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**SE19-CCI- From Developing to Scaling-Up  
Innovative Social Businesses at the Base of the Pyramid**

**Title: Scaling up Household Water Treatment Systems (HWTS) in Pakistan, with WATA Technology**

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**Biography of the Presenting Author:** Mr. Saad Khan, a Swiss and Pakistani national, has a diversified professional background: an educator / trainer; a Swiss private banker; an innovator and humanitarian / development specialist. He has 10 years' experience in humanitarian and development sector. He has worked closely as advisor with various national and international governmental and non governmental organisations and UN bodies. His present focus is on the area of: safe drinking water; energy conservation; building back safer with vernacular and green construction methods; for the benefit of the population at the base of the pyramid.

**Abstract:**

Ten percent of the world population lack access to safe drinking water. In Pakistan 44% of the 180 million population is without access to safe drinking water, 64% of urban and 84% of rural population do not treat their drinking water and consequently waterborne diseases are the leading cause of mortality and morbidity. High stress in the use of ground and surface water, fast growth in population and frequent flooding caused by the climate change further aggravate the availability of drinking water. Injecting active chlorine into drinking water eliminates the pathogenic microorganisms and prevents possible recontamination. Unfortunately, supply chains of chlorine do not always reach communities in developing countries, especially communities in rural areas. The paper describes the lesson learnt from the initial research that led to a start-up of a business of centralised production of liquid chlorine in Pakistan for water treatment at point of use by households. It presents the outcome of the business model of introducing the innovative WATA Technology in Pakistan for locally producing chlorine as a simple and cost-effective means for improving access to drinking water. The challenges identified during the 12 months' pilot of selling liquid chlorine helped transforming the single product business model into a diversified portfolio of innovative Household Water Treatment and Safe-Storage (HWTS) systems that are based on WATA Technology and better integrate point-of-use water treatment in the lifestyle of targeted market segments, particularly the population at the Base of the Pyramid (BoP).

**Keywords:** Social Business, BOP, Safe drinking water, onsite chlorine generation, WATA, Household Water Treatment and Safe Storage (HWTS)

**Full Paper**

**The Context:** About 10 percent of the world's population lack access to safe drinking water ([Water.org 2015](#)). In Pakistan the availability of safe drinking water is increasingly becoming short. Both surface and groundwater in the country are polluted with microorganisms and various toxic compounds. Various human activities, particularly disposal of untreated industrial and municipal wastes are the main sources of water pollution ([Azizullah et al. 2011](#)). The Pakistan Council of Research in Water Resources (PCRWR) has estimated that 44% of the population is without access to safe drinking water. On average 82% of tested water sources were not considered safe for drinking water due to microbial contamination. 62% of urban and 84% of rural population do not treat their drinking water ([PCRWR 2010](#)) ([Nabeela et al. 2014](#)). Consequently, waterborne diseases are the leading cause of mortality and morbidity. It is hard to quantify exactly the waterborne diseases in Pakistan because of lack of maintenance of records at hospitals ([Aziz 2005](#)). An estimated 250,000 child deaths occur each year in Pakistan due to waterborne diseases ([WWF 2007](#)). A study conducted by UNICEF found that 20-40 percent of the hospital beds are occupied by patients suffering from water-related diseases, such as typhoid, cholera, dysentery and hepatitis, which are responsible for one third of all deaths. The total health costs associated with the deaths

and sickness caused by waterborne disease are estimated to amount to more than 1.8 percent of the GDP ([WB-SCEA 2006](#)). New surveyed data on census and mortality / morbidity from waterborne disease is unfortunately not much available.

