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# 5 Innovative WASH Solutions for an Inclusive Urban India



WATER



SANITATION



HYGIENE

# IHUWASH

Innovation Hub for Urban Water, Sanitation & Hygiene Solutions in India

Supported by USAID



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Paramita Datta Dey  
Senior Research Officer, NIUA





## Preface

The goal of the IHUWASH project is to improve the performance of the urban WASH sector in the country through agglomeration, incubation, and acceleration of innovations to address WASH issues. The first stage of this process, agglomeration, refers to the compilation of existing key innovations which have significantly influenced the WASH sector. '5 Innovative WASH Solutions for an Inclusive Urban India' is the second document (the first being 10 Innovative Approaches to Improve the Urban WASH Sector in India) in a series of publications by IHUWASH to sensitize stakeholders and bring to the fore, innovative and simplified WASH solutions that have significantly benefitted urban India. The five case studies documented in this booklet have been grouped under three broad categories – water, sanitation and hygiene. These five case studies were selected based on the following criteria:

- Addressing WASH solutions in urban India
- Focusing on the needs of particularly low income communities
- Sustainability in terms of life cycle cost, business model and livelihood opportunity
- Delivery of low-cost quality services

It is hoped that this document will not only serve to sensitize important stakeholders in the IHUWASH pilot cities – Faridabad, Mysore and Udaipur but also encourage other practitioners to improve WASH performance in their respective locations. The document is also an effort to encourage adoption and adaptation of similar innovations by WASH stakeholders, especially for low-income urban communities, thus creating an ecosystem for a simplified and inclusive approach to WASH.



WATER

# I. WaterHealth

*WaterHealth International provides scalable, safe and affordable drinking water solutions to underserved populations across the world. It is one of the first companies to launch branded water in the unorganized community water industry, under its brand name, dr. water.*

*WaterHealth India (WHIN), a wholly owned subsidiary of WaterHealth International, came into existence in 2006. In eleven years of its operation, WHIN is successfully running over 500 WaterHealth Centers (WHCs) across seven states of India covering Andhra Pradesh, Telangana, Gujarat, Karnataka, Delhi, Haryana and Tamil Nadu providing access to safe water to over six million people.*

## The Background

While generally considered a symbol of progress, rapid and uncontrolled urbanization can lead to major socio-economic problems, a phenomenon widespread across several Indian cities today. With nearly 30% of her population living in urban agglomerations/towns, India is currently facing a serious crisis in terms of urban growth. Among numerous other socio-economic problems, the lack of safe drinking water and sanitation facilities are leading to several health challenges for the urban Indian slums. Water, especially safe drinking water, is a scarce 'commodity' for the urban poor. Surveys of groundwater quality in many cities reveal that a number of waterborne diseases are a result of pathogenic contamination, generally caused by sewage mixing with drinking water. Ill maintained infrastructure, old pipelines and poor drainage systems are the key reasons for this kind of contamination. Consuming such water leads to epidemics and outbreaks of diseases like jaundice, cholera, typhoid, diarrhoea etc. As much as 60% of water and vector-borne (malaria, dengue etc.) diseases in urban areas are reported from slum clusters. Given that the majority of slum colonies in India are unauthorized, no one in the administration owns the responsibility or the accountability for its cleanliness (or lack of it) or providing other amenities including water supply.

## Project Geography

With a total slum population of 16 lakhs spread over 850 slum clusters across the city, Bengaluru, India was chosen as the pilot location for implementing the project.



## The Innovation

WaterHealth India (WHIN) sets up, through a Public Private Partnerships (PPP), a Community Water System called a WaterHealth Centre (WHC) in partnership with Urban Local Bodies (ULBs) and Municipal Corporations. The WHC provides clean and safe drinking water to underserved communities

for a concession term ranging from 20-25 years under the Build Operate Transfer (BOT) model. Under this Public Private Partnership model, the land, water and electricity for the WaterHealth Centers (WHC) is provided by the ULBs while WaterHealth raises the capital to set the plant up. WaterHealth specializes in running the plant through a robust operations



and maintenance (O&M) model. The Company also generates the demand for clean and safe water under a consumer brand called dr:water.WHIN's focus on O&M can be gauged by the fact that the oldest plant installed by the company is over ten years old. This construct helps assuage the following essential problems plaguing the community:

- Ensuring availability of safe and affordable drinking water for the underserved sections of the urban community.
- Ensuring residents across all stratum of the community are made aware of water, sanitation and hygiene (WASH) practices.
- Ensuring holistic community development in the community across health, economic and social parameters.

## The Product

In May 2014, WaterHealth (WHIN) embarked on a journey to provide safe and affordable drinking water to thousands of underserved community members across Bangalore. The partners who made this possible were USAID who invested in the projects and Bruhat

Bangalore Municipal Palike (BBMP) who, as WHIN's public partner, ensured they had all the necessities required for the execution of the same. With their support, WaterHealth rolled out twenty-five decentralized water purification units called as WaterHealth Centers (WHCs) across twenty-five wards of Bengaluru thereby impacting the lives and health of thousands of community residents. All WHCs are equipped with six-step water purification systems comprising reverse osmosis (RO) and ultra-violet (UV) technology.

## Business Model and Financial Sustainability

WaterHealth ensures that the project remains sustainable by assessing each WHC against five (5) parameters:

- **Financial Sustainability** – Each WHC has enough number of consumers at any given point in time to ensure that it is financially viable. This helps cater towards the operating

### Achievements

Each WaterHealth Center has not only provided access to safe and affordable drinking water but has also led to holistic community development in the following ways:

- The model has led to direct employment generation by hiring local community members as plant operators in the WHC. Moreover, each cluster of WHCs has a team of RE (Relationship Executives) who tend to the technical and operational aspects of the same.
- More than 70% of drinking water consumers belong to vulnerable social categories while 30% own the least assets. More than 80% of the consumers are below poverty line.
- Households consuming water from a WHC report lesser incidence of illnesses versus households consuming water from any other source.
- Households consuming water from a WHC show better knowledge and practice of sanitary behaviours.
- Households who draw water from a WHC can potentially save INR 4,711 annually owing to lesser medical expenditure, reduced drudgery and increase in productive engagement.
- Female members of households who save time are 1.6 times more likely to engage in economically productive activities.
- Households drawing water from a WHC reduce their carbon emissions caused due to boiling the water, by approximately 21.1 tonnes of CO<sub>2</sub> annually.



expenditure of the WHCs throughout the concession period. A user fee of INR. 0.40-0.50 per litre is charged for the services.

