

# Attachment 10 Business Development Toolkit

## WATER AND SANITATION AS A BUSINESS: Best Practices from India

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### 1. THE BYRRAJU FOUNDATION: Rural water and sanitation, Andhra Pradesh, India

**Introduction,** a NGO set up in July 2001 based in Hyderabad currently works in 160 villages in five districts of Andhra Pradesh. The Foundation's services are directly made available to more than a million people. An additional one million who live in the neighbouring villages also benefit from its programs. The Foundation works on a range of issues at the village-level, including healthcare, education and adult literacy, water, environment and sanitation and livelihoods. The water supply and sanitation cases are profiled below.

#### ***Water Supply: Sujala Water Plants***

**Problem:** Despite adequate availability of water and substantial investments in village-level water treatment systems, it was found that 'drinking water' in 78 per cent of the villages adopted by the Foundation, did not meet the safe drinking water standards.

**Initiative:** The Byrraju Foundation began a programme aimed at providing safe drinking water to 100 per cent of the population in the adopted villages. The Foundation created a sustainable, low-cost community-driven model, called the 'Sujala' Water Plants to provide drinking water that met standards of both the World Health Organization and the Bureau of Indian Standards. One Sujala Water Plant with a capacity of 1000 – 2000 litres per day have been put up in each village. The capital costs were shared between the Byrraju Foundation, villagers and non-resident villagers. Clean water from the Sujala Water Plants is supplied in food-grade plastic (HDPE) cans. Most plants are operated by purpose-trained village youth. Villagers purchase this water directly from the Water Plants at the rate of Rs. 125 (2.2 Euros) per kilolitre. Although no statistics are available about the profitability of the venture, the Foundation states that the project is sustained through user charges paid by villagers.

**Impact:** Currently the programme provides 1 million villagers in 160 villages with safe, affordable water, which has resulted in a marked reduction in waterborne diseases. The Sujala Water Plants provide an uninterrupted supply of water that is monitored continuously for quality.

#### ***Sanitation: Individual Sanitary Latrine***

**Problem:** Open defecation and a lack of personal hygiene affects health in most rural villages in India. Lack of appropriate technology for toilets in different terrains, problems of sanitary waste disposal and the high costs of toilet construction are the main problems they face.

**Initiative:** The Foundation promoted sanitation and hygiene through an Individual Sanitary Latrine (ISL) program which ensures hygienic sanitation and a cleaner environment. Working through the state government's Total Sanitation Campaign (TSC), the Foundation's ISL is a self-owned sanitation facility made available to every poor family (i.e., living in the Below Poverty Line or BPL). The Foundation institutionalized regular collection, segregation and scientific disposal of domestic and community waste. Adopted villages are equipped with waste removal systems and vermi composting has been institutionalized in these villages. The Foundation pays Rs. 500 to every family who comes forward to construct an ISL. It also

facilitates the collection of contributions from the beneficiary families towards the cost of construction, pools money for the initial expenses, and ensures good quality construction.

**Impact:** ISLs have a 100% usage in the 11 villages where it has been tried so far. Of these, 9 villages have gone on to win the Government of India's Nirmal Gram Puraskar for exemplary performance in environmental sanitation.

*Source:* [www.byrrajufoundation.org](http://www.byrrajufoundation.org)

## **2. EXNORA: Voluntary Garbage Collection, Chennai, India**

**Introduction:** In 1989, entrepreneurs concerned about the deteriorating solid waste management in the city of Chennai in south India formed an organization called EXNORA (EXcellent NOvel and RADical), dedicated to generating ideas for civic improvement. They focused on garbage collection in the city of Chennai.

### ***Solid waste collection from households***

**Problem:** The issue of garbage collection has been a nightmare in a country like India with a population of over a billion people. Despite government-run municipal corporations it is common to see garbage strewn on the streets, causing serious health hazards for the populace.

**Initiative:** In 1989, the entrepreneurs at EXNORA took a loan from a bank to buy a tricycle cart and also pay a monthly salary of Rs. 650 (11.60 Euros) to rag pickers (re-named "street beautifiers"). These rag pickers would collect garbage into the cart each morning from the homes on a street and put it in the garbage container provided by the City Corporation, and thereafter sweep the street. In return, every household on the street would contribute Rs. 10 (18 cents) per month toward the salary of the street beautifier. Being a success, it was soon replicated across the city, and by 1999, there were 900-950 civic EXNORAs functioning across the city. Each body is self-managing, meeting their expenses from the monthly collections from the homes they service.

**Impact:** This new system ensured that waste was not disposed onto the streets and hence ensured cleanliness and hygiene of the surroundings, employment opportunities and dignity of labour for rag pickers and people's participation in the system and thus their responsibility toward their environment. The success in the city of Chennai has led to the adoption of this model in other cities, and United Nations has picked this up as a stellar model for developing countries. Today, EXNORA has moved beyond garbage collection to environmental protection and management, discovering entrepreneurial opportunities at each step.