The water availability situation in Pakistan is also dire. The ground water sources, including confined aquifers, are getting contaminated due to unregulated and inappropriate practices in bore drilling. The ground water is fast depleting due to negligence in the development of recharge sources, such as large or small dams and traditional village water body reservoirs. The surface and groundwater use has reached the upper limits in most parts of the country. By a 2001 estimate annually 51.3 BCM of groundwater was being pumped for irrigation, industrial and domestic use; whereas the safe yield recharge of groundwater was estimated at 65.7 BCM. The total availability of surface water was estimated at 180 BCM, with the total 16 BCM storage capacity of the reservoirs of three main dams, and the annual use of surface water was estimated at 157 BCM ([WASSA 2004](#)).

Pakistan's climate varies from tropical to temperate, with very arid conditions in the coastal south. There is a rainy monsoon season June through September and the retreating monsoon period of October and November. Rainfall varies greatly from year to year, and patterns of alternate flooding and drought are common adding burden on the drink water availability and caseload of Diarrhoeal Infections in the vulnerable populations.

The water disinfection options are limited for household level at point-of-use. Due to high level energy crisis in Pakistan, boiling water is not pragmatic. Chlorine tablets are commonly available but too expensive for the population at the bottom of the pyramid to afford them. Granulated or powder chlorine for industrial use is not openly available for consumer market and is not suitable for household drinking water treatment. Three stage household water filter plants are commonly installed, however the Ultra-Violet (UV) water disinfection systems are often dysfunctional due to cheap and low intensity UV bulbs and frequent power outages. Hence in a Pakistani paradigm the domestic 3 stage water filters are often a part of the problem rather than a solution. All this provided a strong rationale for launching into the urban market a food grade, stabilized, Sodium Hypochlorite as a simple to use consumer product for cost effectively disinfecting drinking water at the point of use. It was understood from the beginning that it would require significant changes in consumer habits, through awareness building, to accept liquid chlorine as water treatment solution.

**Initial Research:** In 2010, after the great floods in Pakistan, the Author (Saad Khan) started field and desk research to understand safe drinking water issues and solutions. The main aim of the research was to discover innovative and effective household water treatment systems that are affordable, easy to use and pragmatic for rural and urban deployment, that have high user acceptability and can be locally produced with scalability. In this endeavour major publication on Point-of-Use (POU) and Household Water Treatment Systems (HWTS) were studied. The strength and weaknesses of existing HWTS, promoted by humanitarian organisations, were evaluated. The reasons for the poor acceptability of these solutions by end users were ascertained. The Author tried to find answers to Pakistan context to the question raised in the publication "Marketing Safe Water System" ([Heierli et al. 2008](#)) *"Why do more than 300 children still die of diarrhoeal disease every hour? For it is not the lack of affordable solutions. Solar disinfection, chlorination, filtration by slow-sand and ceramic filters, and ultraviolet treatment are all effective methods and have been scientifically proven to reduce child mortality considerably"*

#### **Lessons Learned from the Initial Research, relevant to Pakistan Context:**

- **Mistrusting iNGOs:** People have deep mistrust for foreign ideas that are imposed on them. Being at the gateway to the subcontinent, for centuries, the people of the region of today's Pakistan have been subject to hordes of foreigners entering these rich lands with mal-intentions. Therefore, the mistrust is deeply rooted in their psyches. The failure of Procter & Gamble's commercial model of PuRR Sachets in Pakistan is an example of this mistrust ([Christian et al. 2010](#)). The resistance to Polio-drops vaccination campaign and iodised-salt are other examples of good intentions that did not go well with the masses due to mistrust.
- **No Tempering with Drinking Water:** The people of the region dislike tempering with their drinking water by a water treatment system that is unknown to them. They would rather trust raw untreated water from their well, shallow bore or water tap, than treating it with a complex HWTS. Therefore, the HWTS should be designed in a vernacular form that is recognisable and easily understandable by them.
- **Large quantity of flow-output is required:** Many recipients discontinued the use of a HWTS if the out flow of treated water was too slow for the requirements of large family. An average family of 7 members

typically requires about 50-105 litres per-day safe water for basic needs ([Sphere Project 2011](#)). Many slow-sand filters, Bio-sand filters and Ceramic filters have slow water outflow to cater to this need.

