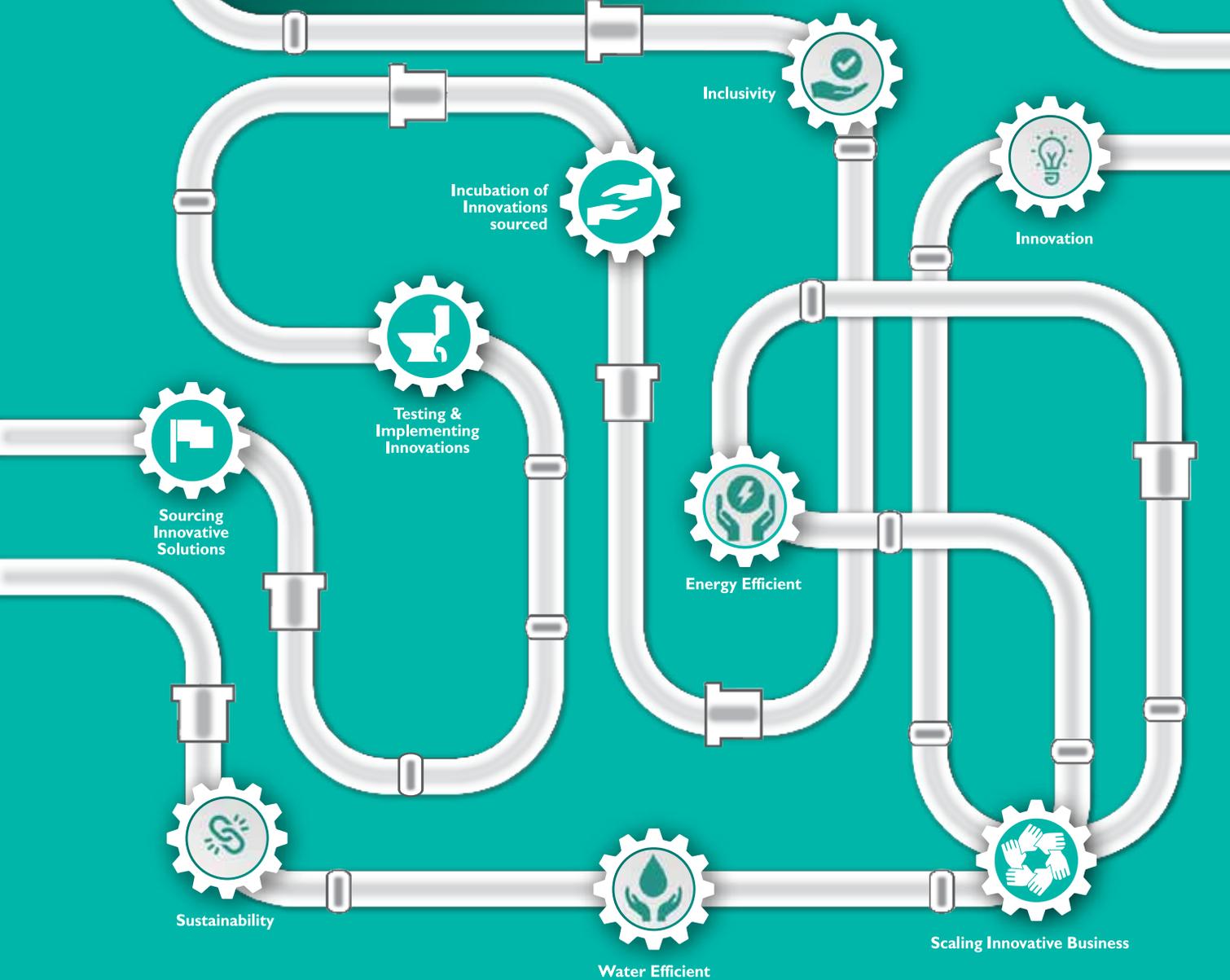


# COMPENDIUM OF WASH INNOVATIONS IN INDIA

Accelerated through IHUWASH program



**WATER**



**SANITATION**



**HYGIENE**

# IHUWASH

Innovation Hub for Urban Water, Sanitation and Hygiene Solutions in India  
Supported by USAID  
October 2019

**COMPENDIUM OF WASH INNOVATIONS IN INDIA**  
**Accelerated through IHUWASH program**  
National Institute of Urban Affairs (IHUWASH Project), 2019

**Supported by USAID**

USAID's Urban WASH Alliance Partnership Program  
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All the listed organisations

**Photo Credits**

All the listed organizations

*Information about the solutions has been provided by the respective organisations.*

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October 2019



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दुर्गा शंकर मिश्र  
सचिव  
**Durga Shanker Mishra**  
Secretary



भारत सरकार  
आवासन और शहरी कार्य मंत्रालय  
निर्माण भवन, नई दिल्ली-110011  
Government of India  
Ministry of Housing and Urban Affairs  
Nirman Bhawan, New Delhi-110011

### FOREWORD

Swachh Bharat Mission launched in October 2014 is one of the most ambitious initiatives undertaken by any Government across the globe. It has made significant impact across the nation paving way for innovative solutions to address the water, sanitation and hygiene concerns. The credit for the success of various interventions goes to the collective efforts of all stakeholders that include the government bodies, private/public sector, social sector, entrepreneurs, academia and most importantly the citizens themselves, turning this transformative journey into a 'JanAndolan'.

In this context, Innovation Hub for Urban Water, Sanitation and Hygiene (IHUWASH) solutions has made a noteworthy effort in scoping, accelerating and providing visibility to innovative solutions that cater to various aspects of the WASH sector. Through the collaborative endeavors of the project, some of the innovations are gaining prominence across the country. I hope that each new solution mentioned in this Compendium will be quite useful for the Urban Local Bodies (ULBs) and other stakeholders in addressing the WASH challenges. The information contained herein will help them to review various innovative solutions and connect with the entrepreneurs for adopting customized solutions based on their city's requirements.

I am confident that the 58 innovative solutions compiled in this publication will go a long way in bringing about a transformative change in the urban WASH scenario of India. If adopted holistically, it will usher in a new wave to address the deep-rooted WASH problems.

In order to make this valuable document widely available, we have placed a PDF downloadable version of this on **NIUA's website: [niu.org](http://niu.org)**

(Durga Shanker Mishra)

New Delhi  
02 October, 2019



# MESSAGE



As global development actors come together to make substantial change in the water, sanitation, and hygiene (WASH) landscape of India; a new set of time-bound targets that complement the Sustainable Development Goals (SDGs) are being established. Never has India witnessed such drastic steps being taken in the sector, as is seen today. Ensuring access to safe sanitation, safe drinking water, and redefining hygiene for the populous has been the cornerstone of the Swachh Bharat Mission. The concerted efforts of the various flagship missions of Government of India are at the apex of the developmental goals. Such an endeavor presents a unique opportunity in not only testing the efficacy of the conventions but also explore the newer horizons of innovation in technology and practice.

USAID believes that forging alliances to address the existing challenges is a key to sustainable and successful solutions. It works with national and local governments, private-sector partners, utilities, and vulnerable communities to rethink old practices, promote equity, innovate, mitigate, adjust, and adapt.

The associated churn of ideas—especially around water, sanitation, technology, innovation and partnerships—has informed much of USAID’s approach to strengthen community resilience and economic empowerment. With its commitment towards identifying and applying innovation to solve real problems; USAID works towards advancing the culture of innovation by opening up international development to new people, ideas, and ways of solving development challenges.

Innovation Hub for Urban Water, Sanitation & Hygiene (IHUWASH), a USAID-supported endeavor, is an effort to implement the philosophy of forging partnership with focus on scaling and replicating innovations in WASH. To that end, it worked to bring innovators and governments closer to scale solutions at the city level; that are often working with limited resources. IHUWASH through its WASH Accelerator identified 58 unique innovative solutions. This was done through an extensive challenge with the support of Ennovent that helped source a diverse cohort of innovative solutions in the realm of water, sanitation and hygiene. The Accelerator gave platform to 23 out of 58 innovators and a unique opportunity to present their ideas and solutions to the city administrators in Faridabad, Mysuru, and Udaipur. I am delighted to hear that seven innovations representing the diaspora of WASH have been shortlisted by the project cities and are likely to be implemented.

USAID recognizes the valuable partnership with National Institute of Urban Affairs (NIUA) and its efforts for successfully implementing the Accelerator Program under IHUWASH. The innovative solutions presented in this compendium will contribute in addressing the WASH solutions, and can be replicable, scalable, and sustainable for making a transformational impact.

We sincerely hope we can weave impactful innovative WASH solutions by stitching the products and services of local innovators, knowledge and wisdom of academia, support from government agency, and collective conscience efforts of all private sector players.

**Keith E. Simmons**  
Acting Mission Director



# PREFACE



The urban diaspora in India is a unique juxtaposition of similarities and dissimilarities. The similarities are the macro ingredients that form the crux of the cities; population, services, economies, and social networks. Despite such tacit similarities, Indian cities (in harmony with global trends) are polarising in the expression of such issues and challenges at the micro level. These issues that can be easily classified (i.e. rapid urbanisation, poor access to basic services, quality of life etc.) are impacting the cities in different magnitudes and facets. It comes as no surprise hence that an increasing reliance on solutions that are innovative, affordable, scalable has been the need of the hour. Yet for reasons known and unknown, start-up's (that are often the test bed of innovations) find themselves in tumultuous economic waters. A key variable in this can be defined as the lack of a coherent and functioning ecosystem across sectors; highlighted especially in the water, sanitation and hygiene (WASH) sector. Such an ecosystem necessitates nurturing policies, incubation, acceleration, and procurement (to scale) support through the lifecycle of an innovation.

Keeping this in mind; the IHUWASH Accelerator was conceptualised with an envision to solve WASH problems of its project cities of Faridabad, Udaipur and Mysuru. The IHUWASH team implemented the program with the support from key government officials, sector experts and city consultants. With an extensive Grand Challenge that called for applications; to the final stage of piloting and implementing a solution has been a learning experience for all. The process began with a Baseline study of the three project cities to understand its WASH scenario. Applicants were strongly encouraged to read the outcomes of the study and to articulate how their business innovation could solve one or more of these WASH problems. Through its well-planned outreach strategy; 58 applications were received. After a thorough vetting process that included weighing the viability, financial models and sustainability of each of the solutions; 26 were shortlisted. Finally, the most apt solutions for each of the cities were presented before its stakeholders.

The response in each of the cities has been overwhelming. Udaipur selected TIDE, GenRobotics, Ekam, SquatEase and InnoDI. Faridabad selected EPG and GenRobotics, and Mysuru selected the InnoDI and SquatEase. The water related innovative solutions were selected to help address the issues related to access to safe drinking water connections. The baseline study showed that around 66%, 37% and 30% of households in the urban cities of NCR, Karnataka and Rajasthan respectively drink untreated (or) unpurified water. Thus, with the solutions of InnoDI and EPG the aim has been to help improve access to safe drinking water. Solutions like EPG's integrated water and sanitation systems and SquatEase pan have been selected to help reduce the cost-effort of operating and maintaining these toilets and also significantly improve the user experience to eliminate open defecation. The study also showed that 84%, 33% and 95% of all fecal waste generated in the cities of Faridabad, Mysuru and Udaipur respectively were not treated in a safe and sustainable manner before disposal. Ekam and TIDE solutions provided solution to these to the city governments and/or individual households and communities.

This Compendium documents and shares the journey of the IHUWASH Accelerator program with an aim to share the knowledge gathered with a wider audience and with key stakeholders such as private sectors, ULB's across the nation, investors, funders and new entrepreneurs. The book is a compilation of comprehensive details of the 58 innovations that were sourced through the IHUWASH Accelerator program, and the final 7 selected by the partner ULBs.

We hope that the efforts that have been made in successfully implementing the program and collating the innovations catering to the WASH sector across India will prove beneficial to both – entrepreneurs and investors. By forming meaningful partnerships; together we can improve the sector at large with innovative solutions in hand.

**Mr. Hitesh Vaidya**

Project Director IHUWASH,  
National Institute of Urban Affairs



# ACKNOWLEDGEMENT



In releasing the Compendium of Innovators of the IHUWASH accelerator, we are thankful to United States Agency for International Development (USAID) for their support and for providing necessary guidance concerning implementation of this project.

Water, Sanitation and Hygiene (WASH) have long been the struggle areas for India's developing economy, which can be managed with scalable innovative solutions. Though there are robust Central and State level WASH policies in India; sustainable and effective long-term solutions on ground can only be achieved through innovative solutions tested with the community and supported by the urban local bodies.

This project consumed huge amount of work, research and dedication. Still, implementation would not have been possible if we did not have a support of many individuals and organizations. Therefore we would like to extend our sincere gratitude to all of them.

Our sincere thanks each of WASH entrepreneurs mentioned in this document. They contributed with their valuable time and effort to apply to the accelerator program and provide us with all information required during the entire duration of the program. The innovators were open to communication, sharing information and receiving feedback at all times. We are elated to create a compendium as a ready reference document showcasing these implementable solutions.

We also thank the ULBs, the Municipal Commissioners and officials of Faridabad, Mysuru, and Udaipur who took out time from their busy schedule, participated in the selection procedure and panel discussions, provided their valuable feedback to the IHUWASH team, and, actively explored the possibility of pilot testing these innovations in their respective cities and beyond.

We are thankful to the IHUWASH team at NIUA for their inputs and to help us shape the document.

Our sincere thanks to the team: Mr. Anand Rudra, Prof. Jagan Shah, Mr. Vipul Kumar, Mr. Aditya Tejas, Ms. Kamna Swami, Dr. Uday Bhonde, Mr. Utsav Choudhary, Ms. Ahona Datta Gupta, and Ms. Aditi Chawla who shared their insights and capable assistance in the drafting process of the compendium and the overall accelerator implementation. We are truly thankful to the City Teams of IHUWASH at the project cities for being the main bridge between us and the ULBs, and facilitating the entire program at the city level – Ms. Prabha Roy and Mr. Prakhar Nigam from Faridabad, Mr. N. Niranjan and Mr. Jeevan Roy from Mysuru, and Ms. Nikita Popat, Mr. Piyush Goyal and Mr. Ritwik Pati from Udaipur.

We are hopeful that this document will help to establish and build long-term partnerships with the innovators to address the WASH sector challenges across India.

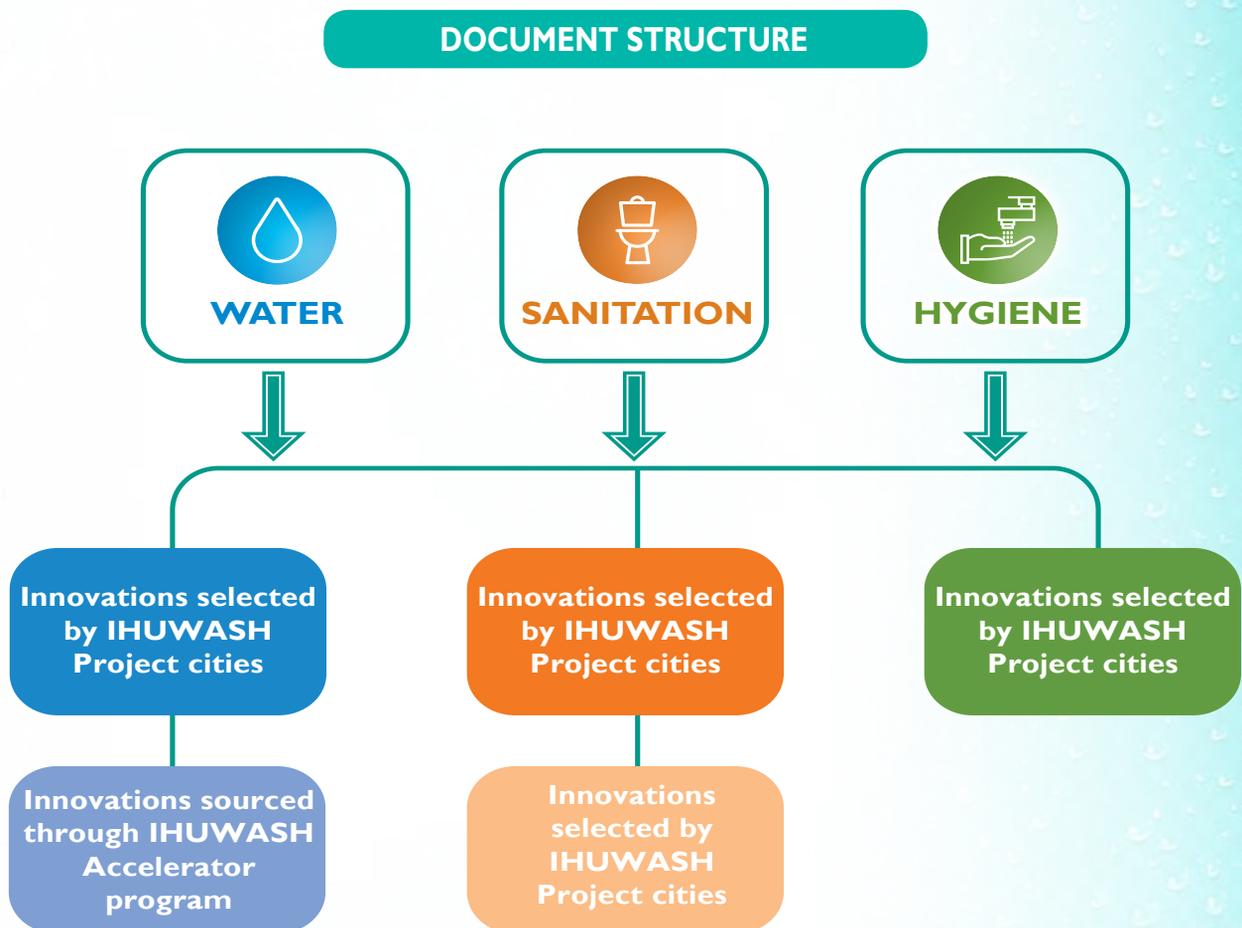
With sincere thanks,  
**Chandrakant Komaragiri,**  
Country Director,  
Ennovent India Advisors Pvt. Ltd.