- **Environmental Sustainability** – Each WHC has a ZLD (Zero Liquid Discharge) policy which means that the rejected water is not dumped into the sewage and is responsibly used to recharge the aquifer.
- **Social Sustainability** – Every member across the public and corporate partner is kept engaged in all social marketing activities conducted throughout the concession period.
- **Institutional Sustainability** – Key opinion leaders in the community are engaged and act as Abhivaktas or spokespersons to create a better buy-in across WASH practices taught in the communities.
- **Technical Sustainability** – The WHC remains technically sustainable through a robust channel of Relationship Executives (REs) who help manage the same as per a pre-defined TAT.

## Implementation Challenges

- There is usually a long gestation period while associating with ULBs in the concerned geography and getting a contract signed with them. This is usually because of multiple tiers of bureaucracy and approvals required during the process.

- Often the land provisioned by the ULB faces community issues despite being allocated by the ULB. These issues are often related to disputed lands or the community using the land for some other purpose.
- Although the ULB makes necessary provisions for raw water in terms of borewell connection, there are multiple unforeseen challenges such as issues with the existing borewell in terms of insufficient water yield. It takes time to construct a new borewell which further causes unnecessary delays in project execution.

Waterhealth attempts to ensure that each project remains viable despite these challenges by keeping alternate water sources and sites ready.

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## REFERENCES

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- > <http://www.waterhealth.com/>
- > **To know more about Waterhealth India, contact Mr. Madhu Krishnamoorthy at [kmadhu@waterhealth.com](mailto:kmadhu@waterhealth.com)**



WATER

## 2. Akvo Caddisfly

*Akvo is a not-for-profit foundation that creates open source, internet and mobile software and sensors. Akvo Caddisfly, introduced in 2015, is a simple, portable, reliable and low-cost drinking water testing kit using the smartphone as a tool. Caddisfly has been designed keeping the community in focus such that it can participate in scientific, evidence-based decision making with regard to safe drinking water.*

## The Background

Globally, 663 million live without access to safe water<sup>1</sup>. Availability of safe drinking water is a distant dream for many, especially in the developing countries. Climate change is expected to worsen this difficult situation. With unpredictable weather patterns resulting in storms, floods, prolonged droughts and contaminated water sources, it is predicted that over 40% of the global population is likely to be living in areas characterised as being under 'severe water stress' by 2050<sup>2</sup>.

In India, geometric increase in population coupled with rapid urbanization, industrialization and agricultural development has had a high impact on both, the quantity and quality of water. According to WaterAid, 80% of India's surface water is polluted due to poor domestic sewerage, inadequate sanitation facilities, poor septage management and the near absence of sanitation and wastewater policy frameworks responsible for this. Further, the decreasing quality and quantity of surface water source has led to rapid extraction of groundwater reserves. In several parts of India, groundwater is the only reliable, year round source of drinking water. However, the country's aquifers are not only under tremendous stress, the quality of water they provide is also deteriorating. While surface water pollutants are often visible, occurrence of natural arsenic and fluoride in groundwater is widespread in the country. Excessive extraction of groundwater increases the concentration of these metals as they are present in higher quantities in the crust as compared to the surface.

Poor water quality poses a variety of challenges in terms of livelihood, health, and wellbeing. Thus, it becomes very important to test water before use. However, water quality testing procedures fall short in a number of ways: the equipment is often hard to use and unreliable, and the lab tests are expensive and slow. Resulting data is generally stored locally and not shared effectively. This makes it difficult to quickly collect, analyze, present and efficiently use data to resolve issues of drinking water.

## Project Geography

Jharkhand, Telangana and Punjab in India, Satkhira and Dhaka in Bangladesh, Nepalganj in Nepal and parts of Kenya, Ghana and Ethiopia.

<sup>1</sup><https://www.theguardian.com/global-development-professionals-network/2015/jul/01/global-access-clean-water-sanitation-mapped>

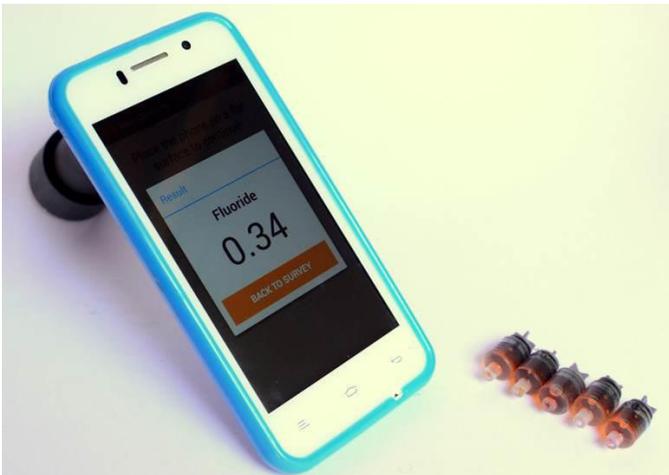
<sup>2</sup>Quoted in Wild Water, a WaterAid publication

## The Innovation

While contemplating about its future product mix, Akvo considered two things: expanding its research and development capabilities on the ground in the countries where its tools were being used; and, expanding from software into hardware (physical products). It identified water testing as a field, wherein it could build on its existing strengths, financed and developed with support from its existing investors and partners.