- **HWTS should not depend on energy or electricity:** Due to prevailing energy crises in Pakistan the electricity supply is intermittent. Therefore, the HWTS that depends on electric supply for Ultraviolet disinfection are often rendered ineffective and become high-risk for waterborne diseases.
- **Negative Propaganda about the health risks from use of Hypochlorite Chlorine for water treatment:** In the last century Chlorine revolutionized water purification and reduced the incidence of waterborne diseases across the western world. “Chlorination of drinking water has been hailed as the major public health achievement of the 20th century” ([Calderon 2000](#)). However, there are concerns that chlorine disinfection of water produces four Disinfection-By-Products (DBP). Two of these DBP, including Chloroform, are classified as “possible human carcinogens” – meaning that the data is extrapolated from research on animals and therefore it may or may not be relevant to human cancer ([IARC 1999](#)). Notwithstanding this fact, Chlorine is often mistakenly declared as definitely carcinogenic to humans and its use is actively discouraged by some even in the developing countries like Pakistan where water borne diseases claim several hundreds-thousands lives annually. Whereas according to Chlorine-Chemistry-Council’s Chlorine and Food Safety White Paper “*Chlorine plays a vital role in the safe production, processing, transport and preparation of foods of all varieties. To date, no other sanitizing agent has appeared which competes with chlorine in all the areas needed for safe food production*” ([C3 2002](#)).
- **HWTS solutions are missing in the market** which successfully corresponds to the consumer needs, integrates well in their lifestyle, is responsive to effective marketing tools and provides adequate benefits to the channels of distribution.

The lessons learnt from the initial research made it evident that a further innovation in HWTS and business models is a necessity. The author therefore decided to work on:

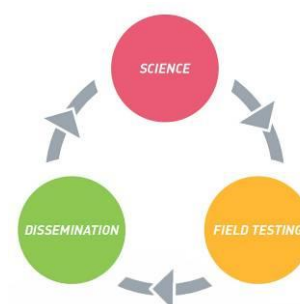
- a) Developing a household water filter system that is simple and vernacular in looks, easy to use, integrates several water treatment technologies including chlorination and is able to treat highly turbid and biologically contaminated waters. It should also have ample safe storage and fast outflow to cater to the needs of large size families. This effort led to the development of SwissPak Water Filter.
- b) Promoting the use of low concentration Sodium Hypochlorite, which is locally produced, packed and branded. Disseminating awareness about the safe use of chlorine in accordance to the guidelines of WHO. Resultantly partnership with Switzerland based Antenna Technologies Foundation was established and WATA Technology was embraced to locally produce liquid chlorine from electrochemical treatment of salt brine.

**The Introduction of WATA Technology, in the aftermath of 2010 floods:** The monsoon floods in 2010 were one of the biggest disasters in the history of Pakistan. A death toll of around two thousand people was relatively small given the size of the catastrophe, but over a million homes were destroyed and more than twenty million people became homeless or internally displaced. At one point, approximately one-fifth of Pakistan's total land area was under water. In economic terms in 2010 the losses amounted to three per cent of Pakistan's annual GDP. According to estimates 98% of water and sanitation facilities in the severely affected areas were damaged and pathogenically contaminated due to heavy silting and heavy water flow. People were forced to drink contaminated water.