# GUIDE: Reading the compendium

The Compendium of WASH Innovations in India contains the list of companies that applied for the IHUWASH Accelerator WASH Grand Challenge in January 2018. The companies listed in this document have been divided based on their respective sectors. The first section contains all the enterprises that are working in the Water sector, followed by Sanitation and then Hygiene. The companies at the beginning of each section are the shortlisted enterprises that are in discussion with various IHUWASH stakeholders for pilot implementation and scaling. The subsequent section enlists those companies that applied to the program but were not selected for further uptake.

The information provided in this document have all been provided directly by each of the enterprises, either through the application form to the IHUWASH Accelerator, or in subsequent discussions with project partner Ennovent and the IHUWASH team.



## SECTIONS OF INNOVATIONS COMPILED

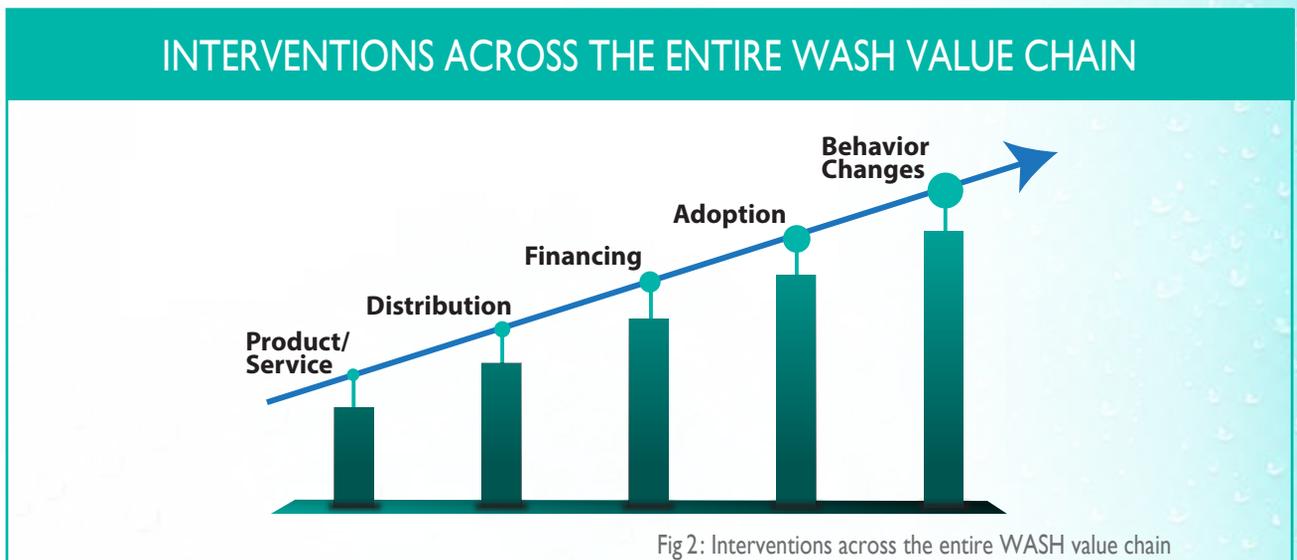
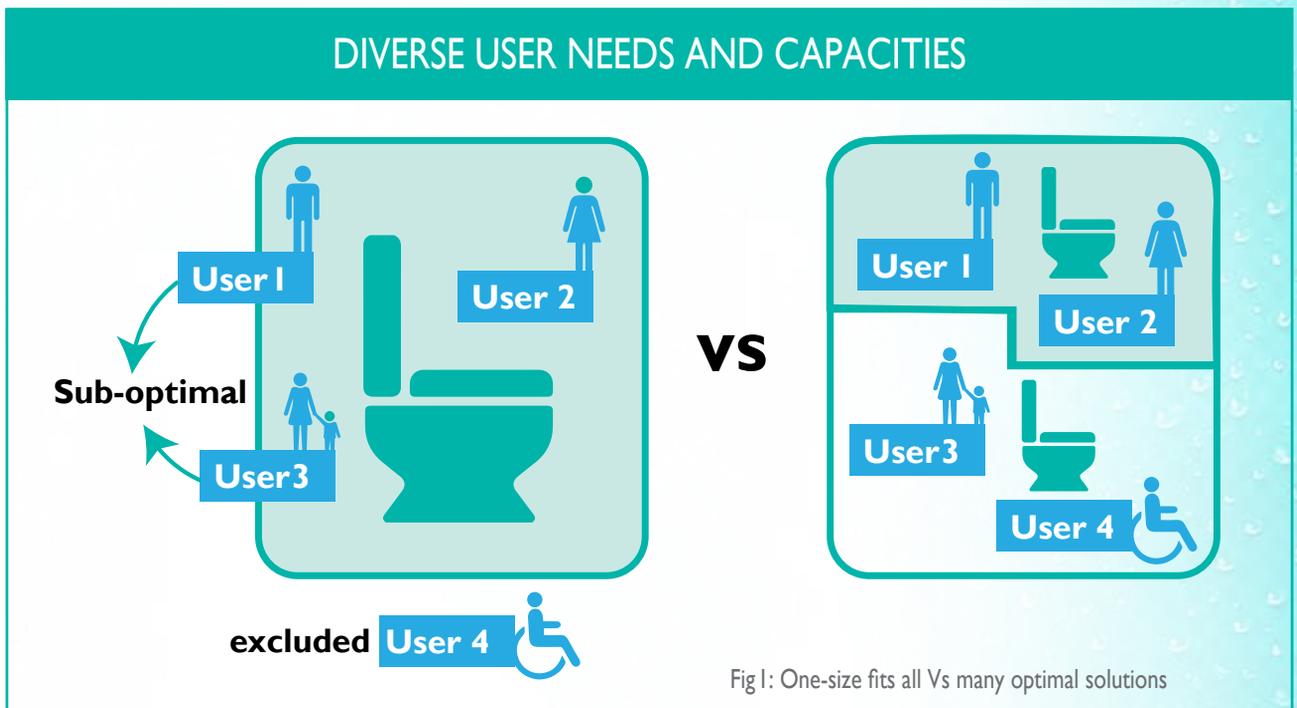
Innovation	Problem	Proposed Solution	Business Model	Implementation	Key Benefits	Key Success Factors	Risks & Mitigation	Organizational Challenges	Case Study	Reference	Additional Notes
Innodi Water Technologies Private Limited	●	●	●	●	●		●	●	●	●	
Environment Planning Group Private Limited	●	●	●	●	●				●	●	
Tide Technocrats Private Limited	●	●	●	●	●			●	●	●	
Foundation for Environmental Monitoring Private Limited	●	●	●	●	●		●	●	●	●	
Waterhealth India Private Limited	●	●	●	●	●						
Watsan Envirotech Private Limited	●	●	●	●				●	●		
(Swaach Neer) Chitkara University	●	●		●			●	●			
(OCEO) Pilmatis Innovations LLP	●	●	●		●	●					
Rite Water Solutions	●	●	●		●	●					
Veolia India	●	●	●		●	●					
(IWAP) Infra Development Corporation of Karnataka	●	●	●		●	●					
Hydro Industries Limited	●	●	●		●	●					
Technorbital Advanced Materials Private Limited	●	●	●			●					
Home Remedies Private Limited (HRPL)	●	●		●			●	●			
Banasthali Vidyapith	●	●	●			●					
Hinren Engineering	●	●	●			●					
Why Waste	●	●	●	●			●	●	●	●	
Urex Enterprises	●	●	●								
Waterwala Labs	●	●	●		●	●					
Dalit Welfare			●								
Genrobotic Innovations Private Limited	●	●	●	●	●				●	●	●
(SquatEase) Sanotion Private Limited	●	●	●	●			●	●	●	●	
Ekam Eco Solutions Private Limited	●	●	●		●		●	●	●	●	●
EERG India Private Limited	●	●	●	●	●						
(Blue Water Company) Hoolock Technologies Private Limited	●	●	●	●	●		●	●	●	●	
Caya Constructs	●	●	●	●			●	●	●	●	
Ravikas	●	●	●	●			●	●	●	●	
Garv Toilets	●	●	●		●	●					
(Namma Toilet) Urbane Industries Limited	●	●	●			●					
(Pee Buddy) First Step Digital Private Limited	●	●	●		●	●					
CURE- Decentralized Safe Sewage Disposal Model	●	●	●		●	●					
Vivir Consultancy	●	●	●								
Biomass Controls	●	●	●			●					
Weldynamics	●	●	●		●	●					
Flycatcher Technologies LLP	●	●	●								
Sanitation Impact Solutions	●	●	●								
(Boondh) MenstruAid Innovations Private Limited	●	●	●	●	●		●				
Luminociti Networks Private Limited	●	●	●	●	●		●	●	●	●	
Haqdarshak Empowerment Solutions Private Limited (HESPL)	●	●	●	●	●		●	●	●	●	
Jatan Sansthan	●	●	●	●	●		●	●	●	●	
Saahas Zero Waste	●	●	●	●			●	●	●		
(ODF Monitoring) Dexter Drones	●	●	●								
Nsmiles India Private Limited	●	●	●		●						
2E Knowledge Ventures Private Limited	●	●	●								
Maya Foundation	●	●	●								
World Steward	●	●									
Katha	●	●	●								
Empower Foundation	●	●	●								

# SUMMARY

## WASH Challenges of Urban India

One of the biggest challenges of urban India is facing is that of sanitation. In 2011, only 46.9% households in India had toilets at home and 3.2% used public toilets. Given India's massive scale of challenges and opportunities in Water, Sanitation and Hygiene (WASH) sector; affordable and scalable innovations that supplements government efforts through market-based models with rigor and financial sustainability of businesses are the need of the hour. This can be made possible only through coordinated and collaborated efforts from all the stakeholders in the value chain, ensuring that challenges are prioritized and suitable innovations are accelerated.

## Challenges of the WASH sector of the India



## NEED FOR SUSTAINABLE AND ALTERNATE REVENUE MODELS

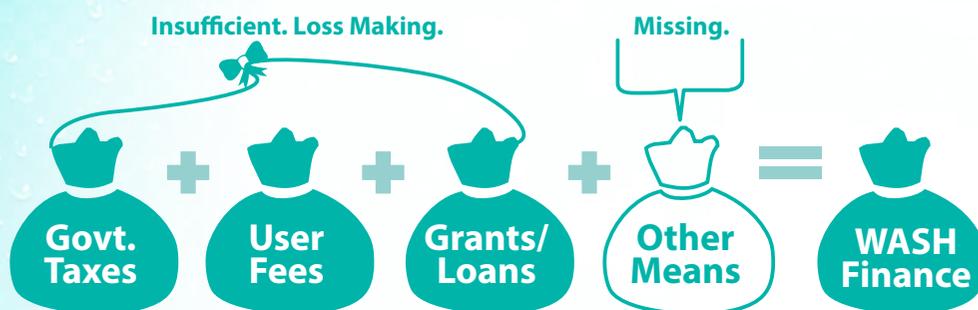


Fig 3: Need for sustainable & alternate revenue sources to cover WASH costs.

## INCREMENTAL SOLUTIONS VS RADICAL INNOVATIONS

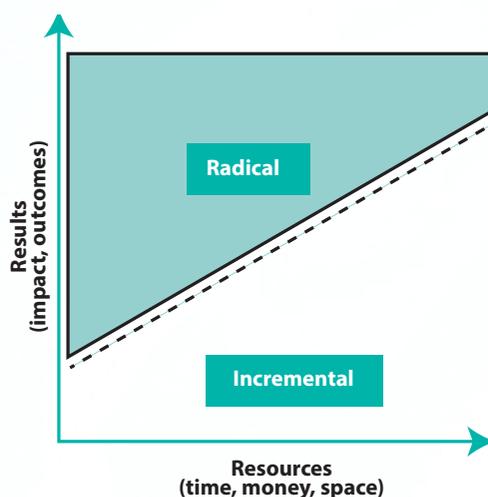


Figure 4: Incremental Solutions VS Radical Innovations

### Interventions by IHUWASH

The Innovation Hub for Urban Water, Sanitation and Hygiene (IHUWASH) Solutions is a collaborative initiative by the National Institute of Urban Affairs (NIUA) and Ennovent supported by the United States Agency for International Development (USAID). The program works with the Municipal Corporation of Faridabad, Mysuru City Corporation (MCC) and Udaipur Municipal Corporation (UMC) to improve the urban WASH sector performance through incubation and acceleration of innovative solutions, technologies, programs and service delivery models within a collaborative framework by building partnerships.

Under the IHUWASH project the Accelerator program was formulated to source and scale innovative solutions targeted towards urban water and sanitation. It has provided customized opportunity to selected innovations depending on its business model, stage of growth, and complexity of operations. The program has also arranged an opportunity for the selected WASH innovations to work directly with government officials, companies, experts and investors that have a clear WASH mandate. Hence, the program offered a

deep level of sector relevant insights, funding, and opportunities to the entrepreneurs to scale up and provide solutions.

## Providing visibility to the Entrepreneurs

IHUWASH has provided various platforms to these innovations scoped to augment their visibility and presence in the sector. The direct interaction of the Entrepreneurs with the ULBs while presenting their ideas in itself gave them the opportunity to interact with the stakeholders.

- National Institute of Urban Affairs (NIUA) and Ministry of Housing and Urban Affairs (MoHUA), Government of India launched the **AMRUT Technology Challenge** on 4th July, 2018 to identify solutions for cleaning of sewers and septic tanks. It came to a grand close on 19th November 2018 on the eve of World Toilet Day. The challenge aimed to scope, scale and catalyze – technological and business solutions to eliminate non-essential human entry into septic tanks and sewers. IHUWASH team has worked as a secretariat for organizing the challenge. A number of solutions that applied under the IHUWASH accelerator also found a platform in the Technology Challenge. In fact, a few of the entries also went on to become category winners.
- On 20th November, 2018 NIUA in partnership with Elets Technomedia organized the **National WASH Innovation Summit** with an overall objective was to bring together WASH stakeholders from government bodies, civil society, donors, and innovators, on a common platform for a discourse on how to support, enable and sustain innovative WASH ecosystems such as IHUWASH at a larger scale. One of the Technical Sessions of the Event aimed at highlighting the journey of the selected WASH entrepreneurs supported by the IHUWASH project, and the winners of the AMRUT Technology Challenge organised by MoHUA. The session focused on the various stages that an innovation goes through and the current challenges of upscaling them.

# TIMELINE OF THE PROGRAM

The IHUWASH Accelerator component extended support to the three urban local bodies (1) Municipal Corporation of Faridabad (MCF), (2) Mysuru City Corporation (MCC) and (3) Udaipur Municipal Corporation (UMC) with the following key components:

**A**

## Sourcing Market-based Radical Innovations:

This identified relevant WASH innovations for the ULBs. The IHUWASH Accelerator achieved this through the following steps:

- Identify priority WASH problem areas through a baseline assessment study
- Selection criteria & benefits to attract market-based radical innovations based on partner Ennovent's experience of working with innovators
- Call for applications to address the identified WASH problems. In a 45-day window period of submission of applications; 58 WASH applications were received.
- Effective communication of this opportunity was done by collaborating with academia, incubators, funders, investors and entrepreneur networks.

**B**

## Transparent shortlisting processes

- A desk review was done to first screen all 58 applications with respect to the program's selection criteria –
  - # innovativeness,
  - # solves a clear WASH problem,
  - # business & scale potential and
  - # its ability to work with the 3 IHUWASH cities.
- Each application in this phase was evaluated by at least two reviewers.
- After this the shortlisted applicants were presented to the individual city teams and key government officials. Based on the contextually relevant city problems, a set of 9 to 13 innovations then had an opportunity to present in-person (as further described in sub-section C) to key government officials of the 3 IHUWASH cities.

**C**

## Forging Multi-Disciplinary Partnerships:

- The program partnered with various subject experts, incubators, and investors to achieve better outcomes and leverage the available limited resources well. In this regard, GINSERV and EDP were brought on board. Concerted efforts were made to mobilize Corporate social Responsibility (CSR) donors and impact investment firms with the aim to help our innovators secure project gap funding and growth capital respectively.

### Key Learnings :

- While Working with government plan for delays in advance that occur due to election cycles and transfers of officials
- While working with potential CSR donors, factor in persistent efforts and strategic communication to help them understand the difference between funding incremental solutions VS investing in radical innovations.
- There is a need for multi-disciplinary partnerships to innovate and achieve better outcomes. Hence, it is imperative to work with various experts, investors & WASH innovators. They help in understanding the demands and peg the frameworks for positive uptake and create win-win propositions.
- To create awareness and to enable the procurement of successful WASH innovations, pilot implementation at city level is the first step. To replicate the models, inclusion of innovations in the form of manual at state level can play an important role. Based on the experience, these innovations can be imbibed in the procurement process at the center level for further upscaling.
- WASH innovations can be upscaled through supportive procurement process, proper risk allocation, and by using standards or regulations to encourage the replication.

## D

### Key Government Stakeholder Buy-In:

Getting key government stakeholders buy-in was a critical part of the program. IHUWASH has built an ecosystem in each of the project cities by forging partnership with public and private sector, academic institutions, financial institutions, NGO's

The following key steps helped us achieve this buy-in.

#### • Background Information:

Each project city has created its own WASH Ecosystem by building partnership with Urban Local Bodies, Academic Institutions, Private Sector, Chambers of Commerce, etc. For the selection process; it was imperative to have key representatives from each of the mentioned partners to be present. Brief summaries of the shortlisted innovations were presented to these key stakeholders including the Commissioner, Additional Commissioners, Mayors, among others) in each of the IHUWASH cities through our city teams.