### ***Household waste recycling***

**Problem:** The local government could not dispose off the large volume of garbage collected from households in an environmentally sanitary manner. Garbage collected from the city was transported to two dumping grounds, which were originally prime wetlands. The accumulated garbage in these dumping grounds was polluting the air, the soil and the ground water, and thus threatening the human and animal life in the surrounding areas.

**Initiative:** Exnora realized that to the local government, collection and disposal of garbage meant a mere relocation of waste and not its safe management. Exnora then shifted its focus from mechanical collection and disposal, to innovation of new methods of waste recovery such as composting of organic waste at household level. Vermi-composting was

propagated amongst Civic Exnoras, in an attempt towards waste recycling, and very soon this became a common practice in many Exnora areas.

**Impact:** EXNORA seems to be a textbook case of a voluntary system in action. First, a self-sustaining business model drove it. Second, it involved participation of society at a local (street) level without the application of force. If enough people did not join, then the model would not sustain, and their street would not be clean.

*Sources:*

<http://www.exnora.org/swm.html>

<http://www.unesco.org/most/asia3.htm>

<http://indiatogether.org/stories/exnora.htm>

<http://www.oneforindia.org/ofi2003/projects/vellorehill.php>

### 3. **SULABH INTERNATIONAL: Urban sanitation, India**

**Introduction:** A sociologist by training, Dr. Bindeshwar Pathak took it up as his mission to improve toilet facilities for the underprivileged in India. Dr. Pathak proceeded to found Sulabh International, which specializes in the construction and maintenance of urban public toilets that operate on a pay-per-use model.

#### ***Self-Paying Urban Public Toilets***

**Problem:** the lack of toilet infrastructure, leading to defecation in public places. This poses serious health hazards and has bogged successive governments. Laws that require all houses to have toilets have been ineffective and impractical. The usual practice was to have human scavengers to carry the faecal matter and dispose it some distance away. The lack of adequate household-level sanitation facilities thus affects the dignity of less-privileged members of society, both the ones who didn't have access to toilets and the scavengers whose job it was to manually remove human excreta from streets and open areas.

**Initiative:** Dr. Pathak proceeded to found Sulabh International, which specializes in the construction and maintenance of public toilets that operate on a pay-per-use model. One-use costs Rs. 0.50 (1.1 cents), and monthly passes are sold for Rs. 20 (44 cents). Women and children can use the services for free. Bath services are also provided for a cost. 60% of the operational revenues are used to rehabilitate scavengers by providing them vocational training and allowing them to reintegrate into mainstream society.

**Impact:** Sulabh International Social Service Organization has constructed more than 6,000 public toilets in slums and public places and maintains them on pay-and-use basis. In addition, some 50,000 scavengers have been freed from the sub-human occupation of cleaning and carrying away the excreta of others on their heads. However, Sulabh is not a charitable institution and is in fact a well-implemented and financially-viable voluntary system.

#### ***Sulabh EcoSan Toilet Design***

**Problem:** Normal toilets use 14 litres to flush which may not be possible in areas of water scarcity. Also, conventional sewerage systems are designed to carry solid waste away and not use it to generate any useful by-products.

**Initiative:** Dr. Bindeshwar Pathak studied various designs of latrines and work done in this field in India and abroad and developed Sulabh Shauchalayatechnology, which is

technologically appropriate, socio-culturally acceptable and economically affordable. It is low cost, requires only two litres of water to flush and can function even where enough water is not available. The Sulabh system can alternately deposit waste into two pits. The first pit can be used by a family of five for up to four years. When the first pit is full, the family can switch to the second pit, which also can be used for about four years. Over that period, the waste in the first pit is gradually and naturally converted into a rich material that can be removed and used as dry, powdery fertilizer. Each pit is about one and a half meters deep and lined with a lattice of bricks. The gas formed by the decomposing waste is absorbed into the surrounding soil, eliminating any foul smell. Experiments conducted in India have established that bacteria from the pits travel no more than three meters vertically, and extend less than one meter downward. The design of the system and the pits can be modified as needed to protect water sources and underground soil. A Sulabh system can be built for as little as Rs. 500 (less than 10 Euros), which makes it an affordable option even in the poorer regions of India.

**Impact:** Apart from providing an alternative design that uses much less water than the conventional designs, the Sulabh eco-friendly toilets can also be designed to produce fertilizer. In urban areas that have costly sewer systems, Sulabh systems have been adopted as community toilets, often with an innovative modification: the attachment of a biogas plant. Through these plants, human waste produces nutrient-rich water that can be used for irrigation and biogas that, when mixed with diesel fuel, can power electrical devices like streetlights. Of late, Sulabh has further expanded into extracting biogas from community toilets through anaerobic decomposition of the waste. Biogas is useful as an alternative fuel for cooking or producing electricity and Biogas Sulabh systems have come to be popular in hospitals, schools and hotels in India. The movement has been scaled up in the last decade and is a big way of providing sustainable sources of electricity to remote villages. The United Nations Centre for Human Settlements has recognized Sulabh's sanitation system as an urban best practice.