In response to the 2010 floods the Swiss Agency for Development and Cooperation - Humanitarian Aid (SDC-HA) identified the supply of safe drinking water as the major issue for the population in the affected areas. All the traditional water sources were contaminated. With their partners SDC-HA sponsored a major program to clean and disinfect open wells with chlorination. The local availability and supply of Calcium Hypochlorite was not reliable and high concentration of such chlorine was susceptible to high risks complexities for storage and use. SDC therefore decided to deploy for this program 70 units of “Standard WATA” - Chlorine generator kits to locally produce low concentration Sodium Hypochlorite chlorine with salt brine. This was the first time that Switzerland based Antenna Technologies Foundation’s WATA chlorine generation technology was successfully used in Pakistan ([Brauchli M 2014](#))

**Antenna Technologies Foundation (AT)**, Antenna Technologies is a Swiss foundation committed to the scientific research of technological, health and economic solutions in partnership with universities, non-profit organizations and private companies. It aims at meeting the basic needs of marginalized populations in developing countries. AT has research programmes in varied domains including Nutrition, Safe Water, Agriculture and Microcredit. Antenna Technology uses an approach of “**Science for essential needs**”, through a cyclic model of “**Science, Field Testing, and Dissemination**”. Science-appropriate technological, health and commercial solutions are developed with technical partners and with inputs of end-users living at the BoP. The solutions are vigorously tested and constantly improved during and after field deployment; including the testing of the technology, the health solutions and the business models. The dissemination of the solutions is carefully done by building a diverse and resilient ecosystem, in partnership with a network of local companies, government institutions, international organizations, and national & international NGO’s.

Fig. 1, *The model of Science for essential needs*



The WATA technology, developed by Antenna for Safe Water programs, 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 chlorine is produced at a concentration of 6g/litre (0.65%) and is used without dilution, in a very simple way to apply dosing. The WATA tests, in a simple to use process, determine “Total Chlorine” concentration in the chlorine solution and “Free Residual Chlorine” in the treated water. The injection of active chlorine into drinking water eliminates the pathogenic microorganisms and prevents from possible recontamination. Unfortunately, supply chains of chlorine do not always reach communities in developing countries, especially communities in rural areas. Producing chlorine locally is therefore a simple, cost-effective and sustainable mean of improving access to drinking water (Antenna 2015). The WATA technology was successfully used in emergency relief after Haiti and Nepal earthquakes and in integrated development programmes in several countries including in Guinea and Burkina Faso.

**The 12 Months Pilot of Business Model in Pakistan:** After realising the profound potentials of WATA technology for disinfecting water at household level, Mr. Saad Khan (the presenting author) decided to introduce this technology and its benefits through commercial business model in Pakistan. Pakoswiss Technologies Limited (Pakoswiss) was incorporated as a social enterprise to take up the challenge of introducing liquid chlorine for Household Water Treatment and Safe Storage (HWTS). Formal agreement was established between AT and Pakoswiss. In February 2014 started a 12 months’ pilot program in Rawalpindi-Islamabad twin cities to channel stabilised liquid chlorine to retail shops. AT provided three Maxi WATAs, each unit with a capacity to produce 120 litres chlorine per day, and some funding towards awareness campaign. Pakoswiss equally contributed in financing the remaining funds for awareness and other operational costs. AquaCleanDrops (ACD) brand was launched, packed in 50ml and 2500ml flasks. It was priced for the poor of the poorest – the population at the BoP. About 600 retail shops are partners in selling ACD. Point-of-sale promotion, door-to-door sale and back-lighted sign boards were introduced. Team salesmen were engaged and a GPS and smartphone based Sales Tracking application was developed for managing sales forces and point of sales data.



Fig. 2, *signboard of a partnering medical store*

**Lessons Learnt from the pilot and realigning tactics:** While we had considerable success in establishing partnership with retail shops, the sales of ACD bottles remain very slow. We know that it is a long and a slow process to make people change habits for new behaviour, and it also requires extensive and expensive awareness campaign and close support from civil society and state health departments.