#### • In-person Sessions:

In-person sessions organised to present the shortlisted innovations to these key government officials.

#### • Choosing Pilots:

The government officials interacted with the innovators, learnt about their proposal and then invited the most relevant innovations to submit pilot proposals.

#### • Detailed Pilot Proposals:

The IHUWASH team worked with these chosen pilots to create and submit detailed proposals to the respective ULBs.

#### • Finalize Pilots:

Based on these proposals, the IHUWASH team had further in-person meetings with the key officials to finalize project feasibility, locations, funding commitments and implementation timelines.

This effort collectively helped us finalize and implement a total of 7 pilot innovations across the three IHUWASH cities.

#### • Implementation

Both Udaipur and Mysuru Municipalities had selected SquatEase toilet pans for pilot testing in the public and community toilets that are being constructed under the IHUWASH project. Out of the two cities, SquatEase has been implemented in the Public and Community Toilets constructed in Udaipur.

## E

### Attracting Risk Capital & Gap Funds:

- CSR bodies (that had a WASH focus in at least one of the IHUWASH cities) were reached out and presented the chosen pilot proposals. We are now in the process of finalizing details of additional funding commitments through other CSR bodies. Together this significantly reduces financial risks for the ULBs.

This compendium seeks to provide more information about key innovations that aimed to strengthen the service delivery chain of Water and Sanitation Management under Make in India program. Key innovations related to water have the potential to address issues related to safe drinking water, last-mile distribution, unauthorized water connections, leakages and theft. Sanitation issues that accelerator program applicants have targeted include decentralized solutions, treating sewage, fecal sludge management and improving public/ community toilets. The compendium also provides key hygiene innovations related to menstrual hygiene, changing WASH behaviors and creating incentives. The program helped the selected innovations to get focused support from city governments, private sector companies, experts and impact investors.

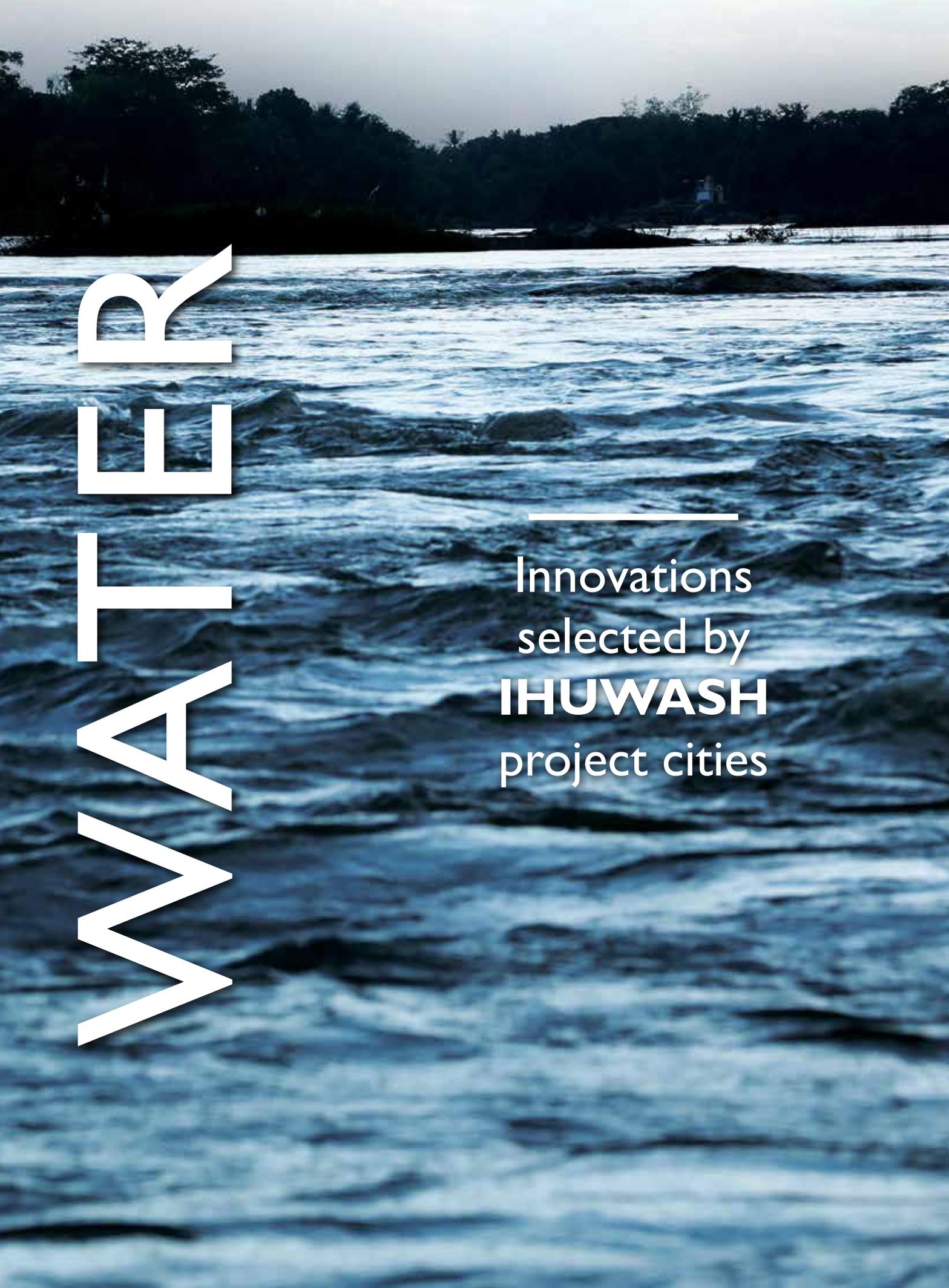
### Way Forward:

- Innovation Partnerships: We are open to partnering with government bodies, corporates and non-profits looking to build systemic innovation partnerships with us to transcend current limitations and solve big pressing problems.
- Expert Partnerships: We are looking to partner with individuals, mentors, investors, organizations and business leaders who have built deep expertise in various fields. Collectively, we would be able to leverage each of our strengths.
- Financial Partnerships: We are looking to partner with corporates, CSR bodies, project financiers and impact investors to build better finance mechanisms for our growing pool of radical WASH innovations.

## F

### Accomplishments:

- The program thus far has been able to scope 58 high quality applications which were further shortlisted to 23 organizations based on innovativeness, solves a clear WASH problem, business & scale potential and ability to work with the 3 IHUWASH cities. Of the shortlisted organizations, 13 solutions were presented to an expert panel in the cities of Udaipur, Mysuru and Faridabad. Subsequently the panelists shortlisted three unique solutions that were contextually relevant in the three cities. Thus far IHUWASH Accelerator program has successfully supported SquatEase – a unidirectional Indian pan to be installed in Public and Community Toilets in the cities of Udaipur and Mysuru.



# WATER

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Innovations  
selected by  
**IH UWASH**  
project cities

## INNODI WATER TECHNOLOGIES PRIVATE LIMITED

**Government Schemes / Incubation Support** Incubated under IIT Madras

**Annual Turnover** ₹ 1,30,00,000 (2017)

**Contact person & details:** Mr. Vijay Sampath, Director

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### PROBLEM

- Lack of affordable and safe drinking water with low water wastage
- Need of proper treatment of ground or surface water bodies with high Total Dissolved Solids (TDS) (up to 2000 ppm)
- Space constraint in water kiosks in prominent tourist and market places
- Requirement of cheap and reliable 24 x 7 drinking water supplies in residential communities

- Based on usage levels and space constraints – implement 300 - 4000 litre per day (LPD) capacity kiosk models.
- Card or token-based payment and real-time usage data monitoring systems to maintain transparency in costs.



### PROPOSED SOLUTION

**InnoDI** will setup affordable and safe drinking water kiosks based on Capacitive deionization (CDI) technology in partnership with urban local bodies (ULBs) across key public places and low-income residential communities to:

- Handle high TDS water with low water wastages while retaining essential minerals.
- Reduce recurring operating costs as no membranes (like in Reverse Osmosis systems) have to be replaced.



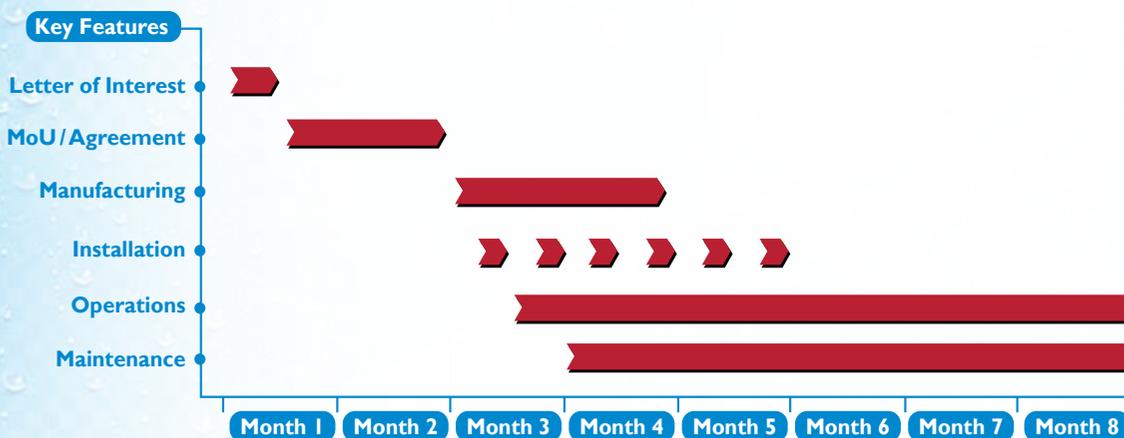
### BUSINESS MODEL

**InnoDI** sells CDI kiosks to ULB. Revenue from recurring water sales goes to ULB. Maintenance will be done by InnoDI. ULB will have to pay for the maintenance and consumables costs separately. The 300, 500 and 1,000 litre kiosks cost INR 4 lakhs, INR 5.5 lakhs and INR 7 lakhs respectively.



## IMPLEMENTATION

- Letter of interest from government officials is necessary to start the manufacturing process.
- Following the letter of intent (LOI), **InnoDI** and ULB will need to work out



a detailed agreement that will cover roles and responsibilities, business model and other terms. This effort is expected to take 30-45 days.

- Upon signing the agreement, **InnoDI** will start deployment of the kiosks in the designated locations in a phased manner. The phases will be jointly agreed between both parties. Initial deployments can start with 20 units, increasing over time to ensure delivery dates are met.
- Manufactured units can be shipped and installed on-site in approximately 2 to 4 working days. However, this does not take into account the time needed by the local government bodies to get the site ready with necessary space clearances, power and water source.

- **InnoDI** will hire and train local people to maintain kiosks. There will be an estimated 1 person per 15 kiosks.

To ensure a mutually beneficial and successful partnership with ULBs, **InnoDi** will need:

- ULB's support in ensuring availability of the required space, power, and water at the designated sites is essential.

- A MOU with broad terms has to be signed by both parties to initiate manufacturing. This has to be followed by an agreement shortly thereafter.
- Physical verification of the installation site to ensure necessary space clearance, power and water source requirements – before shipping the units for installation.



## KEY BENEFITS

- CDI reduces water wastage from 70% (in RO systems) to 20%.
- Lower operating expenses, because no membranes need to be replaced.
- Can effectively treat high TDS water, while retaining essential minerals in the water.

- Internet of things (IoT) based real-time monitoring of usage data prevents misuse and breakdowns.



## RISKS & MITIGATION

- **Adoption:** A disruptive technology when delivered through a small company faces credibility issues that slows adoption. We have mitigated this by associating with leading technical institutes like Indian Institute of Technology Management (IITM), Indian Institute of Science (IISc) and so on. We have also established partnerships with large companies who will accelerate adoption and also validate the technology.
- **Financial resources:** As a start up getting working capital financing for projects and scaleup is a big challenge. Banks and Institutions do not provide working capital without collateral and entertain companies with minimum 3-year track record. This poses a big challenge for scaling up of companies. While there is no clear way to mitigate this, our strategy has been to work with companies with corporate social responsibility (CSR) budgets who are willing to look at investing in new technologies.



## ORGANIZATIONAL CHALLENGES/NEEDS

- One of the main issues that we are facing is access to working capital for managing scales in project. While we have invested in research and development (R&D) and product development, taking up large projects require access to short

term working capital which the banks and institutions are not able to extend. This limits our ability to hire people, buy inventory and ultimately hampers growth.

- Support from government for implementing this technology is missing. Most government tenders call for items like references, completion certificate, (Earnest Money Deposit) EMD etc. but ultimately would like to place orders on technologies that are LI. For a new technology and a company wanting to scale up, these parameters limit its ability to bid and install. There is a need to have a firm policy and budget for using new technologies in governments.



## INNOVATION CASE STUDY

**Support Organisation:** Hyderabad Metropolitan Water Supply & Sewerage Board (HMWSSB)

**Background:** HMWSSB is a nodal agency that develops and monitors water supply in Hyderabad Metro. This company has been buying bottled drinking water daily to provide purified drinking water to over 500+ staff members and visitors in their corporate office in Hyderabad. This organization spent close to Rs. 50,000 per month to provide drinking water, which the source of which was not certain.

In August 2018, HMWSSB installed our CDI based water treatment system as a Point of Entry based solution. This device placed on top of the terrace treats and stores 3000 liters of drinking water daily and is then discharged to every floor in the building through a dispenser attached to the main tank.

By doing so the department has been able to achieve the following:

- Big saving in expenditure (close to INR 4 lakhs annually)
- Get treated bacteria free water on demand at any time
- Water with minerals required for body
- The entire staff was given refillable bottles and they refill water whenever required, which has significantly contributed towards reduction of plastic waste.



## REFERENCE

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**Mr. Azhar (Engineer)**

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## ENVIRONMENT PLANNING GROUP PRIVATE LIMITED

### Government Schemes / Incubation Support Global Social Benefit Incubation Program

2008, Santa Clara University California, Funding support from International Water Management Institute Sri Lanka; Acumen Fund New York, Grass Root Business Fund Washington, Cordaid Netherlands, etc.

**Annual Turnover** ₹ 60,00,000 (2017)

**Contact person & details:** Mr. Deepinder Mohan, Chief Executive Officer (CEO)

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### PROBLEM

Affordable safe drinking water and sustainable community toilets remain two separate problems. However, low-income residential communities need both low-cost safe drinking water and access to clean toilets. Additionally, most community underground water sources have unacceptable TDS content while surface water sources invariably have microbial contamination. It is anyways a perpetual struggle to maintain clean and affordable community toilets.



### PROPOSED SOLUTION

Environment Planning Group Private Limited (EPG) or EPGL model dispenses affordable and safe drinking water 24x7, collects payments, ensures water quality and re-uses reject water from the RO plant in the community toilets such that there is no wastage of RO reject water. Safe drinking water kiosks and bio-toilets

serve beneficiaries within a walking distance (up to 1km) from their place of stay.

Such an arrangement offers following advantages:

- It provides fresh RO/ UV purified safe drinking water at 50 paise (p) per litre through community kiosks. Residents pay for water either on a per litre basis (or) via radio frequency identification (RFID) monthly subscription cards. Prices are kept affordable and below the users' saved medical expenses on water linked diseases and ailments to ensure maximum adoption of the facility.
- Model eliminates water waste by using reject water from RO system to flush community bio-toilets. These odourless bio-toilets use beneficial microbes to rapidly decompose faecal sludge in to clear transparent odour free water, good enough for irrigation and even back in toilets.
- Incentivizes families to adopt both safe drinking water and sustainable sanitation practices



## BUSINESS MODEL

EPG will enter into Build-Operate-Transfer (BOT) contracts with ULBs to setup a cluster of 10 drinking water kiosks + bio-toilets. ULB provides EPG with clear land use permission for a period of at least 10 years. EPG will take up the responsibility of raising CAPEX to create the necessary infrastructure.

EPG will recover costs by charging users INR 5 per 10 litres of RO water. Toilet use facility would be charged at the rate of Rs.2 each time through RFID card for casual users and Rs.150 per month for family linked monthly

cards. Regular water buying members would be allowed access to toilets at an optional monthly charge of INR 150 for the entire family.

### Key Model Costs (CapEx)

Key Model Costs (CapEx)	Amount (₹)
1,000 LPH RO plant with 500lph chiller	₹ 3,00,000
External RO Plant Structure (kiosk)	₹ 1,00,000
10 seat public bio-toilet	₹ 3,00,000
Plumbing, Installation, Transport & Misc	₹ 1,00,000
Initial technical support for 4 months	₹ 1,00,000

### Recurring Revenues

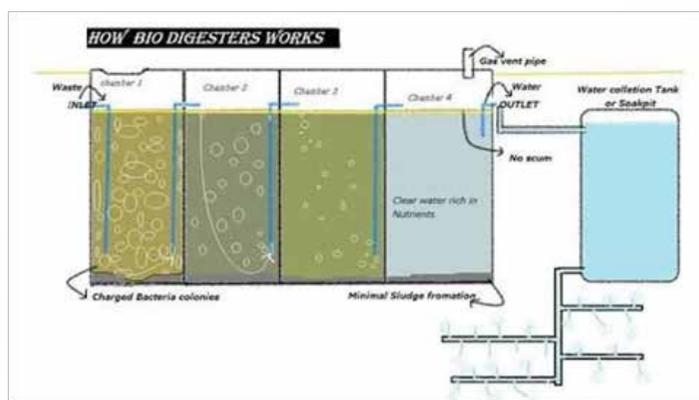
Recurring Revenues	Amount (₹)
Cost of 10 liters water	₹ 5
One-time toilet use	₹ 2



## KEY BENEFITS

- EPG model has zero water wastage from the community RO plant/ kiosk.
- Integration of solution improves water and sanitation related behaviour changes in the community

- Low-cost, safe, community-level drinking water and sanitation solution.
- Better odourless toilets that have reduced recurring costs of treating faecal sludge.
- ULB only provides land and revenue generation rights for 10 years. Zero CAPEX support.