In August 2012, TernUp Research Labs was set up in Bangalore, India, to develop products aimed at solving problems of drinking water. In 2013, TernUp partnered with Akvo to develop Caddisfly and became Akvo's R&D hub in India. The Caddisfly development team at TernUp comprised individuals who focused on good industrial design, were motivated to simplify water testing, and located themselves in the technological hub of the country. The team was well connected to key Indian organizations working to assess and act on the problems of water testing, particularly the Fluoride Knowledge and Action Network, an Indian group of organizations committed to tackling fluorosis in water supplies.

Caddisfly was developed with investment support from ICCO, SNV Netherlands and Aqua for All. Akvo, additionally, worked with the UNESCO IHE laboratory in Delft, Netherlands, to validate the design of the various tests. A first Caddisfly prototype to test fluoride levels



was developed and showcased at a Hackathon organized by the World Bank in India in 2013. By 2015, from a crude prototype a high fidelity market ready product was developed thus propelling the research and development process.

At present Caddisfly can test water for fluoride, residual chlorine, salinity, and various other parameters for which strip tests exist (such as pH, nitrate, nitrite, phosphates, iron, ammonium, etc.). Akvo is also developing additional parameters for testing such as arsenic, coliform bacteria and turbidity in water.



## The Product

Akvo's Caddisfly is a simple, low cost, open source, smartphone-based drinking water testing system connected to an online data platform. Existing features of the phone combined with software applications and pocket-sized hardware attachments, enable users to conduct reliable tests on water samples as well as share the data. This innovation simplifies the water quality monitoring process, which is otherwise considered to be a science heavy exercise.

It works by adding a specific reagent to a water sample in the reusable test chamber, attached to the smartphone. The phone's camera takes a picture to detect the colour of the sample. The Caddisfly app then translates the colour into the actual concentration of the contaminant in the water sample. The test results can then be shared online via Akvo FLOW, Akvo's mobile phone-based field survey tool.

Caddisfly has been developed keeping the user at the centre of its design. It is thus context neutral and universally applicable. It enables communities to generate near real time water quality data, on their own, in a simplified and reliable manner, by using a smartphone. The data generated enables them to make quick decisions on the ground.

## *Business Model and Financial Sustainability*

Caddisfly was financed by an early stage grant from SNV. SNV is the lead funding partner for Caddisfly and a global strategic partner of Akvo. Its investment enabled Akvo to accelerate Caddisfly's development. The costs involved in developing the product were primarily related to human resources, laboratory infrastructure, developing the hardware and accessories, and linking the Caddisfly to an existing cloud based data solution. At present, the innovation has reached its break-even point, and is expected to soon be able to generate its own revenue as the demand for the product is very high. Akvo aims to make Caddisfly affordable for use by governments, NGOs, donors and communities.

## *Engagement Model*

By enabling communities to generate data on their own and thereby take decisions, Akvo's innovation contributes to reducing knowledge asymmetries in the society. The scientific data based decision-making has helped communities and governments around the world to collect reliable water quality monitoring data.

## *Implementation Challenges*

Being a software based organisation, Akvo faced challenges in integrating a hardware system with its software platform. Developing new tests and fixing distribution channels were some of the key challenges too. Akvo is trying to address these challenges by seeking new partnerships with organizations with complementary capabilities.

## *Achievements*

This innovation has been tested widely by communities and governments. Several scientific institutions (IIT Kanpur in India, TU Delft and Deltares in the Netherlands) have developed partnerships with Akvo to use Caddisfly in varied geographical and institutional settings. The World Bank had also partnered with Akvo recently to train the staff of the Department of Water Supply and Sanitation, Punjab (DWSS) on how to use Caddisfly.

However, Akvo believes its main achievement as having enabled each citizen to become a scientist and partake in scientific decision-making towards safe drinking water.

## Future Plans

Currently, Akvo is in active discussions with its partners to scale up Caddisfly. The partnerships are expected to address the inherent issues associated with expanding and penetrating newer markets. Akvo is also seeking partners to link third party sensors to Akvo Flow, its existing data based software solution. This will help to increase the portfolio of parameters as well as reach out to newer markets

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## REFERENCES

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- > <http://akvo.org/akvo-caddisfly/>
  - > [http://akvopedia.org/wiki/Akvo\\_Caddisfly](http://akvopedia.org/wiki/Akvo_Caddisfly)
  - > <http://akvo.org/blog/introducing-akvo-caddisfly-the-water-quality-testing-kit/>
- > **To know more about Akvo Caddisfly, contact Mr. Ayan Biswas at [ayan@akvo.org](mailto:ayan@akvo.org)**



## SANITATION

# 3. Samagra Sanitation

*Started by Swapnil Chaturvedi in 2011, Samagra Sanitation builds accessible toilets to enable the urban poor lead healthier, productive, dignified and empowered lives. Samagra toilets are structured as one-stop Community Centers, which provide life improving value added services to the urban poor. Boasting of over 10,000 daily toilet users and a 92% customer satisfaction rate today, Samagra functions as an agent of behavioural change with user-friendly toilet design and a unique “LooRewards” loyalty programme.*

## The Background

According to the World Health Organization (2014), more than 50% of Indians (i.e. over 600 million people) have no access to toilets. Most of the public toilets and communal restrooms in Indian cities are either dysfunctional or lack proper hygiene. Hence, people are left with no choice but to defecate in the open.

The practice of open defecation creates extremely unhygienic conditions that leads to disease, malnutrition and other environmental hazards. Open defecation increases the risk of microbial contamination of water (with bacteria, amoeba, viruses, etc) which causes malnutrition, stunted growth, diarrhoea and infections such as pneumonia in children. In India, diarrhoea and worm infection are the two major causes that affect children, impacting their growth and learning abilities.