From the recent disasters in Pakistan it became evident that in humanitarian crisis the availability of chlorine is actually no more an issue; in fact, NGO’s and humanitarian agencies have stockpiled High Test Hypochlorite (HTH), granulated and tablet chlorine as part of Disaster Risk Management (DRM) strategies. For example, in May 2014 the WASH cluster’s key members in Pakistan, Oxfam/WHO/UNICEF, had a stockpile of 5.3 million



water purifying chlorine tablets as part of their contingency plan ([WASH 2014](#)). It may therefore appear that the importance of WATA equipment to cost-effectively produce onsite chlorine near the affected population is not as much relevant as it was a few years before. Notwithstanding the availability of high concentration commercial chlorine, the complexities in its use prevent its widespread adaption by common people. Chlorine at concentrations above 10% is generally considered chemical grade for which in many countries there are strict regulations for handling and selling. The household bleach is generally between 3%-8% concentration. Whereas the Chlorine produced by WATA is typically 0.65% which can be ascribed as food grade and is extremely easy to use, without health risks, even for a simple rural population. Therefore, we are convinced that WATA technology remains highly relevant for HWTS for population at the BoP.

In response to the lessons learnt, the Pakoswiss Technologies shifted the focus of the business model from “the sale” of ACD bottles to “the use” of it. We realised that we do not only need innovative ways to sell chlorine bottles, but more importantly we need innovations in integrating use of chlorine in HWTS – in a proverbial sense “*Letting the Jinni out of the bottle*” ([Cambridge 2016](#)). We also need to assure that the innovation provides competitive advantages; alignment to the core business; clear benefits to the customers at the BoP, and substantial business value to the new company and its distribution partners.

From our experience we can confirm that WATA Technology is like a powerful engine to drive disinfection in HWTS. However, it was also realized that in order to effectively bring its benefits to consumers at the last mile, innovative vehicles that are driven by this technology need to be designed. Each vehicle should be suitable for specific purpose. In line with this aim we started research on the development of HWTS which are powered by WATA Technology. The Pakoswiss Technologies also adapted the approach of “**Science for essential needs**” in the development of range of innovative products and solutions for HWTS that effectively use liquid chlorine produced by WATA technology for water disinfection. It soon changed our mission from single product business model to multi product model.

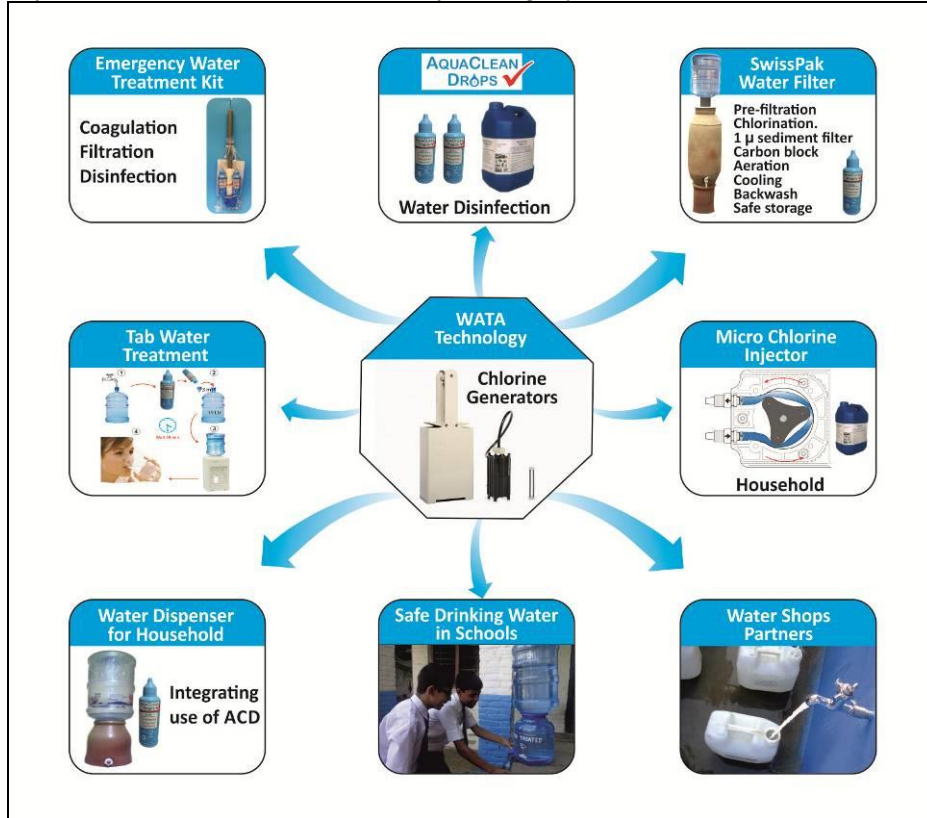
**Multi-Products Business Model:** From the 12 months’ pilot it became clear that the single product business model, based only on selling AquaCleanDrops flasks, cannot provide robust commercial sense for the survival of the social enterprise. Compared to single product business model the multi-products model requires more resources to manage it. Nevertheless, the diversified portfolio of innovative water treatment and safe storage systems may provide to a social entrepreneur reputational assets and targeted market segmentations for commercial viability.