Indicative RO plant (left) and a schematic diagram of how bio-digester toilets work (right) Toilets and RO water ATMs pics appear at the end.



## IMPLEMENTATION

- MoU/Agreement with ULBs necessary to start manufacturing and installation process.
- Manufactured units can be shipped and installed on-site in approximately 30



days working days. However, this does not take into account the time needed by the local government bodies to get the site ready with necessary space clearances, power and water source.

- EPGL deploys its own staff/ franchise to maintain the kiosks/bio toilets. Nonetheless, EPGL will encourage local entrepreneurs to work on suitable revenue sharing model at the upscaling point. First 10 pilot units will be run by EPGL's in-house full-time team only.



## INNOVATION CASE STUDY

- Support body: Water & Sanitation Management Organization (WASMO) of Govt of Gujarat and International Water Management Institute and others
- Background: The International Water Management supported EPGL to introduce water RO plants in two villages in Banaskantha district of Gujarat in 2004.
- Cordaid Switzerland joined EPGL to put up water ATMs in 10 villages near Anand in Gujarat. EPGL has also received funds from Welspun between 2012 to 2014 to set up 8 water ATMs around Vapi and Anjar.

- WASMO partnered with EPGL to promote EPGL RO plants as WASMO EPGL model across 20 villages in Gujarat starting from 2008.



## REFERENCE

**Dr. Tushar Shah, International Water Management Institute and Former Director of IRMA, Anand Gujarat.**

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## TIDE TECHNOCRATS PRIVATE LIMITED

**Government Schemes / Incubation Support** Information provided by the enterprise 2008, Santa Clara University California, Funding support from International Water Management Institute Sri Lanka; Acumen Fund New York, Grass Root Business Fund Washington, Cordaid Netherlands, etc.

**Annual Turnover** ₹ 8,34,00,000 (2017-18)

**Contact person & details:** Mr. Sampath Kumar, Managing Director (or) Mr. Shriram Bharathan, Lead Ecosystem Engagement

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### PROBLEM

In most Indian cities, sewage and solid waste continues to illegally enter waterways and storm water drains naturally; and these problems get compounded when it rains heavily. This causes several ecological problems in addition to polluting waterways and water bodies.

Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand COD levels.



### BUSINESS MODEL

ULBs hire the services of TIDE Technocrats to design, install and oversee successful pilot implementation of the coir-bio filtration system.



### PROPOSED SOLUTION

TIDE proposes to set up a passive, decentralized coir-bio filtration systems in municipal waterways and drains to effectively prevent solid waste and sewage from entering the water bodies from the drains. By treating the waste water prior to the point of joining the water body, through natural materials in a decentralized manner that does not need significant infra investments, the filter system will significantly reduce

One-time Costs (CapEx)	Amount (₹)
Site surveys, planning and design	₹ 3,00,000
Equipment & transportation	₹ 20,00,000
Installation cost JCB, drain clean, fixing on both sides	₹ 2,50,000
Monitoring equipment for installation	₹ 1,00,000
Manpower cost during installation (incl. travel & stay)	₹ 5,00,000
Overheads and Miscellaneous	₹ 1,50,000
<b>Total CapEx</b>	<b>₹ 33,00,000</b>
	+ a 10% cost incurred during the trial run phase
Cost of 10 liters water	₹5
One-time toilet use	₹2

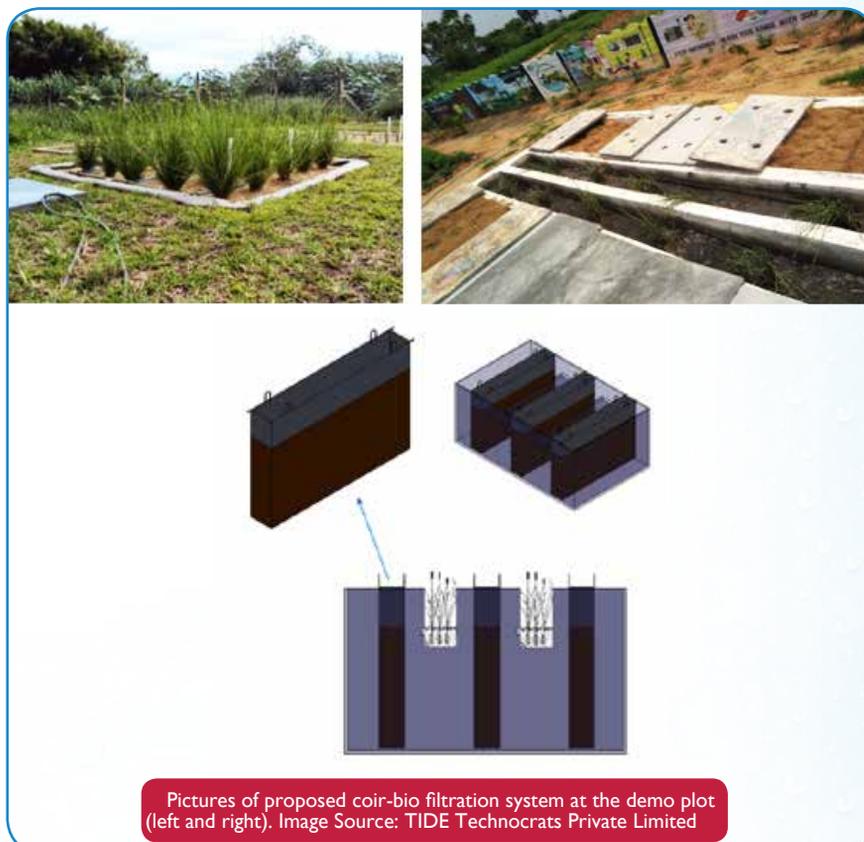
Recurring Revenues	Amount (₹)
Year 1: Staff Costs	₹ 5,40,000
Year 1: Sample Collection & Analysis	₹ 6,50,000
Year 1: Routine Maintenance	₹ 3,00,000
Year 2: Staff Costs	₹ 3,96,000
Year 2: Sample Collection & Analysis	₹ 90,000
Year 2: Routine Maintenance	₹ 1,50,000

The above mentioned estimates are exclusive of taxes. Goods and Services Tax (GST) will be applicable in addition to this



## KEY BENEFITS

- Eliminates contamination and clogging in waterways and drains.
- Low operating expenses, because it is a nature-based passive system with no mechanical moving parts.
- Significantly reduce COD/ BOD levels and prevent further downstream contamination of lakes and waterbodies and removal of large solid waste particles



Pictures of proposed coir-bio filtration system at the demo plot (left and right). Image Source: TIDE Technocrats Private Limited

Each unit consists of:

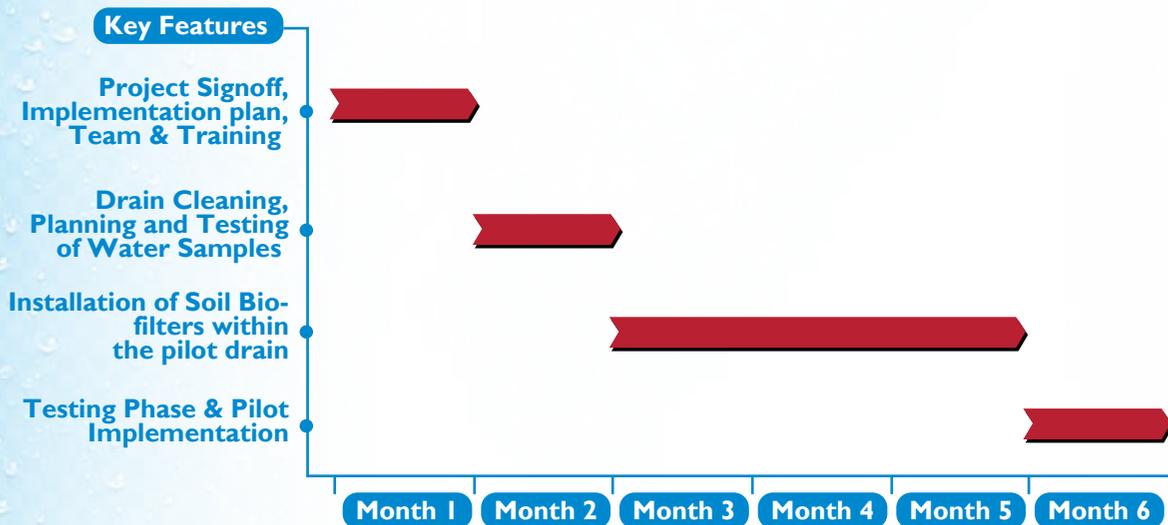
- 3 Coir Bio filter structures – of required volume
- 2 Vetiver structures – of required volume
- The coir bio filter structures consist of non-woven coir with density as below:
- Set 1 : 40kg/m<sup>3</sup>: Set 2 : 60Kg/m<sup>3</sup> : Set 3 : 80Kg/m<sup>3</sup>
- The vetiver plant bed structure will be placed on a thermocol board or any similar floating unit. Plants to be placed at an interval of 30cm center to center and this

would be placed in between coir structure sets, and allowed to float on water.

- A bar screen is placed prior to the structure to improve screening by removing floatables and inorganics
- Significantly Reduced BOD and COD levels from input
- Solid Waste is pre-screened
- Able to handle flow rates during summer and monsoon
- Easy installation with many available materials enables lower capital cost when compared to other technologies



## IMPLEMENTATION



## ORGANIZATIONAL CHALLENGES/ NEEDS

In 6-months' time; a pilot of 100m to 150m distance can be implemented. For successful implementation partnerships with ULBs, Water departments, local stakeholders like RWAs, tourism departments is required.



## INNOVATION CASE STUDY

The proposed technology of Soil Bio-filter (SBF) has been successfully tested at our Faecal Sludge Treatment Plant site in Wai (Maharashtra) (present) and other locations in the past in order to treat the waste water / filtrate coming out of the Dewatering

Unit post separation of solids & liquids from the incoming septage. The waste water input into the SBF and the treated

water output samples were being tested and the following results were obtained:

S. No	Parameter	Waste Water (Filtrate) Values	Treated Water Values
1	pH	7.62	7.34
2	Colour CU	525	744
3	Turbidity NTU	81	4
4	Total Suspended Solids mg/l	739	12
5	Total Solids mg/l	1374	920
6	Viscosity Cps @ 27 deg Cen	9.6000	10.400
7	Chemical Oxygen Demand mgO <sub>2</sub> /L	2899	96.64
8	Biological Oxygen Demand mgO <sub>2</sub> /L	810	28
9	E Coli CFU/MI	2.4 X 10 <sup>3</sup>	1450

\*The test report from Lotus Labs can be submitted on request.



## REFERENCE

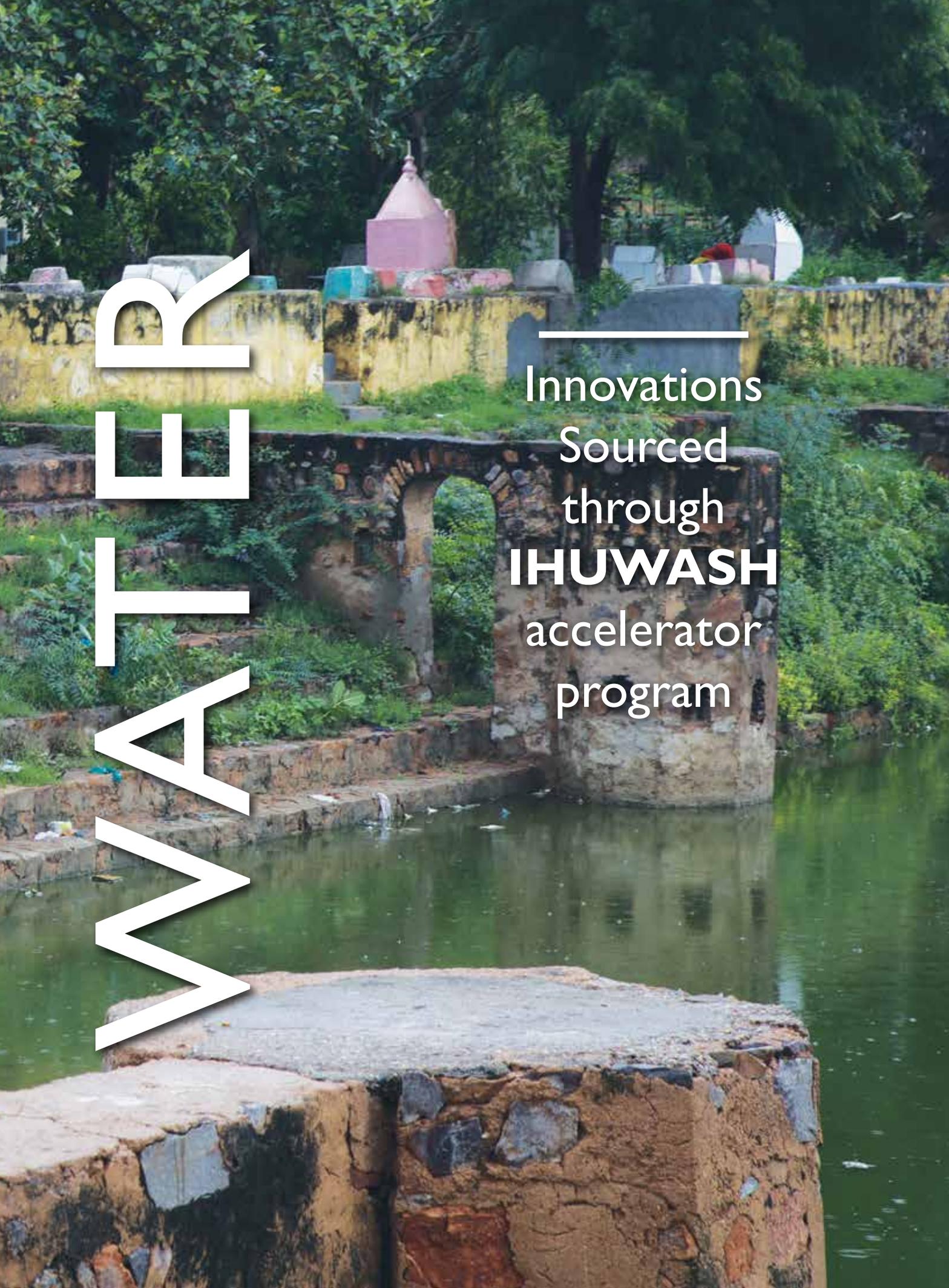
**R S Arun Kumar (For Wai project), Lead – Sanitation, Tide Technocrats Pvt. Ltd.,**

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**Prof. Praveen Arakkal (For RIT Installation), Rajiv Gandhi Institute of Technology,**

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A traditional stone water fountain with a pink dome and a stone archway over a pond. The fountain is built with rough-hewn stones and has a small waterfall on the left side. The pond is surrounded by lush green trees and foliage. The overall scene is a peaceful, rural setting.

# WATER

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Innovations  
Sourced  
through  
**IH UWASH**  
accelerator  
program



## FOUNDATION FOR ENVIRONMENTAL MONITORING PRIVATE LIMITED

**Government Schemes / Incubation Support** Information provided by the enterprise

**Annual Turnover ₹ 35,74,820 (2017)**

**Contact person & details:** Mr. Saurabh Levin, Product Designer

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### PROBLEM

**Conventional** water testing kits are bulky, expensive and inconvenient for frequent on-site tests. Additionally, there is a lack of trained staff, who can aid accurate results.



### PROPOSED SOLUTION

Foundation for Environmental Monitoring Private Limited (FFEM's) smartphone based in-situ water testing kits:

- Effectively monitor water quality across the city on a frequent basis.
- By providing low-cost, mobile testing kits that anyone with a little instruction can use.

- Also, test results are displayed instantly on smartphones and data is available on a server.



### BUSINESS MODEL

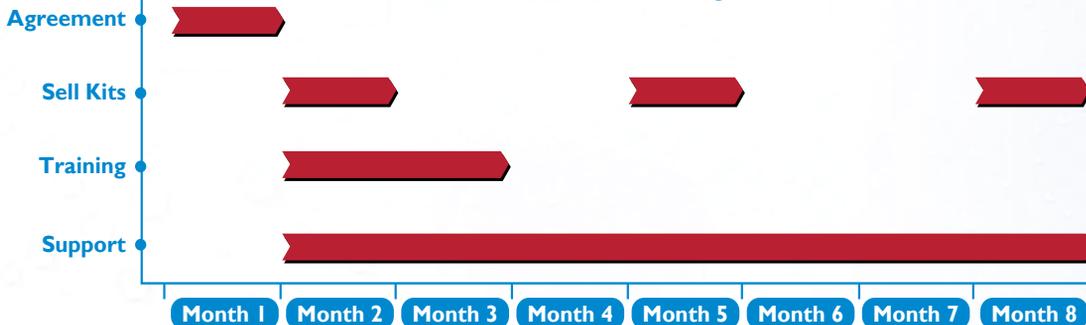
ULBs buy water testing kits from FFEM to test various water quality parameters.

One-time Costs (CapEx)	Amount (₹)	Notes (Optional)
Initial Training	5,000	Per day
Base testing kit (bag, bottles, test chamber)	1,000	Per kit
Recurring Costs (OpEx)	Amount (₹)	Notes (Optional)
Testing kits	8 to 25	Depending on test parameter
App and data	Free	On an open source basis



### IMPLEMENTATION

#### Key Features





## KEY BENEFITS

- Up to 95% savings in recurring water testing costs. Allows frequent testing.
- Eliminates dependence on water testing labs and trained staff. Minimal training of the staff is sufficient.
- Helps ULBs monitor water quality progress remotely. All data is plotted on a map with geo-coordinates and is managed automatically on a server that officials can easily monitor.