However, the most affected group by this problem of open defecation are girls and women who live under constant fear for their safety from sexual predators. In India, it is a common practice for females, who lack access to private toilets, to wake up before sunrise or wait until dark to relieve themselves. Moreover, finding a safe place to defecate is often a challenge for them. In most cases, women and children have to look out for some companion to accompany them in order to avoid the perils of falling into the hands of sexual predators or human traffickers. All these environmental conditions lead to the holding up of urine and other wastes inside one's body which is not just highly uncomfortable but poses serious health hazards as well.

At the same time, the following problems also remain in the public sanitation space:

- The sanitation ecosystem is not well-defined
- Gaps in policy-procurement process is very linear leading to monopoly thus creating limited scope for innovations to flourish.
- No scalable revenue model due to lack of user charges, inadequate cost recovery from users
- Urban Local Bodies (ULBs) unable to cope with the growing demand that come with high number of floating population and urban expansion
- Uneven distribution and location of toilets
- Lack of maintenance in public toilets due to limited capacity and lack of financial resources, often leading to vandalism and encroachments
- Unethical emptying and evacuation practices of waste/sewage with septage seeping into the ground
- Standards not followed, poor construction of toilets
- Unsatisfied users

## Project Geography

Urban slums in Pune

### The Innovation

Before he became the “Poop Guy”, Swapnil Chaturvedi was living the American dream. An engineering graduate from North-western University with a secure job in the IT sector, Chaturvedi was living a comfortable life in the United States with his wife and daughter. But all this changed in 2007, when he visited his native place in India. On his trip, he witnessed enormous disparity in the income and lifestyle between the rich and poor. More than anything, he was appalled to see the abysmal state of basic sanitation facilities in Indian cities. During their stay in India, Chaturvedi’s little daughter often used to complain about the stinking toilets in her school. He found out that her daughter used to painfully hold her bladder during school hours and would get relieved only after coming home. This proved to be the turning point for Chaturvedi, who himself set out to create clean toilets for India’s urban poor.

In 2011 Swapnil Chaturvedi founded Samagra Sanitation in Pune city in order to provide the much needed sanitation services to the urban poor. The concept has been funded by the city of Pune and the Gates Foundation and has received in-kind support from organizations like Unilever, Kimberly-Clark and UNICEF. Samagra is also supported by the Toilet Board Coalition’s (TBC) first Toilet Board Accelerator Program - an alliance that aids innovative and market-led sanitary solutions.

### The Product

Samagra provides superior designed toilets starting from basic services like lighting and ventilation to sanitary dustbins and accessories for children. It uses information and communication technologies (ICTs), behavioral sciences and human centered designs to make public toilets accessible, affordable and aspirational for the poor.

### Behavioural Change

Samagra brings in behavioural change through an incremental process via community workshops and door to door surveys. Samagra’s holistic model incorporates ‘change framework’ into its DNA. The concept of Samagra, in the founder’s own words is “to change environment and user behaviour, give an awesome toilet experience, engage users and then monetise the user engagement”.

## Business Model and Financial Sustainability

Samagra has designed a rewards scheme titled Loo Rewards to create a sustainable financial model that can bring sanitation to the common people. Under this scheme, families pay a small amount for monthly unlimited access to the sanitation blocks and their accompanying services. When households pay on time for their monthly usage (between the 1st and 5th of each month) they earn reward points that can be redeemed against purchases they make with local vendors for washing and sanitary products, water purification systems or nutritional snacks. Samagra's loyalty program, which is mobile-based, is an example of using both software and hardware to build a profitable business. The reward points motivate people to pay on time, and highlight what they will gain and what they stand to lose by delaying payment.

Samagra's revenue model thus does not come from toilet usage fees, but from commissions it can potentially earn through the redeemed

reward points. The next challenge, therefore, is to ensure that families redeem the reward coupons they win. Samagra has gone through over five iterations of offerings – what products to offer under redemption, at what frequency, when to offer and so on. Samagra is currently achieving 40% rate of redemption. However, by offering products that Chaturvedi says “are more aligned with users’ needs and wants,” Samagra hopes to accomplish redemption rates of over 80% in the coming months with the entire user fee going to the caretaker, as his/her income.



## Engagement Model

The most unique feature about the project is its engagement model. The toilet runs a reward scheme, as a result of which people come back and use the toilet services. The project has also partnered with the State Bank of India to provide banking services at the sanitation blocks where people can open bank accounts, pay bills, transfer money and recharge their mobile phones. They can also take advantage of member discounts on a variety of goods and services.

The engagement model, motivating people to pay actively, involves and incentivizes all stakeholders – the end users, the government, local store owners, toilet operators, SHG's and NGOs. For the municipal corporations, it provides a data visualization platform, where it can monitor toilet usage and its maintenance. Operators in this model can retain all of their collections.

## Implementation Challenges

Samagra founder Swapnil Chaturvedi went through several different sanitation projects before finding this sustainable and scalable model. His previous efforts included a small pilot constructing toilets that did not require plumbing and had to be cleaned manually in Raipur. This project failed because it did not comply with the Prohibition of Employment as Manual Scavengers and their Rehabilitation Bill, 2013. Another endeavor of his was a 'Poop-to-Power' project in Bhubaneswar which was wound up because it lacked financial sustainability.

The challenges in community sanitation include, firstly, ensuring clean well-ventilated secured toilets in good working condition and, secondly, to find a way to make users willing to pay for clean toilets. Enforcing payment for community toilets in slums is difficult as the community does not have any ownership towards the utilities provided to them.

## Achievements

The Samagra project is an ideal example of successful operations & maintenance (O&M) model for public sanitation facilities. This model has helped in curbing open defecation in its areas of operation and has provided dignity to the urban poor, especially girls and women.

Samagra has also been instrumental in aligning the social enterprise with its integrated mission of health, hygiene and productivity. It has engaged with an NGO to offer laddoos (sweets) as rewards that are fortified with micronutrients and have been scientifically proven to improve the height and weight in children. Samagra is also in the process of creating a franchisee model where women from the slums are trained in making these sweets, ensuring that they get a continued supply of raw material for the same as well as contribute to branding of the finished product.

