolivia and Helvetas in Haiti), we implement the Safe Water Programme in primary and secondary schools with particular emphasis on awareness raising and adopting good hygiene behaviour. EAWAG and Antenna have gained considerable knowl-
Table 1: Results obtained with Watasol programmes

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<td>Major Achievements</td>
<td>- The results of Antenna studies on the stability of chlorine are recognized by key stakeholders, and are disseminated to users as recommendations.</td>
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<td>- Almost 3,000 devices have been sold worldwide to governments, organizations and local associations, which have integrated WATA in their development programmes.</td>
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<td>Lessons learned</td>
<td>- Without a long-term reliable partner, WATASOL programs can not be sustainably developed.</td>
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<td>- Scaling-up safe water needs an innovative mix of public and private interventions: health education and awareness creation are public tasks while the delivery should be a domain of the private sector.</td>
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<td>- Business models can make the delivery of safe water profitable but may need public funds for social marketing.</td>
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<td>Steps for the future</td>
<td>- Following lessons learned, success factors challenges, a toolbox for scaling-up will be developed.</td>
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<td>- Institutional collaboration for scaling-up business models for Safe Water reinforced.</td>
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<td>- We will continue to enhance existing or new initiatives for a massive scaling-up of safe water solutions.</td>
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edge and experience thanks to school projects in other countries, mainly Nepal and Cameroun, and found that schools are an ideal entry point for promoting good hygiene behaviour.

The methodology consists of training local NGOs who then train school teachers using a manual developed by EAWAG and Antenna and which features 9 lessons: Water and Health, Water contamination, Water disinfection, Solar water disinfection, Chlorination, Water quality testing, Water re-contamination, Good hygiene behaviour, Sanitation. The goal is to make the pupils the teachers/promoters of change and of good hygiene behaviour.

3. Conclusion

- Electrolysis of salt and water to produce active chlorine is not an unknown discovery; it has existed for a long time. The challenge is finding an application which is sustainable and which empowers communities to access safe water.
- Antenna promotes WATASOL and works in partnership with other organizations that provide different solutions like filters, SODIS method...
- Almost 10 years of successful field experience 11 mio beneficiaries up to date, should also be considered as convincing evidence
- Awareness and recognition of WATA and WATASOL to fight waterborne diseases still needs to be improved among large organizations

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Citation