## RISKS & MITIGATION

**Certification:** Many of the potential customers (including the Government) require FFEM kits to be certified before they can justify their purchase. However, until this year, no Government recognized body has existed to certify field testing kits, and other certifying bodies such as Underwriter's labs that have restrictions on the kind of devices that they can certify.

FFEM will at some point approach United States Environmental Protection Agency (USEPA) for additional international recognition. However, this process is fairly expensive. USEPA have conducted validation testing at multiple labs, and FFEM have published a paper comparing FFEM's method to standard lab tests.

**Environmental Risks:** The spent reagent and water sample contains a small amount of chemicals, which might be environmentally hazardous in their untreated form. Currently, the users are requested to collect the spent

reagent in a separate bottle. Once the bottle is full (after approx 100 tests for a 500ml bottle), it can be disposed with the nearest district hazardous waste disposal facility. They are working on methods in which, the spent reagent can be shipped back, and retrieve the chemicals in a solid form. However, this will require some R&D, which requires funds.



## ORGANIZATIONAL CHALLENGES/ NEEDS

- FFEM is primarily trying to pursue government adoption for testing kits, as they are the key stakeholders and instrumental in creating an impact.
- FFEM has been unsuccessful in finding the right contacts for pilot testing.
- Certification has been a challenge, although with recognition of National Environmental Engineering Research Institute NEERI as a certifying body, the process is likely to be simplified.
- The organization requires funding for particular R&D projects, such as rapid detection of bacterial contamination in groundwater.



## INNOVATION CASE STUDY

**Support Organisation:** Indian Institute of Technology (IIT)-Kanpur

**Background:** In 2018 FFEM worked closely with Indian Institute of Technology (IIT)-Kanpur to develop a test for chromium contamination in groundwater. Using low-cost

test, the organization conducted a pilot testing program in the village of Rania in Kanpur, Uttar Pradesh. The surroundings of the village of Rania report heavy contamination of Chromium VI, due to indiscriminate dumping of spent Chromite ore. Groundwater, which forms the primary drinking water source in this area reports upto 80 ppm (parts per million of Chromium VI) where the safe drinking water standard is 0.05 ppm.

Groundwater is usually yellow in highly contaminated sources, but even reasonably colourless water sources report high Chromium VI concentrations. In the absence of viable sources of water, villagers are forced to use this contaminated

water for drinking and cooking.

In 2017, Prof. Abhas Singh of IIT Kanpur along with FFEM worked on surveying the extent of Chromium contamination and on methods of improving access to safe water. Ferrous sulphate filters were developed at IIT Kanpur. However, these filters require precise measurements of Chromium VI to calculate dosing. FFEM developed a smartphone based water quality test which was used extensively at Rania to conclusively able to prove the presence of chromium contamination in the groundwater. Dr. Abhas Singh is now working to implement his low cost chromium filters in the affected areas.



## REFERENCE

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## WATERHEALTH INDIA PRIVATE LIMITED

**Government Schemes / Incubation Support** Information provided by the enterprise

**Annual Turnover** ₹ 83,30,00,000 (2017)

**Contact person & details:** Mr. Uthappa S C, Head – Acquisitions

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### PROBLEM

Communities without access to safe and affordable drinking water often resort to drinking unsafe water or buying water that often costs around INR 1 to 2 per liter. On the other hand, in busy tourist (or) market places; people have to pay INR 15 per liter for safe treated drinking water.



### PROPOSED SOLUTION

WaterHealth India Private Limited (WHIN) proposes to partner with ULBs to set up community water systems to serve the underserved areas of the city. The Community Water Systems (CWS) by WHIN will be on BOT basis along with Operations & Maintenance for a period of 25 years. The following are the implementation steps:

- ULB's would partner with WHIN for the setting up of Community Water Systems in the identified locations; 100% of the capital cost will be funded by WHIN for installing these plants.
- WHIN would conduct a feasibility

survey across the identified location and recommend those that are best suited for installation of the CWS.

- WHIN would create access points of safe drinking water based on feasibility study either through multiple small capacity WaterHealth Centres (WHC) or connect large capacity WHCs through piped network at certain locations.
- WHIN would design water purification plants (that address the contamination in the identified location), install and run them.
- The MMC would provide a centrally located site for the WHC; as a perennial raw water source and electricity connection for the plant.
- The MMC would provide RoW (Right of Way) incase piped network is recommended by WHIN at certain locations.
- WHIN would build the plant and employ local operators to manage the day-to-day operations. A centralized Quality and Service team would provide other operational support to the WHC.
- WHIN will utilize the services of our state-of-art laboratory in Hyderabad and Bengaluru to test water samples from all plants on a fortnightly/monthly basis.

- WHIN would recover Operations and Maintenance costs by selling water at nominal tariff within the ward and excess capacity not consumed will be sold to residents in nearby areas.
- After the period of 25 years, WHIN will hand over the plant (at zero cost) to respective municipality or can renew the O&M contact on mutually acceptable terms.

WHIN would charge user fees of INR 10 per twenty-litre cannister of purified normal water and INR 5 per liter of purified chilled water. Prices would be eligible for revision that will be linked to inflation index.



## BUSINESS MODEL

WHIN will enter into Build-Operate-Transfer (BOT) contracts with ULBs for drinking water RO plants. This includes Operations & Maintenance for a period of 25 years. WHIN will raise the upfront financing needed, no investments from ULBs other than making land, water source and electricity available. WHIN will recover costs by selling water at nominal tariffs of INR 10 per twenty-liter cannister of purified normal water and INR 5 per liter of purified chilled water.



## KEY BENEFITS

- ULBs do not pay to setup the community-level RO plants. It only has to provide land, energy and water.
- Communities and people get access to safe and affordable drinking water as and when needed.

- ULBs own the RO plant assets after the mutually agreed upon concession term.



A Water Health Centre (WHC) (top) and community members in front of WHC (bottom).  
Image Source: Waterhealth India Private Limited.



## IMPLEMENTATION

WHIN would execute the project in a phased manner with clear deliverables at the end of each phase as explained below:

Project Plan for End-to-end turnkey solution (Structure + Equipment)

Phases	No. of Days
Site Clearance & preparation (after completion of necessary documentation)	7
Civil site work	25
Raw water supply set-up	7
Structure Erection	7
Equipment Erection, commissioning and testing	14
Site handover for start of operations	2
<b>Total</b>	<b>62</b>

WHIN would assign a Project Manager for managing the project. The Project Manager would be responsible for executing the project as per the agreed plan. The roles and responsibilities of the Project Manager are indicated below:

- Finalize the project plan in consultation with concerned stakeholders
- Mobilize the necessary resources, equipment, manpower and financial resources

- Ensure completion of the tasks as per the project plan
- Obtain sign-off from the client on project deliverables
- Ensure quality of deliverables as per the specifications
- Resolve any issues pertaining to the project with relevant stakeholders.





## WATSAN ENVIROTECH PRIVATE LIMITED

**Government Schemes / Incubation Support** Information provided by the enterprise  
**Annual Turnover ₹ 39,00,000 (2017)**

**Contact person & details:** Mr. Chandrasekhran, Founder & CEO

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### PROBLEM

Provision of clean drinking water supply in rural India continues to be an enormous challenge. People in the rural parts of India have very less access to clean drinking water. Due to the consumption of contaminated water, people acquire waterborne diseases and a plethora of other water borne illness. It is therefore essential that we deploy technology for the benefit of those people who belong to the rural population of the nation, and do not and cannot have access to costly gadgets. With this mission at heart, WATSAN stepped forward to provide affordable water filters for the benefit of rural India.



### PROPOSED SOLUTION

WATSAN's sole purpose is to provide water and sanitary solutions to the rural population by manufacturing and distributing low-cost, yet effective electricity-free water filters to urban slums and rural families who cannot afford other expensive options. WATSAN's product lasts for about 10 years; which is a boon for the less privileged families in rural India. They claim to be the first to work on

Arsenic removal from water in many parts on India like West Bengal, Bihar, Assam, North East, Jharkhand, Punjab, few districts in Tamil Nadu, parts of Uttar Pradesh and Karnataka. WATSAN has also developed the Fluoride removal purifier, and the field tests have been very encouraging. They make affordable, electricity free, maintenance free and zero water wastage water purifiers, which can be both standalone and as well as large sized community purifiers.

WATSAN has been able to reach out to 2,10,000 rural households, BSF posts like Wagah and Kargil borders, many anganwadis or child care centres through CSR of few companies, large size water purifiers for companies like L&T ECC, RAMCO etc. All of this has been done through collaboration with NGOs and SHGs and not through traders. They have also built Any Time Water dispenser, which can be fitted on wheels or run as a kiosk to dispense water in variable volumes like 1, 2, 5 and 20 litres, using a smart card. This can monitor the place where the dispenser is running, how much water is dispensed and how much money is collected and recharged through the smart card, all through remote monitoring using IoT.

WATSAN has also built toilets without sand, water and cement, but with glass

fibre waste, which otherwise would end up as landfill, recycled and reused to build toilets. It takes 6 people and 1 day to make one toilet. The faecal waste is converted to fine powder and used as natural manure. WATSAN not only provides the products, but also trains villagers on how to maintain them and help make them self-sufficient.



Natural Water Filter- Standalone filter; Arsenic removal filter; Fluoride removal kit; Large tank filter (Top) and Modular Toilet (Bottom)



## BUSINESS MODEL

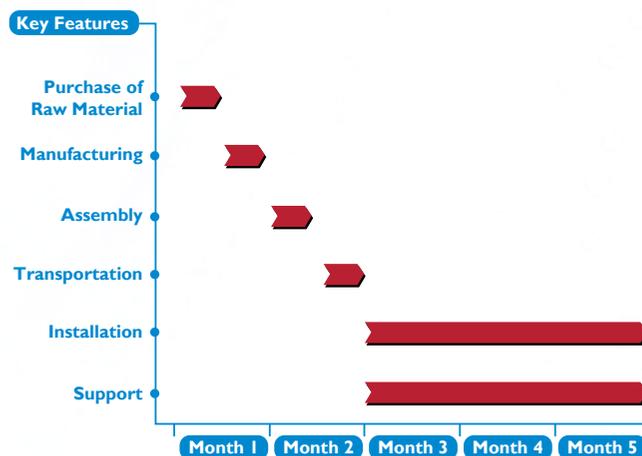
We have signed agreement with World Vision India as partners, Hand in Hand in Tamil Nadu, and SME Network in Karnataka (all NGOs).

One-time Costs (CapEx)	Amount (₹)	Notes (Optional)
Natural Water Filter	1,100	Including GST
Arsenic Removal Water Filter	2,000	Including GST
Fluoride Removal Kit + Water Filter	2,000	Including GST
Recurring Costs (OpEx)	Amount (₹)	Notes (Optional)
Absorbents Replenish (Arsenic and Fluoride Removal water filter)	800	Absorbents to be replenished once a year



## IMPLEMENTATION

Our model involves Purchase of Raw Materials, Manufacturing, Assembly, Transportation, Installation and support



## ORGANIZATIONAL CHALLENGES/ NEEDS

Stocking sales of 1000 filters/ Month/ State is the challenge at this moment. We are able to collaborate with few organizations like World Vision India, Hand in Hand in Tamilnadu. Additional support like long term funding/grants to expand would provide additional momentum to our scale plan.



## INNOVATION CASE STUDY

**Support Organisation:** Border  
Security Force (BSF), Wagah

Background: CSR initiative of DCB  
Bank at Wagah BSF, WATSAN Natural

Filter-200 liters was installed in three places at Wagah on August 15th 2018. WATSAN filter is electricity-free and Zero-water wastage. It saves about 13% on electricity bill and 22% water bill.



## (SWAACH NEER) CHITKARA UNIVERSITY

**Government Schemes / Incubation Support** Information not provided by the enterprise

**Annual Turnover** ₹ Idea stage no revenue generated

**Contact person & details:** Dr. Jyotsna Kaushal, Dean Applied Sciences, Chitkara University

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### PROBLEM

Clean clear drinking water is a key necessity and right of every human being. Polluted water is the major cause for communicable diseases. Its purification is time consuming and cost is heavy. The aim of this innovation is to develop a cost effective water purification system for rural community.



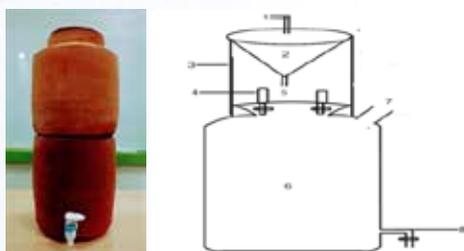
### IMPLEMENTATION



### PROPOSED SOLUTION

Chitkara University made a water purification system with following salient features:

- Made from Clay and Rice Husk Ash. Uses herbal solution.
- Low cost: ~ Rs 800. Modular in design
- Removes heavy metals, organic compounds and microbes



Left picture shows product. Right picture shows filter's schematic diagram: 1. Water inlet 2. Treatment column 3. Filtration chamber 4. Candles 5. Outlet from treatment 6. Storage chamber 7. Input for Herbal solution,



### RISKS & MITIGATION

- Our model doesn't charge customers an initial upfront investment, we have to finance this. Our biggest risk is that we exhaust our financial capacity to fund our projects. To mitigate this, we are developing partnerships with private sector funding agencies to unlock various project financing options.
- We need support in financing. We believe IHUWASH could play a key role in this.



## ORGANIZATIONAL CHALLENGES/ NEEDS

- Optimise the SWAACHNEER product for particular region.
- Manufacturing and Storage.
- Go to Market through NGO Neerakriti.
- Technology Transfer to Local/ Regional Artisans.





## (OCEO) PILMATIS INNOVATIONS LLP

**Government Schemes / Incubation Support** Information not provided by the enterprise

**Annual Turnover** ₹ 10,00,000 (2017)

**Contact person & details:** Vikram Gulecha, Cofounder

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### PROBLEM

While availability of drinking water continues to be a problem, assuring that it is safe and affordable is a challenge by itself. Deteriorating quality and rising cost of drinking water is an ever-growing concern in today's time.



### PROPOSED SOLUTION

OCEO is an intelligent, sustainable and cost-effective way to solve safe drinking water crisis.



### KEY BENEFITS

- Reduces reject/waste water by over 30% as compared to other water purification system
- OCEO Smart Sense technology conducts real time monitoring of data like water flow, quality of water, and device working condition.

- Predictive maintenance of the device is done through connection with platform on real time basis



### BUSINESS MODEL

- OCEO Smart water purifiers are installed at the user's location and offered on pay per use basis.
- OCEO Smart Dual Purification system performs six stage purification for drinking water and a three-stage purification for cooking water based on end user requirement.
- Our integrated real time monitoring platform allows to perform predictive maintenance of the devices and make sure users get clean, safe drinking water.
- OCEO purifiers are most suitable for households, offices, service apartments, hostels and shared accommodations. Funds are primarily needed for manufacturing the device, training & hiring service team in each city, and their travelling costs. Subject to number of households to be served; the investment amount will vary. It will cost

INR ~12,500 to INR 18,000 per device depending on volumes to be served. The cost of delivery is less than INR 1 per liter.



## KEY SUCCESS FACTORS

- OCEO devices are connected to data servers for remote management via Global

System for Mobile Communications (GSM) (SIM card) network. Hence, availability of Telecom Network is a deciding factor for successful implementation

- OCEO devices can treat contaminated, non-saline water up to 1800 ppm TDS only.





## RITE WATER SOLUTIONS

**Government Schemes / Incubation Support** Information not provided by the enterprise

**Annual Turnover** ₹ 3,20,000,000 (2017)

**Contact person & details:** Abhijeet Gan, CEO

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### PROBLEM

In urban spaces, there is lack of clean, hygienic and safe drinking water infrastructure at public places, which can provide water at affordable cost.



### PROPOSED SOLUTION

Jal-Rath is a mobile water purification & vending solution for urban areas powered by a patented Nano-Blue cold-plasma (ozone based) water purification technology that removes microbes and heavy metals.



### KEY BENEFITS

- Provision of affordable safe drinking water at one third of the market rate through mobile water purification & vending (Water ATM) unit.
- Built on e-rickshaw platform and can be solar charged.

- It is an alternative to plastic bottles and can save kilos of plastic on an annual basis.



### BUSINESS MODEL

Solution enables ULBs to ensure access to clean drinking water across public places and provide a great livelihood opportunity. It is proposed to implement a pilot initially across all the 3 cities by deploying 10 Jal-Raths at every city. The deployment will take 2-3 months' time and post deployment, Rite Water Solutions would run the operation and establish the business model and unit economics. They seek funding for the pilots to be carried out across 3 cities and once the bankable business model is successfully established, it can be scaled up rapidly across the country with help of Mudra loans and Jeevika Program. This can ensure access to clean drinking water across urban places in a massive way. The cost of one unit is INR 5,00,000.



## KEY SUCCESS FACTORS

- To get a buy in from ULBs for implementing Jal Rath project.
- Identifying potential areas & getting NOCs to deploy Jal Rath in these areas.
- Finding right operators/micro-entrepreneurs to run these units.





VEOLIA INDIA

**Government Schemes / Incubation Support** Information not provided by the enterprise  
**Annual Turnover** ₹ 3,20,000,000 (2017)

**Contact person & details:** Justine Lerche, Head of CSR

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## PROBLEM

Access to safe drinking water is low to almost negligible. Resources are polluted and require cost effective interventions.



## PROPOSED SOLUTION

The GAC project is a hybrid innovation, which offers solutions to bridge the gap of accessibility of water and sanitation in urban India by combining off-grid short-term and long-term grid solutions.



## KEY BENEFITS

- Quick and continuous access to safe drinking water for population and offer tailor-made sanitation solutions, while being easily replicable.
- Integrated decentralized sanitation solution and resource protection.

- Provision for “Social Welfare Team” to support population in the transition.