## Future Plans

Samagra is presently working on eco-friendly and sustainable toilets that can convert human waste into electricity and give away bio-fertilizes as a by-product. With sufficient funds available, Samagra's mission is to open up "Poop Franchises" which will combine Poop Rewards and the renewable waste-to-fuel toilets to build sanitation networks in urban as well as rural India.

The organization is currently making a profit in about 40% of its sites and over the next six months, Samagra hopes to break even before setting up operations in three additional Indian cities.

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## REFERENCES

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- > <http://www.samagra.co/>
- > *IOSR Journal of Business and Management (IOSR-JBM)* e-ISSN: 2278-487X, p-ISSN: 2319-7668. PP 09-12
- > *Searchlight South Asia, September 2013, Vol. 4, Issue 12: Generating Demand: Engagement Model in Sanitation*
  
- > **To know more about Samagra Sanitation, contact Mr. Swapnil Chaurvedi at [swapnil@samagra.co](mailto:swapnil@samagra.co)**



## SANITATION

# 4. Magic Genie Eco Toilet

*The Magic Genie Eco-Tech Smart Green Toilet is an integrated solution that provides “toilet as a service”. These self-cleaning toilets do not require a sewage or water connection and save upto 300,000 litres of water per seat per year. Operated and managed by the A2Z Group, these portable toilets require minimum manual interference and are suitable for both high-footfall locations as well as remote areas.*

## The Background

Historically, municipalities were the main providers of public toilets, but these facilities suffered from poor maintenance and cleanliness as an issue was largely avoided by the public. There have been several complaints on how toilets meant for public use are either lying vandalised or cannot be used simply because they are not clean. One of the major stumbling blocks in persuading people to use latrines is the type of toilets being built. Most of them use what is called a “single-pit technology.” “Now the pits fill up and pits need to be flushed out and when they are desludged, it costs money. So what happens is that people are reluctant to use. Household toilets, whether in villages or urban areas, the cost of cleaning up the pit is one major deterrent for use,” explained Khosla. Such conversations with experts working to provide sanitation to all motivated the A to Z Group to work on evolving a smart and green toilet.

## Project Geography

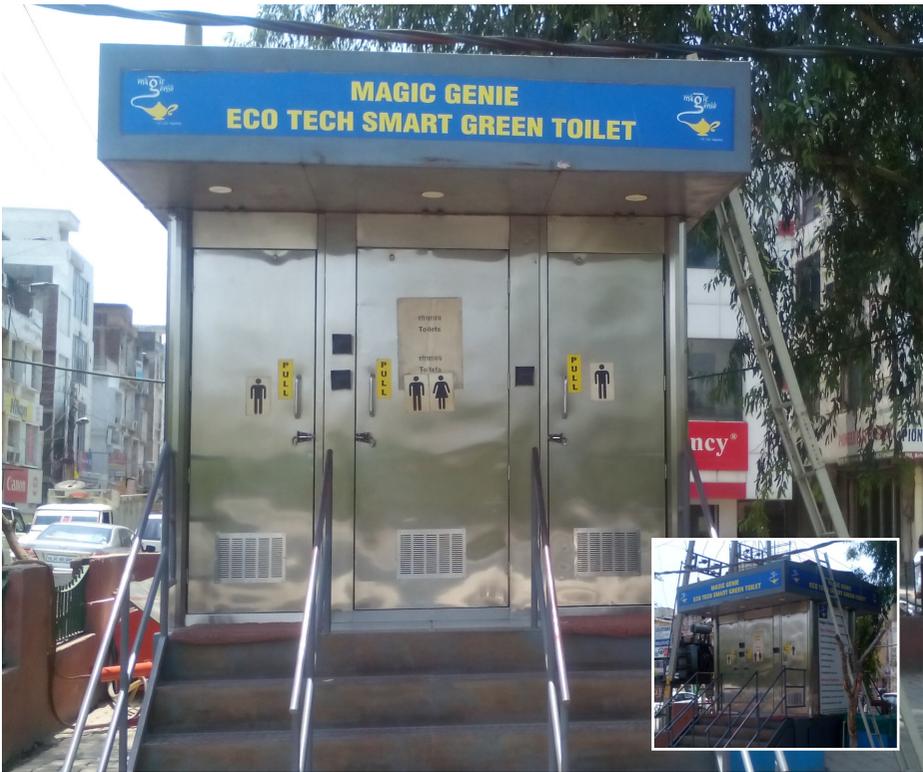
Magic Genie pilot toilets have been installed in Faridabad (Neelam Chowk market in front of Escorts Hospital), Gurgaon (Sohna Chowk), Noida (IEML), Greater Noida and Indore (Khajrana Ganesh Temple) and Jammu (Town Hall).

## The Innovation

The A to Z Group has been in the Waste & Facilities Management sector since the last fifteen years. The group understands that the major challenges in toilets is the lack of hygiene, water for cleaning and regular electricity supply. Moreover, the maintenance through human interface is also a major challenge facing these toilets. If the human interface is thus minimized and toilets can have a self cleaning mechanism, several of these operations and maintenance challenges can be taken care of. Thus, Mr. Khosla and his team carried out intensive research and came up with the “Magic genie Eco Toilet” that they believe “is a next generation corporation, focused on hygiene and sanitation as clear and distinct lines of business on cleanliness.”

## The Product

The Magic Genie Eco-toilet is a portable toilet that does not require sewage or water connection. These toilets are designed in such a way that they require minimum manual interference. Once filled the water caters to hundreds of users saving 300 KL of water on each seat each year, reducing the load on ground water and treatment plants. The water saved on 8 seats can fill up an olympic sized pool. The toilet is equipped with automated



## Features of Magic Genie Smart Toilet

- Use of Smart Card for entry into the toilet cubicle.
- Automated cleaning and sanitization after every use, using high pressure water jet spray.
- Perforated stainless steel flooring to drain out water easily.
- IT Management- Remotely monitored through a black box.
- Liquid waste separated from solid waste - recycled and reused
- Requires no external water source, only one-time filling. Thereafter, generates its own water.
- Digital inverter for stand-by electric supply.
- FM radio facility and indicators for 'toilet-in-use' or 'vacant'.
- No connection to sewer line or soak pit or septic tank is required.
- Movable, can be relocated.
- Easily located through a mobile app.