We started ascertaining the needs for developing innovative methods of integrating the use of ACD in: treating biologically contaminated tap water; disinfecting household water tanks; in providing safe water to schools; in treating turbid water during emergencies; in treating turbid and biologically contaminated ground waters for long term in rural context; in treating toxic or eutrophicated waters from village rain harvested water ponds and gray water ponds that often cause contamination of drink water sources. We evaluated local traditional practices and other innovations in HWTS. Finally, we came up with vernacular product designs that are simple to use, that have aspiration appeal, and with which end-users can easily relate themselves to. We developed in-house technical capacity and partnered with experts in Water-Sanitation-Hygiene (WASH) sector from International donors and UN Agencies, and professors / students of Department of Environmental Sciences & Engineering (IESE), of National University of Science and Technologies (NUST). Following is a list of multi product portfolio of Pakoswiss Technologies:

**a. Centralised Liquid Chlorine Production – with WATA Technology (core business)**

At the core level of the multi-product portfolio is the WATA Technology. Maxi-WATA is used to produce AquaCleanDrops™ – a brand for stabilized Sodium Hypochlorite in 50ml and 2500ml flasks sold through partner channels. Each Maxi-WATA has a maximum capacity to produce 120 litre Sodium Hypochlorite per day. Presently with three Maxi WATA devices we have a capacity to produce, stabilize and bottle 360 litres per day. The Standard WATA, with 2-7 litres per day capacity, is sold to hospitals or water treatment institutions for making their own chlorine. Mini WATA is targeted to schools, small food handling businesses and field teams etc.

**Figure 3: Multi-Products Business Model of Pakoswiss Technologies for Household Water Treatment & Safe Storage systems, based on WATA Technology**



**b. AquaCleanDrops™**

**Target Markets:** Households at all levels; Health and Food Handling Businesses; Water Shops etc.

AquaCleanDrops (ACD) is a food grade, stabilized, liquid chlorine that is used for disinfecting drinking water and food. It is also useful for sanitizing hands, kitchen surfaces, and food and milk utensils. It is low concentration (6g/l) Sodium Hypochlorite which is safe for health. ACD is available in 50ml and 2.5 litre flasks. It is also available to humanitarian organizations in the Emergency Water Treatment Kit. AquaCleanDrops is the least expensive water disinfectant method available for household use. A 50 ml ACD bottle costs PKR 60 and can disinfect 330 litres of water. The cost per person per day is USD 0.012.

**c. Emergency Water Treatment Kit (EWT) for Household use**

**Target Markets:** Disaster affected households where water sources get turbid and contaminated.

It is designed for simple households to effectively treat turbid and pathogenically contaminated water for making it safe for drinking. The EWT Kit simplifies water treatment methods of “Coagulation / Sedimentation”, “Filtration”, and “Disinfection”. The kit can treat 650 litres water, which is sufficient for emergency drinking water needs for one month for a household of 4 people. The EWT Kit costs USD 3.5, therefore it costs USD 0.04 per person per day and is the least expensive disinfection solution for treating highly turbid waters at household level.