*Sources:*

<http://www.sulabhinternational.org/pg02.htm>  
<http://www.islamonline.net/English/Science/2003/09/article14.shtml>  
<http://timesfoundation.indiatimes.com/articleshow/799506.cms>  
<http://www.sulabhtoiletmuseum.org/profile.htm>  
Sulabh Public Toilet Linked Biogas Plant:  
[http://www.unwac.org/showhtml.php?filename=bestp\\_7](http://www.unwac.org/showhtml.php?filename=bestp_7)

#### **4. MURUGUNATHAM: Low-cost Sanitary Napkins, Tamil Nadu, India**

**Introduction:** Muruganantham, 42, from Coimbatore is the son of a handloom weaver, who always dreamt big, he wanted to own a factory one day. He chanced upon an opportunity when he saw his wife hiding something from him one day while at home. When he enquired further, he realized that she was using unhygienic cloth instead of sanitary napkins.

**Problem:** Sanitary napkins are too expensive for the poor. As Muruganantham's wife put it, if all the women in his house opted for sanitary napkins, they would have to cut their milk budget by half! Muruganantham decided to develop a sanitary napkin manufacturing machine that would produce cost effective napkins accessible to women in the rural areas. After putting in three years of effort, he developed a cost effective machine, which was manual and ran on minimum electricity, as he wanted it to be managed only by women. He decided to only sell these machines to self help groups of women in rural areas. His units cost anything between Rs. 88,000 – 100,000 (1500 – 1800 Euros). The packets cost Rs. 11

(18 cents) to manufacture, and are sold for Rs. 15 – 20, giving the women in the unit a profit of Rs. 4 – 9 (7 – 16 cents).

**Impact:** Currently Muruganantham has sold over 36 units not just in Tamil Nadu but in other states as well and estimates he would sell 100 by the end of 2007.

For more information you could take a look at his Web Site: [www.newinventions.in](http://www.newinventions.in)

#### **5. NAANDI FOUNDATION: Water purifier for rural communities, Andhra Pradesh, India**

**Introduction:** Water Health International, a US based water solutions provider, and Tata Projects of the Tata group of companies created a water purifier together with rural communities in Andhra Pradesh.

**Problem:** A high proportion of villagers in rural Andhra Pradesh, especially in Krishna district, suffer from water-borne diseases.

**Initiative:** A unique decentralised water purifier was designed by technologists working together with village communities. This purifier produces chemical-free and pathogen-free water. The pilot programme was launched by the Naandi Foundation in Bomminampadu village in Krishna district of AP, where a large proportion of the 730 households suffered from water-borne diseases. The water from the local source is passed through the purifier, which produces potable water. Households are charged a nominal purification fee of 10 paise per litre (or Rs. 10 per kilolitre, which is roughly 18 cents).

**Impact:** Along with the clean water, the Foundation also provides education on health and hygiene, and together this has helped bring in healthier lifestyles in the village. Even though the purification fee is low and affordable, the volumes ensure that collections are sufficient to pay for the all maintenance and servicing costs of the plant, including the salary overheads of the local staff (recruited from the village itself) – and that the initiative is financially sustainable.

Source: <http://www.naandi.org/>; <http://www.waterdigest.in/>

#### **6. TATA RESEARCH DEVELOPMENT & DESIGN CENTRE: Water filter from rice husk ash, Maharashtra, India**

**Introduction:** A rice husk ash-based water filter designed by Tata Research Development and Design Centre (TRDDC), a division of Tata Consultancy Services (TCS), India provides a simple and low cost method to provide safe drinking water in rural areas.

**Problem:** The 180 households of Pusane village, Pune district in Maharashtra state in western India were plagued by water-borne diseases.

**Initiative:** The innovative filter uses rice-husk ash as a filtering medium. Rice-husk ash is abundantly available in rural India, and contains activated silica and carbon that helps in removing colour, odour, suspended particles and micro-organisms. Cement is used as the binder while pebbles support the filtering unit. The filter has two parts. Its top portion is made of food grade plastic material (a form of plastic approved to keep food items) costing Rs. 150 (less than 3 Euros). It can be reused after the expiry of the filter element's life (6 to 8 months) by replacing the filter bed. The cost of such replacement is Rs. 25. The lower part

of the filter could be any container of the user's choice. TRDDC does not manufacture or sell the filters, but other organizations such as Sevalaya in Chennai and Indian Institute of Youth Welfare in Nagpur promote, sell and install these filters.

**Impact:** Till date, more than 4,200 filters have been installed, with encouraging results

*Source:* Dr. Kalyan K Das, TRDDC, [kkdas@pune.tcs.co.in](mailto:kkdas@pune.tcs.co.in)