## BUSINESS MODEL

The GAC project is supported by three complimentary organizations respectively specialized in water grid solutions (Veolia), off-grid solutions (WaterHealth- mobile treatment plants) and decentralized sanitation solutions (India-Sanitation-Coalition). The GAC consortium will work for the selected municipality (customer), while implementing innovative governance principles with government bodies, NGOs, private sector and civil society. The GAC will benefit all citizens (users) of the selected area as it will test innovative financial models to enable cross-subsidizing between the poorest and richest populations. The project aims to explore new financial models and funding sources including private sector participation (direct investment or CSR funds), public funds, development agencies participation and cross-subsidization/microcredit models to include the users. Estimated budget for CAPEX.

- Design and Feasibility Study: ~

INR 1.38 Crores (Fund hosted by ADB might cover the costs)

- Implementation Phase: INR 83 Crores. OPEX to be defined following feasibility study. The project aims to explore new financial models and funding sources including private sector participation (direct investment or CSR funds), public funds, development agencies participation and cross-subsidization/ microcredit models to include the users.

- Private sector investment involvement
- Availability of funds
- Existing water plant and water network (to be refurbished/extended), availability of land and electricity for the off-grid solution
- Social diversity and citizen's financial capability to enable financial innovation



## KEY SUCCESS FACTORS

- Good governance, clear political leadership, alignment and stability of impact driven stakeholders





## (IWAP) INFRA DEVELOPMENT CORPORATION OF KARNATAKA

**Government Schemes / Incubation Support** Information not provided by the enterprise

**Annual Turnover** ₹ 41,40,00,000 (2017)

**Contact person & details:** Pankajkumar Sampat, Associate Professor

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### PROBLEM

High level of non-revenue water (NRW), water losses and cost recovery are major problems, which need to be dealt with by methods of water accounting and auditing. Water management needs to be proactive, and user friendly within the resources available with ULBs, with the support of the State Government.



### PROPOSED SOLUTION

Integrated Water Accounting Platform (IWAP) application to make water supply system efficient and management proactive.



### KEY BENEFITS

- Research-based solutions to account the volume of water distributed in the system and link it with the billing and recovery for identification of the gaps.

- Usage of scientific practices like leak detection and prevention monitoring, customer care and theft prevention, prevention, computerized billing and recovery reconciliation system to minimize these gaps.
- Analytical reports for the decision and policy maker to understand and take decisions to improve the system.
- Systematic improvement plan to address the issues by studying the existing system and providing research-based solutions.



### BUSINESS MODEL

- We will study the city water supply system, provide transaction advisory to support ULB to improve the overall water supply system and cost recovery through proactive water management by using advanced technology like IoT, GIS considering the field reality of the city, whether metered or unmetered water supply, status of infrastructure, mapping etc. Parallely, IWAP shall develop IWAP user friendly software with select industrial partner. In the third year, begin expansion by working with more ULBs,

thus the project shall be self-sustained from the revenue income by training, software license, transaction advisory to implement system reforms. Funding support is required to develop user-friendly application software and to train the staff.



## KEY SUCCESS FACTORS

- Developing user-friendly software
- Capacity building training of the ULB staff





## HYDRO INDUSTRIES LIMITED

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 41,40,00,000 (2017)

**Contact person & details:** Hannah James, WaSH Project Manager

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### PROBLEM

Provision of high quality drinking water at affordable prices and sufficient volumes in areas with high density population is a challenging problem. There is a need for innovation in the drinking water economy to provide World Health Organisation (WHO) quality safe and affordable drinking water.



### PROPOSED SOLUTION

A hydro treatment unit to provide high quality, drinking water at affordable prices. The solution proposes to produce up to 50,000 litres of WHO quality drinking water per day, for <0.5 INR per litre over 10 years.



### KEY BENEFITS

- Rapid, efficient, high volume treatment of water of WHO drinking water standard.
- Delivery of drinking water to households, saving consumers time and effort.

- Job creation and low-cost production of water, enabling profit margin for owners and distributors whilst keeping the cost to consumers < INR 0.5 per litre.



### BUSINESS MODEL

The organisation will set up a hydro treatment unit in collaboration with the local authority, water council and local NGO. The local authority and water council could set, monitor and enforce a price of water to households. Local NGOs to provide the education and community engagement aspect. The local entrepreneurs or government body will become the customers who own/operate a Hydro water treatment plant and further employs/sells to distributors, who can deliver/sell to households. The model can produce upto 50,000 litres of WHO quality and affordable(<0.5 INR per litre) drinking water per day. The unit could be next to a school, providing drinking water and encouraging attendance as water could be collected after school and carried home. The funding required for the project is INR 67,20,000.



## KEY SUCCESS FACTORS

- Requirement of a water source (surface or ground) for high refill rate of large volumes of water
- Collaboration with local NGO, water council and community
- Relationship with entrepreneur and/or government body



## TECHNORBITAL ADVANCED MATERIALS PVT LTD

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 60,00,000 (2017)

**Contact person & details:** Suneet Malhotra, Business Dev. Associate

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### PROBLEM

Access to safe and affordable drinking water is a challenge in India. Water purifiers for individual use or Community Drinking water purification depends on electricity for functioning, waste water while purification is excess, removes essential minerals, needs regular maintenance & dependency on technical person to maintain system & thus becomes costly.



### PROPOSED SOLUTION

Technorbital in association with NCL, Pune has developed a hollow fibre ultra-filtration membrane technology using Technorbital's modified PAN. These UF hollow fibre membranes are commercially manufactured at Technorbital plant in Kanpur (UP). The UF membranes are lot more effective than the conventional water filter membranes whether in drinking water or waste water treatment. Further, these are low maintenance and affordable than the conventional membranes.

The system also ensures clean, healthy (no minerals removed) and potable water with removal of water borne diseases by removing virus, bacteria, pathogens and iron with a system that can keep running without the need of any technical support or person. The sustainable and low cost solution ensures potable water for small families to large families.



### KEY SUCCESS FACTORS

- Availability of clean & healthy water
- No need of Electricity
- No wastage of water
- Low Cost of Purification
- Effortless Maintenance with high efficacy removing Virus, Bacteria, Pathogens, Turbidity & Iron



### BUSINESS MODEL

Technorbital can install several units as

water purification systems for communities, which will be the most cost effective and sustainable technological solution of India. They can involve regional or local partners to implement this. Government funds could help implement and scale up the systems in

various parts of the city. Target customers are CSR initiatives of companies and not for profit companies. The per unit cost of the product ranges from INR 700, INR 1100, and INR 60,000 to INR 2,50,000 making cost of per litre purification at .06 paisa per litre.





## HOME REMEDIES PRIVATE LIMITED (HRPL)

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 80,000 (2017)

**Contact person & details:** Mr Pushp Raj Kaushik

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### PROBLEM

Water is essential for the survival and development of all children. Without water; children cannot stay alive or thrive in a healthy environment. Water resources, and the range of services they provide, strengthen poverty reduction, economic growth and environmental sustainability.

Water facts:<sup>2</sup>

- 663 million people still live without access to clean drinking water, despite the Millennium Development Goal target for clean water being met in 2010.
- 8 out of 10 people in rural areas don't have access to clean water.
- 159 million people use untreated water from lakes and rivers, which is the most unhygienic water source.
- According to the WHO, since 1990, 2.6 billion people gained access to improved drinking water and today, 91% of the world's population drinks clean water.<sup>3</sup>

Water treatment at the point-of-use, such as at households, schools, health facilities, workplaces, and public space have been found to reduce diarrhoea, which is caused by waterborne pathogens. Point-of-use water disinfection makes contaminated water safe to drink through creates sustainable solution to make a ready to use sachet (CureAqua) available and affordable to low- income families and communities.



### BUSINESS MODEL

Sehat Mitra (community mobilisers) are the heart and soul of the Home Remedies system. They live in the communities they serve and therefore understand the needs of their community. They do not work

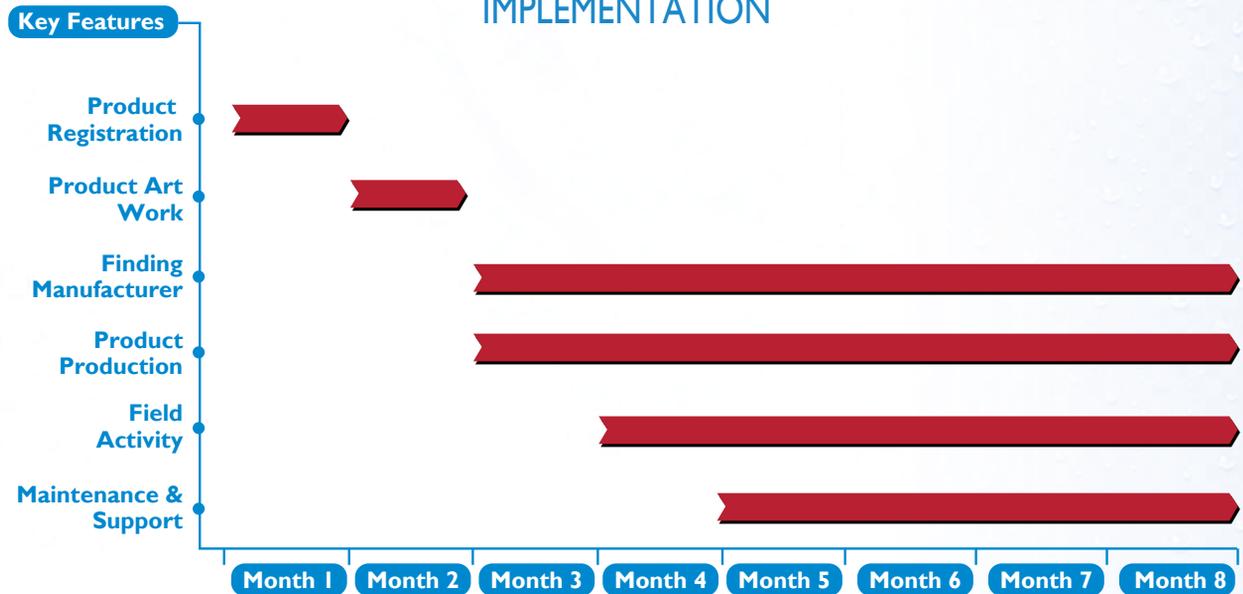
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[https://www.who.int/water\\_sanitation\\_health/monitoring/jmp-2015-key-facts/en/](https://www.who.int/water_sanitation_health/monitoring/jmp-2015-key-facts/en/)

as volunteers or salaried staff—they are empowered entrepreneurs who earn an income by providing products and services that improve the lives of their community. They aspire to make a difference and make a living. HRPL uses a highly-selective screening process that includes references, tests, and role-playing. The typical Sehat Mitra is a mother, 25 to 50 years old. They are savvy and connected, with rich social networks that they leverage to spread health education and build their businesses. They visit families in the convenience and privacy of the home, where they educate & offer products related to primary healthcare and water treatment products and advise community on improving at-home health practices.

One-time Costs (CapEx)	Amount (₹)	Notes (Optional)
Product registration and availing of trade mark and other related issues	25,000	
Product and relater IEC designing & initial printing	20,000	
Product development cost	100,000	
Recurring Costs (CapEx)	Amount (₹)	Notes (Optional)
Batch Production	200,000	Batch Production cost
Staff Costs	2,000,000	Per annum
Maintenance & Support	30,000	M&E per annum



## IMPLEMENTATION



## RISKS & MITIGATION

- Community's traditional behavior is one of the important factors
- Limited outreach among community because of limited funding
- Positioning of product.



## ORGANIZATIONAL CHALLENGES/ NEEDS

- Safe drinking water is not a top priority for the community.
- Source of water and supplied water are safe but storage is contaminated and to

have this understanding among community is very limited as there are very few projects developed in this direction.

- Product margin is very limited so the sustaining all field staff with one product id not possible.





## BANASTHALI VIDYAPITH

**Government Schemes / Incubation Support** Ministry of Human Resource and Development (MHRD), University Grants Commission (UGC), Department of science and Technology(DST)

**Annual Turnover** The proposed solution is at idea stage

**Contact person & details:** Dr Suphiya Khan, Associate Professor

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### PROBLEM

Fluoride (F) is a major contributor to the world water crisis; affecting about 200 million people worldwide. The available techniques are neither acquainted nor affordable and effective in removing Fluoride. Most of the solutions need electricity and water to operate, which is not easily available to the poor community. There is a need for user friendly, affordable, effective and durable product.



### KEY SUCCESS FACTORS

- Device-less technology without the use of electricity
- Cost effective, portable and environment and user-friendly solution to help access by all communities
- Mitigation of health risks associated with drinking fluoride contaminated water



### BUSINESS MODEL

The proposed approach for the defluorination is based on the development of Nano-Particle coated Polyurethane Technology (NP-PUF) technology.



### BUSINESS MODEL

The proposed patent protected Nano-Particle coated Polyurethane Technology (NP-PUF) solution will provides affordable technology towards addressing the public health with special reference to water purification especially at the resource-limited rural and urban areas to mitigate health risks associated with ground water F contaminations. Green and cost-effective strategy will be utilized for NPs synthesis using plant waste material followed by coating on polyurethane foam (PUF). Foam coating with



### PROPOSED SOLUTION

The proposed approach for the defluorination is based on the development of Nano-Particle coated Polyurethane Technology (NP-PUF) technology.

metal nanoparticles will be done by dip adsorption method. The developed NPs-PUF sponge is proved sufficient for the defluorination of 5 liters water/day. Funding requirement is INR

50 lakhs for product validation and optimization of low cost manufacturing. Present cost of product is INR 3 and we want to reduce it to INR 1.





## HINREN ENGINEERING

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover 3,500,000 (2017)**

**Contact person & details:** Sunil Mysore, Managing Director

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### PROBLEM

In Bangalore alone, receives on average 787 mm of rainfall during the monsoon. This works out to approximately 3.5 million litres of water per acre per year. If we reuse or recharge about 30% of the water that falls over the city; we can have more water than what the river Cauvery is supplying to the city. This innovation is to exactly do this in a safe and sustainable manner.



### PROPOSED SOLUTION

The solution captures rooftop rainwater to use it for all purposes.



### KEY SUCCESS FACTORS

- Visible reduction in water scarcity.
- Definite increase in quality of water available.
- More employment.

- Reduction in water tanker traffic
- Training of manpower



### BUSINESS MODEL

Solution implementation steps include:

- Promotion and popularizing use of rainwater.
- Market Rainwater harvesting.
- Build a demo site where people can come and taste rainwater.
- Train a highly skilled workforce.
- Popularize open well concept.
- Have 10 to 15 open wells in different parts of the city for people to get a feel of the technology.
- Inculcate safety in the workforce.
- Demonstrate and popularize rooftop rainwater harvesting combined with water pumping using solar power to reduce the water cost further.
- Target customers can be households or factories. An investment of INR 25 lakh is required for demonstration sites, team building and marketing.



## WHY WASTE

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** Information not provided by the enterprise at the time of documentation.

**Contact person & details:** Ms. Garvita Gulhati

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### PROBLEM

Restaurants across the globe waste huge amounts of water in the most trivial ways. In fact, 14 million liters of water is wasted globally every year, simply as the water that we leave behind in glasses at restaurants. Why Waste? works towards providing simple solutions to restaurants to curb this wastage. They also work with several other institutions like homes, offices and schools to optimize water usage and prevent wastage through several interactive methodologies and tools.



### PROPOSED SOLUTION

Our key innovation - glass half full, filling the glass only half instead of full as a method of telling people to take only as much as they need and to not waste. This is done through our half-marked glasses, which are glasses with a mark half way through, which also have a quirky quote on them, which inspires the customers to save water.

They have tent cards on table, which provides a description of why, how and how much water can be saved in this process. (attached below). This can be applied in absolutely any restaurant across the globe. Why Waste? provides extremely simple techniques, methodologies and tools in order to help develop a changemaker and water positive mindset



### BUSINESS MODEL

Why Waste? hopes to self-sustain the model through do it yourself “Do it yourself” modules - the process of creating a why waste in your own city. Also. They are coming up with modules on How each of us can, through personal

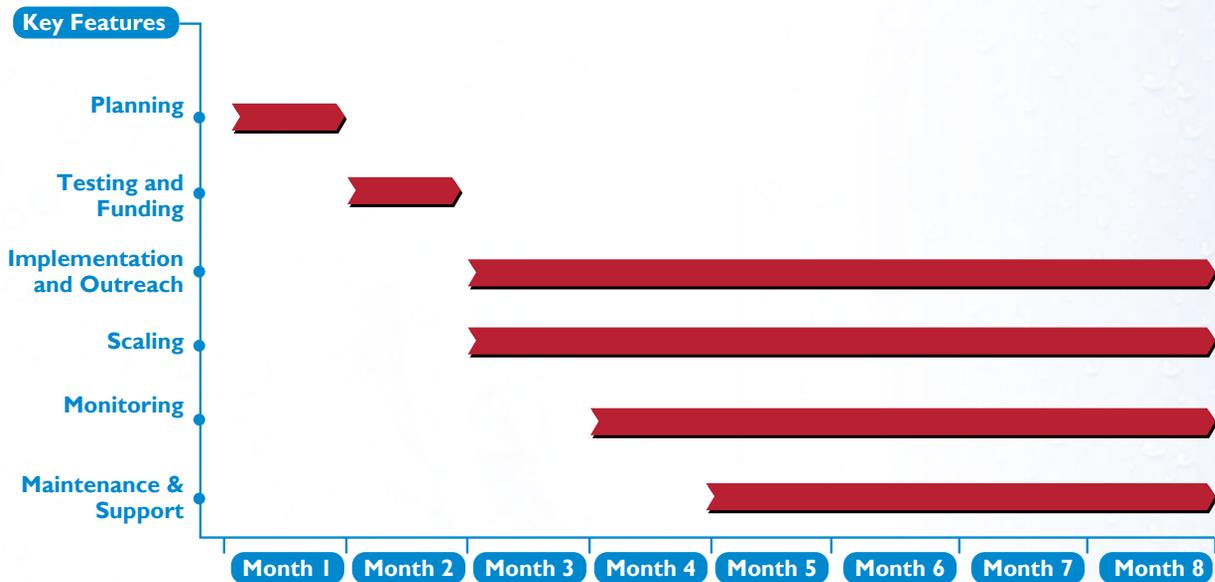
changes, save 100 litres of water every day. As of now, they are an organization, where everyone works 100% on a volunteer basis, i.e. free of cost. Beyond this, the money we use

for our operations are primarily gained through grants. We hope through the abovementioned details we are able to self-sustain our initiatives.