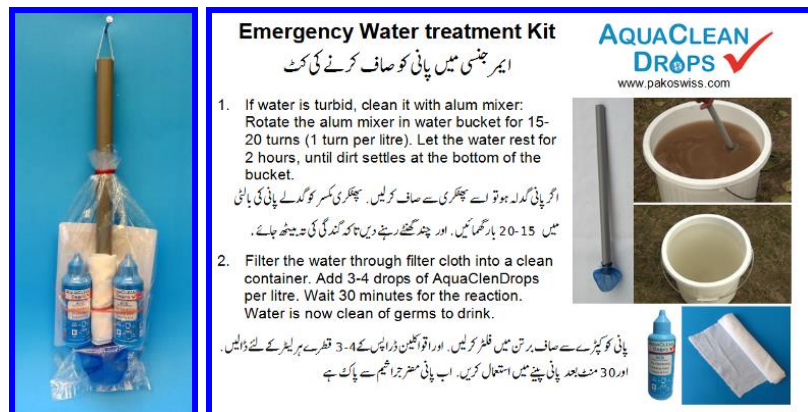


Fig. 4, Emergency Water Treatment Kit, and its instruction card

**d. SwissPak Water Filter and Safe Storage**

**Target Market:** Rural communities with turbid and contaminated water source.

It is a point-of-use water filter which is specifically designed for rural households for treating turbid and microbial contaminated water. It is based on modern filtration technologies of large filter plants that are simplified for deployment at rural household level. It is robust and has a high output flow. It has 30 litres safe storage in terracotta urn, which keeps water cool and fresh without using energy. It improves the filtration process and significantly prolongs the life of replaceable filter cartridges. It is the only portable filter with chlorine dosing mechanism and has provision for coagulating very turbid waters. This filter is powered by gravity flow and brings several innovations and improvements in the design and process of Household Water Treatment and Safe-storage systems. The cost per person per day is USD 0.008, calculated for minimum 2 years use by a family of 7 members.



Fig. 5 Water Filter & Safe storage

**e. Chlorine integrated Water Dispenser & Safe Storage (low cost)**

**Target Markets:** Low income Households at BoP, Middle income HH and Schools, with water connections or wells/bore.

Water Dispenser & Safe Storage is affordable safe HWTS, with inspirational appeal. It integrates and simplifies the use of AquaCleanDrops liquid chlorine. Hand crafted with high-fire Peshawar terracotta clay, it keeps water fresh and 5°C cooler than the ambient temperatures.



Fig. 6 Water Dispenser

**f. Safe Drinking water for Schools (Rural and Urban)**

Pakoswiss Technologies is developing safe drinking water solutions for schools by combining its products and technologies such as Water filter, AquaCleanDrops and water dispensers.

**g. Micro Chlorine Injector for Household water storage**

**Target Markets:** Urban middle and high income households, hospitals and apartment-houses with rooftop water storage tanks and water pumps; Village hand-pumps and water selling shops.

Chlorine dosing pumps are widely available in the market for injecting large amount chlorine (more than 1 litre per hour) in water pumping stations. However, such a technology is not cost effectively available for micro dosing of less than 100ml per hour for household applications. Pakoswiss Technologies is developing cost effective micro-metering solutions for households, by measuring water flow in pipes to overhead roof storage tanks and injecting measured dose of AquaCleanDrops chlorine in it. Such a technology could also be used to inject micro dosage of chlorine in hand pumps and for Water Selling Kiosks