## Achievements

Other than being granted an international patent for the technology, this innovation has also won the India CSR Award (Swachh Bharat Samman) in the area of Sanitation and Toilet Construction in 2015 and the prestigious Skoch Award for the Best Innovation in the field of sanitation in 2015.

cleaning and sanitization after every use, using high pressure water jet spray. This ensures good hygiene standards. Perforated stainless steel floors of the toilet ensures cleanliness as it helps the water to drain out easily. Accessories like holding bars are user friendly particularly for the differently abled and senior citizens. Soap dispenser and wash basin inside these toilets ensure good hygiene. Water for body parts is treated through reverse osmosis (RO). The waste water generated from flushing is reused. The solids are separated from liquids in the bio-digested tank underneath the toilet that scientifically treats solid waste to avoid bad odour. The toilet is fresh and odourless for each new user.

Reuse of wastewater reduces the load on ground water resources and STPs. The number of toilets in each unit is customizable. Recycled water and hybrid power sources ensure that it is installed in remote locations and high footfall areas like railway stations, factories, bus stands, highways, heritage places, factories, shelters, government complexes and large events.

## Implementation Challenges

One of the major challenges being faced by the group is evolving a win-win business model with the ULBs. Speedy approvals for various clearances and rights is also a hurdle.

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## REFERENCES

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- › <http://indiacs.in/eco-friendly-toilets-for-a-swachh-bharat/>
- › <http://www.financialexpress.com/india-news/swachh-bharat-how-a-toilet-innovation-is-saving-lives-environment/327550/>
- › <http://ecotoilet.magicgenie.co.in/index.php/category/media/>
- › <https://www.slideshare.net/AmitMittal57/ppt-eco-smart-toilet-241115-57314533>
  
- › **To know more about Magic Genie Eco-Toilet, contact Mr. Manoj Tiwari at [mt@a2zemail.com](mailto:mt@a2zemail.com)**



## HYGIENE

# 5. Aakar

*Aakar is a hybrid social enterprise that enables women to produce and distribute affordable, high-quality, 100% compostable sanitary napkins (Anandi pads) within their communities while simultaneously raising awareness and sensitization of menstrual hygiene management. Comprising Aakar Innovations and Aakar Social Ventures, the organization today has reached out to over 50,000 customers. With more than 300 women employed in their mini factories, Aakar has generated revenues of 2 million by women entrepreneurs.*

## The Background

Social stigmas and taboos exist across races, cultures, countries and no demography is free from it. Affecting the lives of women in India, both physically and socially for generations is a topic that is most frowned upon and never openly discussed - menstruation. The lack of awareness about menstrual hygiene, unavailability and/or lack of access to sanitary napkins lead not only to diseases but also results in social isolation and suffering for women, especially in remote areas.

Due to the absence of any dialogue and almost non-existent channels of communication, there is hardly any awareness or information regarding menstrual hygiene. In India, only 12% of women use sanitary pads while more than 300 million women do not use sanitary napkins and have to rely on old rags, sand, plastic and ash to address their sanitation needs. As a consequence, women who use unhygienic materials during their menstrual cycles have a 70% higher chance of attracting reproductive tract infections. Another deterrent to the use of sanitary napkin is its high price in the market.

There are several detrimental implications of the current state menstrual hygiene on both education and livelihoods of women in the country. 23% of adolescent girls (12-19 years) drop out of school after they start menstruating and most of them are forced to miss school for almost 5 days a month due to their periods. This impedes one quarter of the female population from pursuing education. Similarly, women in this country are forced to miss, on an average, four working days a month that results in 48 days of lost income in the year. This affects other issues ranging from availability of food, health & hygiene to the larger context of women empowerment.



## Project Geography

Aakar has a presence in 14 states across India as well as internationally in countries like Kenya , Uganda and South Africa.

## The Innovation

The founders of Aakar Innovations, Jaydeep Mandal and Sombodhi Ghosh had never seen a sanitary napkin except for the ones advertised on television. Their journey in this space has been incredible; they have had many triumphs and have also met with equal number of failures. They have learnt lessons from each of them and have developed their own methodology in order to gain community trust. Their original idea was to build a social venture that promoted rural livelihoods through a micro-enterprise model by commercializing grassroots innovations.

When Jaydeep was volunteering for the Honey Bee Network in Bengal, he realized that although grassroots innovations were being recognized, they could not have the requisite impact on the masses. Looking through the National Innovation Foundation's database to identify opportunities, he realized that menstrual hygiene was a completely neglected space and decided to focus his energies on this sector. Their efforts started in 2010 with Mr. Muruganathan's sanitary pad production machine in Uttarakhand. The idea was to commercialize the innovation and create sustainable enterprises in villages. Soon, along with Ghosh, Mandal developed his own technology in the low-cost space, adhering to BIS quality standard norms and making these pads highly affordable to the below poverty line sector. Their customers were women who had never used a napkin before and based on feedback from them, they identified parameters such as comfort, no leakage and retention of liquid in the absorbent layer.

## The Product

Aakar Innovations developed the country's first compostable Anandi pad, available for the low-cost market providing women and girls in rural villages as well as urban slums a more environmentally sustainable solution. Aakar also disseminates information about good menstrual practices and makes sanitary napkins accessible and affordable for the poor. This has also not solved the issue of disposal of sanitary napkins by making them compostable but also improved the overall standards of menstrual hygiene.

## Behavioural Change

Aakar Innovations has ushered in behavioural change incrementally by engaging extensively with the community to conduct awareness campaigns in villages and capacity building of village micro entrepreneurs. Their focus is in ensuring that there is a shift in the mindset of people with regard to menstrual hygiene, empowering women to make informed choices and also change long-standing social perceptions about menstruation.