## IMPLEMENTATION

Information not provided by the enterprise at the time of documentation



## RISKS & MITIGATION

- Why Waste? hopes that breaking through the laws of government and changing the rules of hospitality doesn't stop them from moving forward. They also hope to be able to do justice to the funds provided to through the activities and keep people forever engaged in this process.
- The environmental and social benefits are what stands as testimony to why what they do is so important. As to break through larger organisational decision making, they hope that through their support from the World Economic Forum,

Global Changemakers, change.org, and Ashoka, they will be able to accomplish this.



## ORGANIZATIONAL CHALLENGES/ NEEDS

Funding, sustaining and monitoring are our biggest challenges.



## INNOVATION CASE STUDY

Support Organisation: Pune Restaurants and Hoteliers Association (PRAHA)

Background: One of the key collaborations was with the Pune Restaurants and Hoteliers Association (PRAHA). Why Waste? collaborated with all 3500 restaurants that come under them. Together, they have saved 50% of the water resources that were previously being wasted simply through our glass half full technique.

They are now installing Why Waste? testcards across all their restaurants. These tent cards help explain the customers the process, why they do it, and the benefits of it. This helps them become more conscious citizens and change their habits on a daily basis.



## REFERENCE

**Mr. Ganesh Shetty, President of PRAHA.**



## UREX ENTERPRISES

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** Information not provided by the enterprise at the time of documentation.

**Contact person & details:** Mr. Deepak Bijaya Padhi, Manager

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### PROBLEM

Affordable and safe drinking water for under-served communities.

fitted to individual taps at a monthly cost of INR 10 per household. The filter is recycled and powered with solar energy to heat the water and take it through a 5 step filtration process to keep away harmful residues.



### PROPOSED SOLUTION

Provides hot and filtered drinking water to people. This water is treated with the help of solar powered water filters that can be



### BUSINESS MODEL

Model charges users a monthly membership fee of INR 10 per tap. No costs to ULB.



## WATERWALA LABS

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation

**Annual Turnover** 100,00,000 (2017)

**Contact person & details:** Manas Ranjan Hota, CEO

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### PROBLEM

Availability and accessibility of safe drinking water is a challenge across the nation. Approximately 50% of the population in urban India have to rely on impurified water and inadequate purification technologies for drinking. Additionally, maintenance of water purifiers is expensive and difficult.



### PROPOSED SOLUTION

Drink Prime Smart Water Purifier network for Communities solve the problem of unsafe drinking water using their product technology and app based service network.



### KEY BENEFITS

- Monitoring of quality and quantity of water purified using the smart water purifier app
- Proper timely maintenance of purifiers

- Installation and maintenance on a micro community level (up to 5 households) can reduce the cost burden by sharing among users.



### BUSINESS MODEL

They propose to set up a network of IoT connected water purifiers for community and household level. These water purifiers would be remotely monitored for quality and be maintained by their certified technicians. Customers access pure water by Using the App Based verification system preventing misuse. Target customers are the civic authorities, and users are the residents who don't have access to safe drinking water. They would need funding support and infrastructural support from the respective city Governments.



### KEY SUCCESS FACTORS

- Access to debt capital for funding the devices.
- A critical network of service

technicians in the particular area where the purifiers are installed.

- Develop local team of service technicians to deploy and maintain the purifiers.



## DALIT WELFARE

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** 4,15,670 (2017)

**Contact person & details:** Mr. J.P.Nagabhusanam, President

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### PROBLEM

Affordable and safe drinking water for underserved communities.



### PROPOSED SOLUTION

The trust will closely work with local water authorities to purify, arrange and supply safe drinking water daily to target areas.





# SANITATION

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Innovations  
selected by  
**IH UWASH**  
project cities

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## GENROBOTIC INNOVATIONS PRIVATE LIMITED

**Government Schemes / Incubation Support** Information provided by the enterprise

**Annual Turnover** ₹ 30,00,000 (2017)

**Contact person & details:** Mr. Rashid K, Director

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### PROBLEM

Manholes in cities periodically need people to manually excavate accumulated sludge, because current tools cannot effectively do this. However, manual scavenging is illegal by law. In addition, there are a number of reported deaths every year due to manual scavenging. According to National Commission for Safai Karamacharis (NCSK) there is on average at least one manual scavenging related death every 5 days since 2017<sup>4</sup>.



### PROPOSED SOLUTION

Genrobotics' man-operated robots eliminate the need for manual scavenging. Their robots (Bandicoot) are designed to remove accumulated sludge and plastic waste that clogs manholes in a way that other existing tools are unable to achieve.



### BUSINESS MODEL

ULBs buy water testing kits from FFEM to test various water quality parameters.

Cost Items	Amount (₹)	Notes (Optional)
Sale of Bandicoot V 1.5	22,00,000*	Earlier robot deployed in ULBs
Sale of Bandicoot V 2.0	30,00,000*	Latest more advanced features
Shipping and Taxes	as applicable	Depending on entity & location
Training & Scavenger Rehabilitation	00.00	Free to the ULB
Recurring Cost (OpEx)	Amount (₹)	Notes (Optional)
Annual Maintenance & Support	2,49,996*	Cost inclusive of any part replacement and maintenance of the robot

\*Values are subject to change, please contact the company for latest prices.



## KEY BENEFITS

- Effectively cleans and takes out accumulated solid waste from manholes. It also achieves faster and more reliable cleaning of manholes across the city.
- Eliminates the need for humans to go down the manholes and submerge themselves in sewage.
- Compliance with Indian law to eliminate all forms of manual scavenging involved in manhole cleaning.
- Upskill the scavengers by teaching them to become robot operators' as a part of



rehabilitation from manual scavenger to robotic operator program. Hence, eliminating manhole related deaths.

- Innovative outer body coat prevents corrosion and sewage related damages for a longer life.

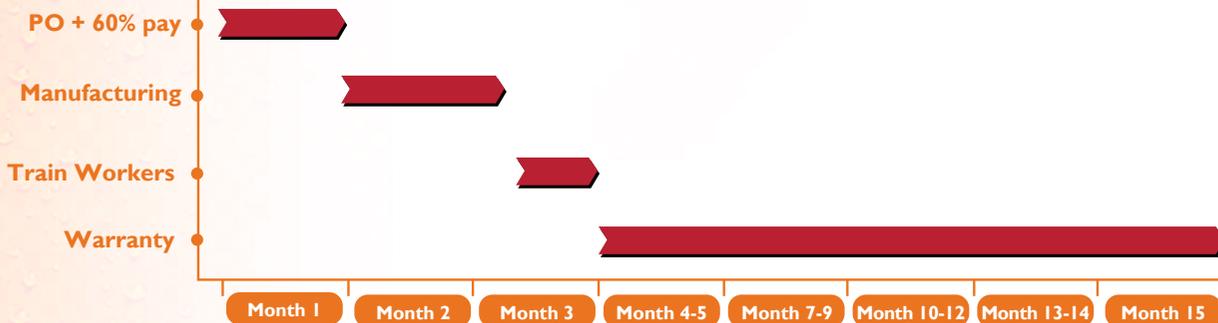


Bandicoot Robot VI.2 Tamil Nadu implementation (left top), close up of the robot (bottom).  
Image Source: Genrobotic Innovations Private Limited.



## IMPLEMENTATION

### Key Features



## INNOVATION CASE STUDY

**Support Organisation:** Municipal Corporation of Tadipatri, Ananthpur, Andhra Pradesh and Municipal Corporation of Gurugram (MCG), Gurugram, Delhi NCR

Background: The Genrobotics underground manhole scavenger robot – Bandicoot was launched on 6th August 2018 at Tadipatri Municipality, Ananthpuramu District by Honorable Collector, Shri. G. Veerapandian, I.A.S.

The Municipal Commissioner of Tadipatri, Mr. S. S. R. Krishna has issued a signed performance letter dated on 29/12/2018; stating that the

<sup>4</sup><https://www.theguardian.com/world/2018/sep/19/death-toll-of-indian-sewer-cleaners-revealed-for-first-time>

robot has been operational since its launch and is performing well till date. He also stated that the Bandicoot robot is redefining scavenging activities in Tadipatri through efficient and innovative technology. This performance letter can be made available on request.

Since the late April 2019, MCG has started using the robots of GenRobotics for cleaning sewers<sup>5</sup>. MCG procured the Bandicoot 2.0 robot, and using it across wards 5, 13, 18 and 19. The corporation aims to procure additional robots to use across the city.



## REFERENCE

**Mr. S. S. R. Krishna, Municipal Commissioner, Tadipatri, Ananthpuramu District**



## ADDITIONAL NOTES

- The product is already successfully implemented in Kerala, Tamil Nadu and Andhra Pradesh.
- The Bandicoot V 2 is more advanced from the Bandicoot V 1.5 in the following ways:
- The spider unit has been manufactured using carbon fiber reinforced polymer (CFRP), thus weighs lesser.
- Sensor based poisonous gas detection with concentration range indicator.
- Diameter reduced to 450 mm.
- The bucket capacity of the robot increased to 18 L.
- The body is powder coated and Nano coated.
- Total 5 cameras instead of 1 camera from the previous version.
- IP 68 waterproofing.
- Some Video links to implemented robots:
- Bandicoot Concept - <https://youtu.be/gXriMjojZDg>
- In Kerala - <https://youtu.be/SSst7EKoy-XE>
- In Tamil Nadu - <https://youtu.be/zMYuDFGwx4E>
- In Andhra Pradesh - [https://youtu.be/kiB\\_ruoKpIc](https://youtu.be/kiB_ruoKpIc)
- In Gurugram - <https://youtu.be/HGZajIBFaAQ>



<sup>5</sup><https://www.hindustantimes.com/gurugram/municipal-corporation-of-gurugram-starts-using-robot-to-clean-gurugram-s-manholes/story-hBIVQukuAfwCUgkK2q7TGM.html>



## (SQUATEASE) SANOTION PRIVATE LIMITED

**Government Schemes / Incubation Support** NIDHI PRAYAS INNOVATION GRANT by NIDHI Prayas Centre, Science and Technology Park, promoted by Department of Science and Technology, Government of India

**Annual Turnover** ₹ 10,00,000 approximately (FY 17-18)

**Contact person & details:** Mr. Satyajit Mittal, Founder and Director

✉ [satyajit@squatease.com](mailto:satyajit@squatease.com) ☎ +91 99229 22664 🌐 <http://squatease.com>



### PROBLEM

Conventional community/ public/ household Indian squat toilet pans approximately 250 million across the country.

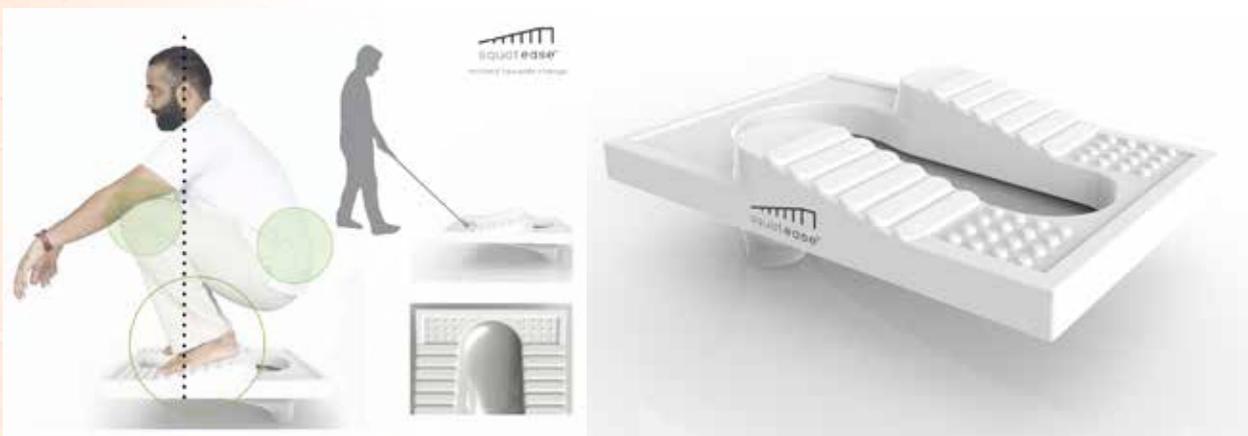
SquatEase is designed to prevent improper (opposite direction) usage and maintains better sanitation and hygiene. It also helps people with knee problems, and those overweight for comfortable use.



### PROPOSED SOLUTION

To replace conventional Indian toilet pans with SquatEase, an award winning innovative toilet pan that:

- Eliminates improper usage, using lesser water for better cleaning and pour flush.
- User friendly and helps people squat without pressure on knees, hips and back.
- Makes it more accessible with marking of direction change for the visually impaired.



The SquatEase pan (left) and how it improves balance for users (right).  
Image Source: SquatEase Private Limited



## BUSINESS MODEL

ULB's buy Squat Ease pans as per requirement for upgrade as well as new toilet installations.

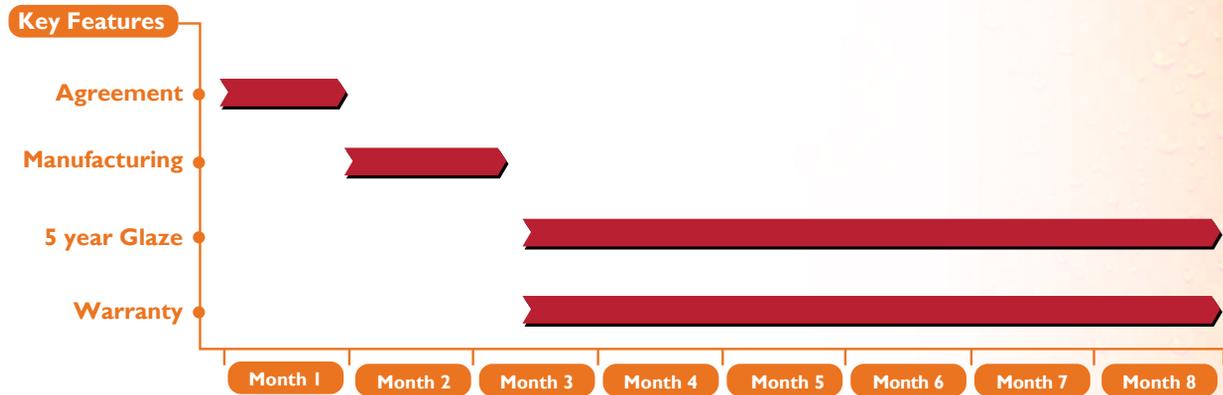
Cost : INR 650/- per unit

GST & shipping extra at actuals

Further bulk discounts up to 30% applicable on orders of 1,000+ units.



## IMPLEMENTATION



## RISKS & MITIGATION

Risks:

- Behavioural/Habitual Change - Discussing usage of toilet still a taboo
- Implementation time across geographies may result in copying/ fake.
- Specification of Toilet Pan design in technical / Technology to be defined in tenders

Mitigation:

- Pilots in School / Public & Community toilets with feedback mechanism and communicate among school children and among community users.
- Create a robust distribution and logistics channel through a third party and sell on GEMS.

- Impress upon local bodies to undertake pilot and then mass implementation.
- Also involve through CSR of PSU's and large private sector companies.



## ORGANIZATIONAL CHALLENGES/ NEEDS

- Funding for Inventory and reach out to market across geographies.
- Innovation awareness
- Putting up a sales and distribution set-up across the country.



## INNOVATION CASE STUDY

**Support Organisation:** Ministry of Housing and Urban Affairs, Maharashtra,

and Talegaon-Dabhade Nagar Palika,  
Pune and Kumbh Mela 2019

**Background:** Pilot with MoHUA in  
Maharashtra - 30 SquatEase units installed in  
Talegaon-Dabhade, Shirur and Alandi Nagar  
Palikas installed in Community/ Public Toilets.

10 units deployed in Community toilets  
in Talegaon-Dabhade, Pune Dist. by  
Nagar Palika in Slums for Evaluation and  
Feedback. The installation is complete  
and toilets are currently in use.

5000 units were installed as Public toilets  
at the Kumbh Mela 2019 in Prayagraj. Total  
No. of Uses at Kumbh with 5000 toilets with  
SquatEase Pan - 10,00,000 uses approx. over  
a period of 25 Days (approximate calculating  
about 10 users per toilet per day on the lowest  
side). A team of 3 people from SquatEase  
interacted with users and approx. 500 cleaning  
staff deployed at the Mela for feedback. The  
response has been extremely encouraging.



## REFERENCE

**Mr. Vaibhav Aware, CEO Talegaon – Dabhade District, Pune**

 +919970605028

 abhas@iitk.ac.in



## EKAM ECO SOLUTIONS PRIVATE LIMITED

**Government Schemes / Incubation Support** Information provided by the enterprise

**Annual Turnover** ₹ 1,69,13,087 (2017)

**Contact person & details:** Mr. Uttam Banerjee, CEO

✉ [uttam@ekameco.com](mailto:uttam@ekameco.com) ☎ +91 99998 07207 🌐 [www.ekameco.com](http://www.ekameco.com)



### PROBLEM

Fecal sludge can most effectively and inexpensively be managed at the household or community level by introducing specific bacterial cultures to reduce its quantity and BOD/ COD levels. However, current fecal sludge containment and treatment practices are unscientific and inefficient leading to a large portion being untreated. In addition to the contamination, this also causes water borne diseases.