**h. Bio-Solar-Reactor (BSR) for water pond treatment**

**Market:** Village water bodies; Waste Water ponds; Fish-Ponds.

BSR is the latest innovation from Pakoswiss. It helps expediting nature's processes of surface water-body treatment and balancing aquatic conditions suitable for biodiversity. It innovatively utilises a combination of major gray water treatment technologies such as: consortium of aerobic/anaerobic Effective Microbes, Aggregation Precipitation, Flux and Aeration. Once installed the BSR works autonomously without needing frequent service interventions. It uses solar power and various processes are controlled by an Electronic-Control-Module. In Bio-Solar-Reactor these tested technologies are innovatively integrated into a product that is scalable to produce and deploy, and that can successfully respond to effective marketing tools. BSRs are expected to play significant roles in reviving the tradition of maintaining village water bodies for flood and rain water harvesting. Such water bodies are important sources of water for human and livestock consumption, agriculture and recharging ground waters.

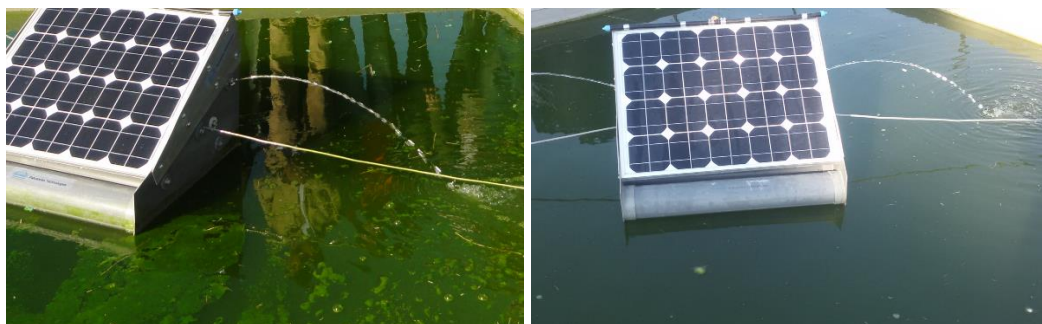


Fig. 7, Testing of Bio-Solar-Reactor in a tank of eutrophicated sewerage water. Left image taken on the installation day shows micro algae bloom, Right image after 15 days

**Early Successes:** Two of the above mentioned innovative products, SwissPak Water Filters and Emergency Water Treatment Kits (EWT-Kits), are already field tested and have attained considerable market success. The production capacity for these two products is established in partnership with small artisanal enterprises. SwissPak Water Filter was field tested by UN Habitat in 2013 and subsequently 8000 units were deployed in Sindh and Baluchistan provinces of Pakistan, with excellent user responses. Emergency Water Treatment Kits were successfully field tested by Handicap International Pakistan in 2014, and after 2015 floods 4500 units were distributed to as many households by InterCooperation Switzerland and SDC-HA in Chitral, Khyber Pakhtunkhwa province. Presently Pakoswiss maintains a stock of 5000 EWT kits for emergencies. The revenue from the single sale order of EWT-Kits was more than the overall sale of ACD Chlorine flasks during 2015. The profit from the sale of SwissPak filters provided important funding for financing operational costs of Pakoswiss.

**The business outlook** appears promising. Pakoswiss has already developed valuable reputational assets in innovative HWTS. It is the only company from private sector which has been invited to become a member of UN WASH group and their technical core team. We believe that the multi-product model has the potential for a breakthrough and possibly achieving an early breakeven in the next 12-18 months. During the next couple of years, the company would certainly depend on the external findings for dissemination efforts and awareness campaigns.

With the high growth in population, depleting ground water sources, and slow development in new water reservoirs, the availability of safe drinking water will unfortunately continue to deteriorate in Pakistan. Pakoswiss Technologies is poised to play an important role in empowering population, particularly at the BoP, to treat their drinking water. It is committed to develop and scale up pragmatic and sustainable HWTS solutions that corresponds to the consumer needs, integrates well in their lifestyle, is responsive to effective marketing tools and provides adequate commercial value to the company and its distribution channels partners.

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