## Business Model and Financial Sustainability

Aakar focuses on providing affordable and environmentally friendly sanitary napkins to women in rural areas and urban slums. The attempt is to create a self-sustainable and profitable business unit owned and run by Village Level Entrepreneurs. Their business model is focused on becoming a platform integrator by selling machines to women self-help groups and making sure that there is on-time availability of raw materials at the best price and the lowest cost. Aakar also leverages its non-profit arm to extensively communicate with the village clusters to create community awareness, capacity building, behavioral change and last mile reach.

Aakar has been bootstrapped and their revenues are generated mainly through the sales of raw materials and machines. However, they have also raised seed level equity funding



from angel investors and a few other institutional investors. The final consumer (women) pay for the product and they also generate income from sales to the government and CSR activities. Aakar's channel partners are SHGs, NGOs, CSR companies, governments, individuals and bilateral agencies. Their solution

is affordable for both channel partners and consumers. The mini-factory model is market driven whereas the behavioral change communication (BCC) awareness programs are grant driven. The organization hopes to break even this financial year.

## Engagement Model

Aakar has developed a unique engagement model to reach out to its target audience. It empowers women to produce and distribute 100% compostable, high-quality and affordable

## Achievements

The Aakar Innovations initiative has focused on providing affordable and quality napkins to women in disadvantaged areas that are beyond the reach of multi-national corporations. Simultaneously, they have empowered local communities by creating a profitable and self-sustainable business entity owned and run by Village Level Entrepreneurs. This has not only helped in combating challenges associated with menstrual hygiene but also provided dignity to these women. They are credited with launching India's first 100% compostable sanitary pad made with a semi-automatic machine in the low cost space. Their operations span 14 states and 6 countries with 30 units that provide direct employment to more than 500 unskilled women in their villages.

For their efforts, they have been recognized by several national and international bodies, which include:

- Social Impact Award for GSVC-2012 Asia-Africa Region organized by ISB-Hyderabad & Haas School of Business, UC Berkley
- Listed as one of the 30 Start-ups worldwide for BASES-Stanford University for E-Boot Camp 2012-Silicon Valley, USA
- 2nd runner up among top 15 teams in Village Capital Accelerator Program 2013, which was jointly organized by CIIE-IIM-A & Village Capital-USA
- Selected as Top 10 & Top 30 Innovations (indigenous raw materials for napkins & bio-degradable napkins) by FICCI, DST, Lockheed Martin, Stanford University, IUS&TF and IC2 Institute, TIE-SV 2013, among 1500+ innovations
- Featured in The Economic Times Top-15 Hottest Start-up shortlist for 2015
- Chosen for the "Honorable mention at the United Nations" in 2015 Global Sourcing Council 3S Awards at the United Nations Headquarters, New York, USA in September, 2015
- Member of Indian Prime Minister Narendra Modi's delegation in 2015 to Silicon Valley, USA, 2016 to Kenya & 2017 to Rwanda
- Invited by the Innovation Lab, World Bank, Headquarters in Washington DC, USA in November, 2015 for presenting the Aakar social enterprise model
- Millennium Alliance Award 2015-16 for piloting the innovation in Africa and rapid expansion in India by UKAID, USAID, World Bank Govt. of India, FICCI etc
- Selected to be a part of Prime Minister's team, 'Champions of Change' by Niti Aayog, 2017



sanitary napkins within their communities while also raising awareness on menstrual hygiene management.

Each Anandi pad is manufactured in an all women employed and supervised facility. This creates an opportunity for local community women to become employed, learn entrepreneurial and marketing skills. These village level micro-entrepreneurs called Anandi Bens (after their brand name “Anandi”) are the product champions, which leads to high trust based engagement within their own community.

## *Implementation Challenges*

Aakar Innovations faced several implementational challenges on many levels. The problem of menstruation, in the first place, is saddled with social stigmas and even talking about menstruation is considered to be shameful. Menstrual hygiene has always been a huge issue for rural women. However, gaining acceptance and trust with regard to the use of sanitary pads has not been easy, especially considering the potential customers that Aakar works with.

Since Aakar was the pioneer in the low cost biodegradable sanitary pad space, they also faced issues while designing the optimum product that would successfully address the needs of these rural women. Based on feedback received, they perfected the compostable sanitary pad. Also, since there was no established ecosystem they also had to encounter problems related to machinery and supply chain requirements. The cost of raw materials

is fundamental to product pricing and hence Aakar has had to use indigenous materials (banana fiber, water hyacinth etc.) to reduce cost. Continuous availability of power is an issue and in some places their machines work either with solar energy or inverter back-ups. On the other hand, they have had to adapt to the behaviour of women along with facing the daunting task of keeping them motivated.

## *Future Plans*

Aakar Innovations has aligned the social enterprise and successfully integrated the mission of health, hygiene and productivity. In the next 5 years, the organization aims to scale up its operations to about 400 + centers and establish around 20 'hub and spoke' Aakar models across the country. Internationally, Aakar aspires to make inroads in developing nations like Africa and parts of South East Asia through successful partner collaborations. Their goal is to provide direct employment to 6,000 women and indirect employment to over 10,000 people and reach out to 16,00,000 consumers with their product.

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## **REFERENCES**

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- > [www.aakarinnovations.com](http://www.aakarinnovations.com)
- > ***To know more about Aakar Innovations, contact Mr. Jaydeep Mandal at [jaydeep@aarinnovations.com](mailto:jaydeep@aarinnovations.com)***



# IHUWASH

Innovation Hub for Urban Water, Sanitation & Hygiene Solutions in India

Supported by USAID

## About IHUWASH Project

The IHUWASH project aims to improve performance of the urban WASH sector in India by following a process of agglomeration (compilation of best practices), incubation (supporting innovative solutions) and acceleration (giving momentum to innovations). IHUWASH is a collaborative initiative of the National Institute of Urban Affairs (NIUA), lead partner; and TARU Leading Edge Private Limited, IRC and Ennovent. Yes Bank and Valluri Technologies are strategic partners in the project.

## ABOUT STUDY CITIES

Three cities, Faridabad, Mysore and Udaipur from the states of Haryana, Karnataka and Rajasthan, respectively, have been selected. The aim is to improve performance of the urban WASH sector in these cities through innovative solutions. The project duration is for three years beginning 2016.

### Faridabad

The city is located in the state of Haryana and is about 32 kms to the south of the state of Delhi. According to Census 2011, Faridabad was the most populous city in Haryana with a population of 1.4 million. The Ministry of Urban Development (MoUD) ranked Faridabad's sanitation status - 33.25. It has been awarded 'Fastest Mover Big City' by Swachh Survekshan 2017, conducted by the MoUD. It achieved a rank of 88 amongst the 434 cities surveyed across India. Faridabad has been selected under the Smart Cities Mission, Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and Swachh Bharat Mission (SBM): the three missions launched by MoUD.

**Project potential:** Faridabad is ranked ninth amongst the largest industrial estates in Asia and is still growing. Out of a total of 11,665 registered working factories in Haryana, 2,499 were in Faridabad. Its strategic location within the Delhi-NCR region will allow access to support from numerous government agencies and academic institutions in terms of technical and capacity building. The Smart City Mission, AMRUT and SBM are being implemented in the city. All these factors offer tremendous potential for public-private- partnerships (PPPs).

### Udaipur

Located within the State of Rajasthan, Udaipur is famous for its palaces, lakes (Pichola, Rang Sagar, Fateh Sagar, Swaroop Sagar, Badi Talab, Madar and Udai Sagar) and gardens. It is located about 430 km to the south of the state capital, Jaipur, and about 670 km to the south of Delhi. It is the sixth largest city in the state and has been selected under the Smart City Mission. In the context of sanitation the city scored only 31.95 marks out of 100, in 2009. This places it in the red category where immediate attention to public health and the environment is indicated. In the latest Swachh Survekshan 2016 conducted by the MoUD for 73 cities, Udaipur was not included. However, in Swachh Survekshan 2017, the city is ranked to 310 out of 434 cities. The city has now prepared its City Sanitation Plan (CSP) under the National Urban Sanitation Policy

## PROJECT SITES



(NUSP). The city has also been selected under SBM and AMRUT.

**Project potential:** Udaipur has a high influx of tourists. This floating population poses a challenge to the city administration in terms of toilets, solid waste management and water supply. The Udaipur Chamber of Commerce and Industry (UCCI), a not-for-profit, industry led and industry-managed organization has supported development of an environment park covering 100,000 sqft in the city. Apart from UCCI, there is a marble industry association and many other private industries, which can support implementation of innovative sanitation solutions. Udaipur has been identified as a smart city based on a competitive proposal submitted to the MoUD and, therefore, has demonstrated willingness to increase the existing infrastructure in the city.

### Mysore (Mysuru)

The city is the second largest in the state of Karnataka, and an educational, commercial and administrative hub. It is an important tourist and heritage centre located only about 135 km from the state capital, Bengaluru. It is located in the foothills of the Chamundi Hills and stretches over 128.42 sqkm. Census 2011 reports a population of 893,062 living in 209,527 households in the city. Mysore (Mysuru) was ranked first in Swachh Survekshan 2016, however, it was downgraded to number five in Swachh Survekshan 2017. The city is not included in the Smart City Mission but is part of AMRUT and SBM.

**Project potential:** Mysore (Mysuru) had a ranking in Swachh Survekshan 2016 that indicated satisfactory sanitation services. The city leads in sanitation management and can be a model for other cities. As it has already reached an advanced stage in providing basic services, there is scope to pilot other innovative sanitation models, establish a WASH park, set up WASH laboratories, under the city administration.





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**Lead Implementing Partner:**

→ **NIUA** is a premier institute for research, capacity building and dissemination of knowledge of the urban sector in India and the lead implementing organisation of this initiative. It conducts research on urbanisation – urban policy and planning; municipal finance and governance; land economics; transit-oriented development; urban livelihoods; environment, climate change; and smart cities. [www.niua.org](http://www.niua.org)



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→ **IRC** is an international think-and-do-tank that works with governments, non-governmental agencies, entrepreneurs and people around the world to find long-term solutions to the global crisis in WASH services. At the heart of its mission is the aim to move from short-term interventions to sustainable WASH services. [www.ircwash.org](http://www.ircwash.org)



→ **Ennovent** is a business innovations catalyst for sustainability. We believe sustainable solutions for low-income markets can create long-term business value. We partner with the private, public and third sectors to take novel business ideas to these markets in developing countries. [www.ennovent.com](http://www.ennovent.com)



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→ **Valluri Technology Accelerators** focuses on building solutions in the areas of Energy, Water, Environment & Pollution, Sanitation & Waste, Healthcare and Transportation & Mobility through convergence of multiple high-end domain technologies by partnering with leading global and national organizations. [www.vallurita.com/](http://www.vallurita.com/)

**City Partners:**



**Faridabad** is an important industrial hub, the most populated city in Haryana and part of the National Capital Region (NCR). It is being developed under the Smart Cities Mission, Swachh Bharat Mission and the Atal Mission for Rejuvenation and Urban Transformation (AMRUT).



**Mysore** is the second largest city in Karnataka and an important educational, commercial and administrative hub. Since the city is a tourist and heritage centre, it is covered under Swachh Bharat Mission and the AMRUT.



**Udaipur**, 'The City of Lakes' in the state of Rajasthan and is known for its picturesque surroundings and royal past. Its rich architectural heritage and beautiful lakes fascinate tourists worldwide and encourage them to visit the historic city. It is being developed under the Smart Cities Mission, Swachh Bharat Mission and AMRUT.

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