### PROPOSED SOLUTION

Ekam's fecal sludge treating bacterial cultures can be used in household septic tanks and community-level sewage treatment plants (STPs). This decentralized solution significantly reduces both the a) quantity of accumulated fecal sludge by 50% as well as b) BOD/ COD levels by up to 60%.



### BUSINESS MODEL

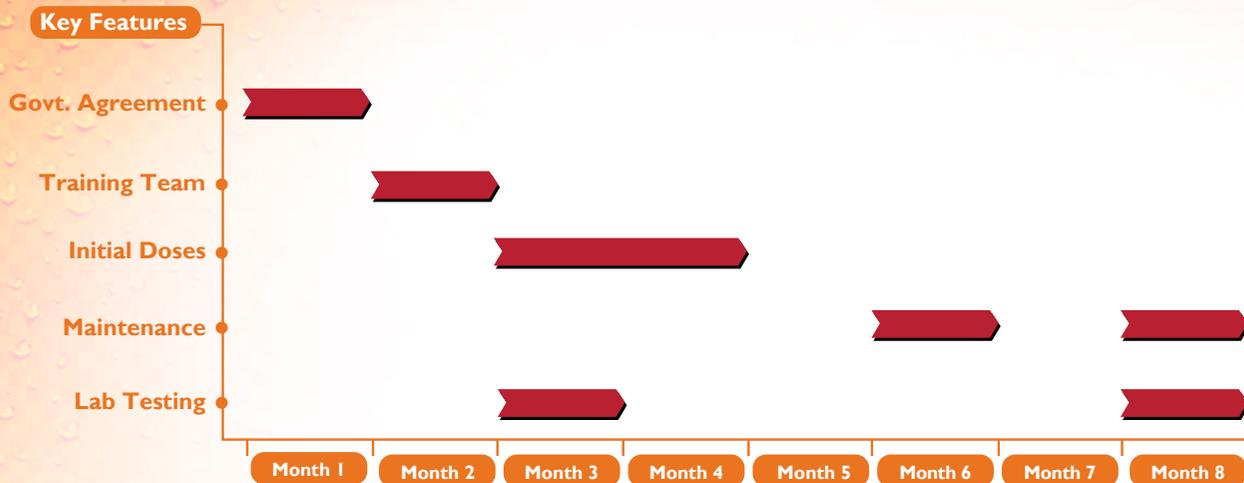
#### Model #1: Household Level Dosing

To dose household septic tanks with (aerobic or anaerobic – depending on septic tank design) bacterial culture to treat fecal sludge effectively and eliminate contamination. This includes:

- Working with the local government authorities to create household level buy-in
- Setting up manpower and operations to effectively dose septic tanks at periodic intervals
- Monitor the progress and outcomes of BOD and COD levels.

#### Key Costs:

- INR 6,000 per year per household for 500+ households – INR 30,00,000 per year
- Training/ hiring local labor – INR 2,50,000 per year
- Periodic testing at local labs (2 times/ year / household) – INR 2,00,000 per year



### Model #2: Work with existing STPs to reduce costs

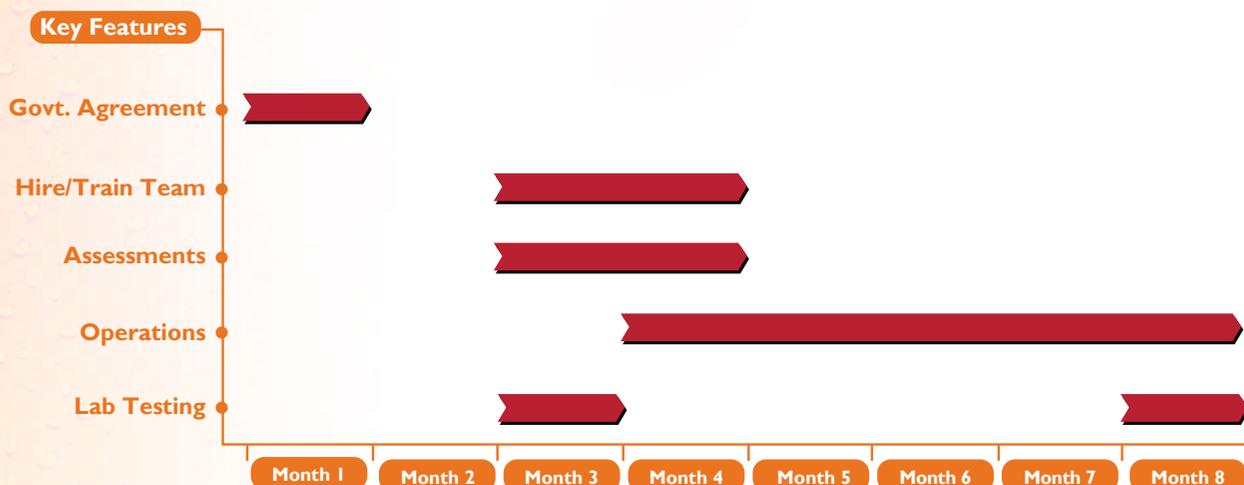
To dose the existing Sewage Treatment Plants with Sewage Care Bacterial Culture to manage the sludge in a better and efficient way. The proposed solution includes:

- Working with the local government authorities to survey and assess the present situation of the existing STPs.
- Setting up manpower and operations to effectively dose STP at periodic intervals

- And monitor the progress and outcomes in terms of BOD and COD levels.

#### Key Costs:

- INR 25 Lakh per MLD per year (Approx.)
- Training/ hiring local labor – INR 2,00,000 / year
- Periodic testing at local labs (once every month) – INR 1,00,000/- per year.



### Model #3: Create and manage community-level 30 KLD STPs

- Creating decentralized treatment setups each serving around 100-200

households and treat the waste at local levels. The proposed solution includes:

- Working with the local government authorities to survey and assess the present situation of the geography.

- Land availability and finalization, construction of treatment facility.
- Setting up the logistic infrastructure to transport the waste from individual households to the treatment facilities.
- Setting up manpower and operations to effectively treat the waste
- And monitor the progress and outcomes in terms of BOD and COD levels.

### Costing (in approximation)

- Space required : 90K square feet (300 ft X 300 ft)
- Capital Cost : INR 15-18 L
- Operation Cost : INR 90,000 per month



### KEY BENEFITS

- The decentralized solution eliminates costly upfront investments for governments
- Effectively treats fecal sludge and eliminates its related water contamination threats
- It also significantly reduces the need for power and labor
- Output water can be re-used by municipality/ farmers for irrigation. Type and level of filtration will depend on the end usage.



Anaerobic (top) and Aerobic (bottom) bacterial culture for household septic tanks and STP by Ekam. Image Source: Ekam Eco Solutions Private Limited

### RISKS & MITIGATION

- For this solution to work effectively; the users (families) must adopt regular dosing of septic tanks, eliminate dumping of inorganic matter (such as sanitary pads and diapers) into the toilets, and refrain from using strong chemicals like acid to clean the toilets. However, these are widely practiced today and need behavioral changes. Ekam will create awareness among its consumers on such topics.
- It takes a long cycle of approvals to get buy-in and work with ULBs. However, without this, mass adoption of this technology becomes unviable. Ekam is exploring various ways to work with ULBs to get around this problem.



### ORGANIZATIONAL CHALLENGES/ NEEDS

- The biggest challenge for a small organization like Ekam is to create awareness among not just the users but all the stakeholders. With the growing population and expansion of cities and urban areas; we need to think beyond centralized treatment facilities, large STPs and underground sewage lines. This may require policy change on water management, water conservation and waste management.
- It becomes all the more challenging to deal with the government for a new comer like Ekam because of the tendering processes and specifications. Even listing their product under the Government e-Market is a challenging task. The purchasing process needs to be more flexible for new innovations.



## INNOVATION CASE STUDY

### Support Organisation: Parassinikadavu Muthappan Temple

Background: The temple complex is situated on the bank of the river, hence has a very high-water table. Conventional Septic tanks were not feasible because of this situation and the place being a remote location is not connected to sewer line.

This site experiences on an average 4000-5000 people every day. It had a septic tank for 2 toilet blocks housing 36 toilets and about 25 urinals. The major problem was that overflow of septic tank was contaminating the river and the ground water.

Treatment of the toilet sludge with Ekam's bacterial culture Sewage Care Anaerobic solved the problem. The bacterial culture treats the waste in 3-4 days and converts it into fertile water clear of pathogen and bacteria. The BOD / COD were reduced to the norms and 90% of the treated water is now utilized for plantation.



## REFERENCE

### Sachin Joshi (Co-Founder, Ekam Eco Solutions)

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sachin@ekameco.com



## ADDITIONAL NOTES

### Accelerated decomposition of organic fecal sludge in septic tanks:

Waste that is not decomposed by the anaerobic digestion eventually has to be removed from the septic tank, or else the septic tank fills up and un decomposed wastewater discharges directly to the drainage field. Not only is this bad for the environment but, if the sludge overflows the septic tank into the leach field; it may clog the leach field piping or decrease the soil porosity itself, requiring expensive repairs.

Sewage Care Anaerobic is a high potency; bacteria-laden, powdered formulation specifically designed for use in anaerobic conditions e.g. septic tanks. It contains a specially isolated blend of microorganisms, micro/macronutrients, and surface tension suppressants/penetrants. Sewage Care Anaerobic contains a unique and proprietary blend of microorganisms that are naturally occurring bacteria and works exceptionally well only in anaerobic conditions.

### ADVANTAGES:

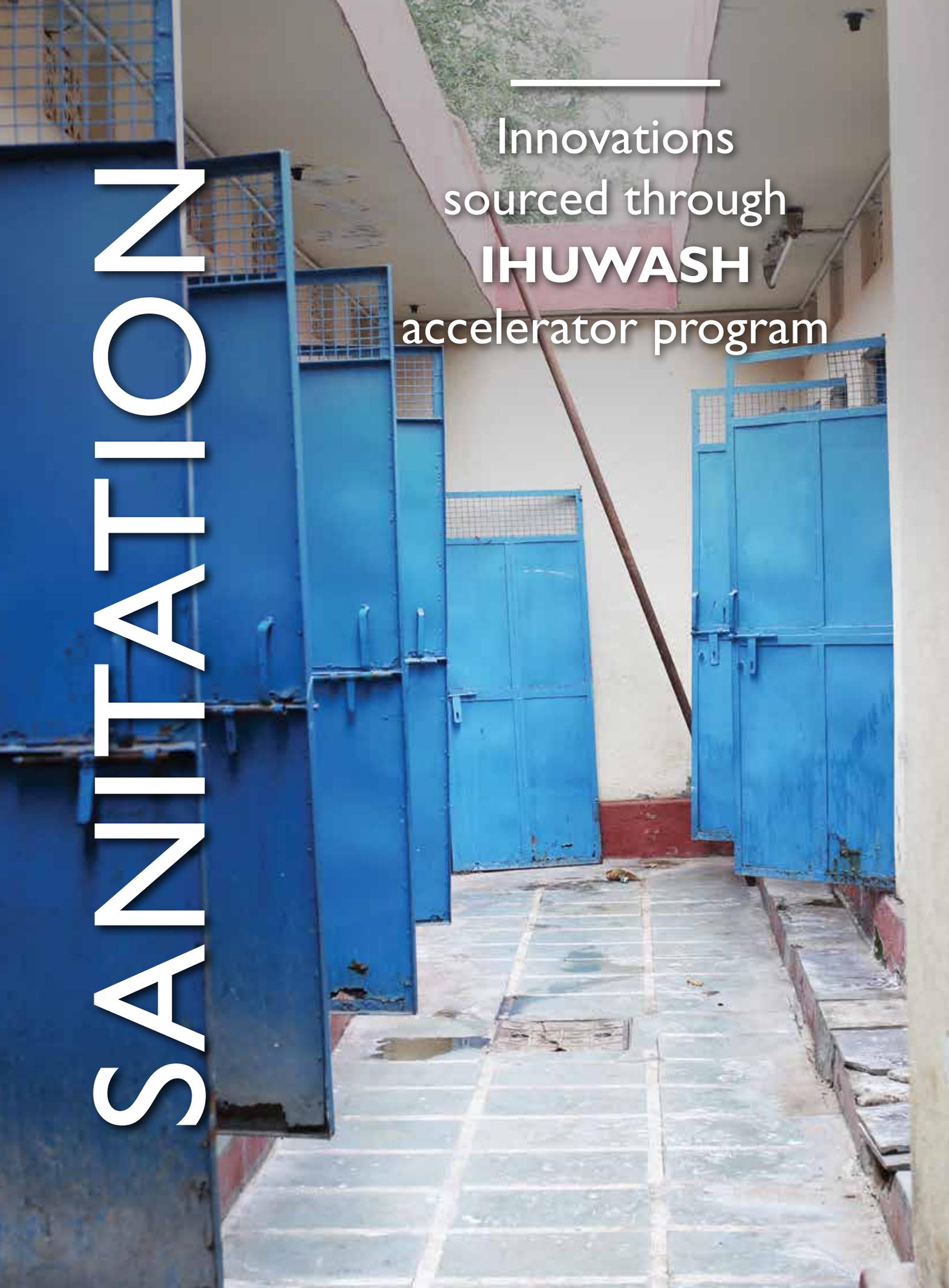
- Helps keep Sump Tanks, Septic Systems and Sewage Pits trouble free.
- Reduces back-ups and pumping.
- Reduces odors 95-99%, surface scum more than 80% and bottom solids by more than 50%.
- Degradation of Fats, Oils, Grease, Starches, Proteins, Animal Fats, Triglycerides, Foaming Surfactants, Soap, Phenols, Sludge & Amines
- Reduction in BOD, COD & TSS



# SANITATION

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Innovations  
sourced through  
**IH UWASH**  
accelerator program





## EERG INDIA PRIVATE LIMITED

**Government Schemes / Incubation Support** Information provided by the enterprise

**Annual Turnover** ₹ 42,00,000 (2017)

**Contact person & details:** Mr. RS Arun Kumar, Director

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### PROBLEM

Not all households in any Indian city can be covered with underground drainage in the immediate future. Often slums and low-income communities don't have this necessary infrastructure in place. This leads to illegal dumping, unscientific disposals and fecal waste entering water bodies.



### PROPOSED SOLUTION

eERG will set up passive, decentralized waste water treatment system for communities that are not connected by underground drainage systems in partnership with ULBs that can:

- Effectively contain and treat waste water with fecal matter (black water) from toilets in a decentralized manner and does not need significant infrastructural investments or land.
- Eliminate fecal waste related contamination by treating the wastewater with appropriate technology and constructed wetland systems.



### BUSINESS MODEL

eERG will take up turnkey project implementations and will supply, install, and operate for a period of 6 months. In addition to this, eERG can also be hired on a long-term service contract basis to ensure the viability and long-term operations of the unit.

Major Costs	Amount (₹)	Notes (Optional)
Treatment plant + wetlands	6,50,000	Serving 20 – 30 HHs
6 Months Operations	Free	First 6 months only
Breakage replacement Warranty	Free	Not applicable on vandalism



### KEY BENEFITS

The Life+ system also eliminates fecal waste related contamination, lowers operating expenses and safely treats black water with

no costly moving parts or aeration operations needed. The treated water will be free from odour and solid particles. The BOD will be less than 30 mg/l and COD will less than 75 mg/l in the final treated water.



## INNOVATION CASE STUDY

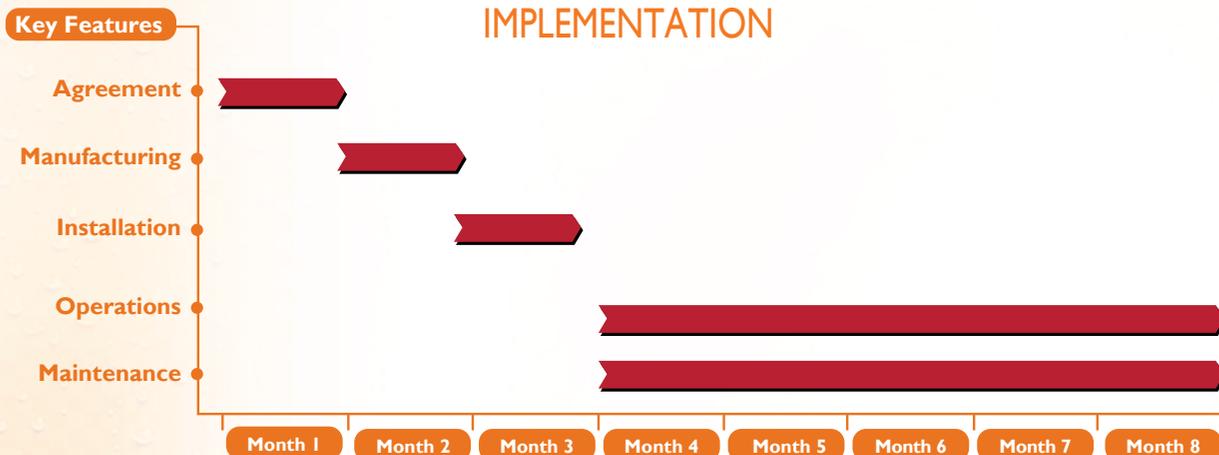
Information not provided by the enterprise at the time of documentation



Life+ systems during installation (left) and after installation (right).  
Image Source: eERG India Private Limited



## IMPLEMENTATION





## (BLUE WATER COMPANY) HOOLOCK TECHNOLOGIES PRIVATE LIMITED

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 90,00,000 in FY'17

**Contact person & details:** Mr. . Snehit Prakash, Project Director

✉ snehitpr@gmail.com



### PROBLEM

According to the 2011 Census; over 47% of urban Indian households depend on onsite facilities for fecal sludge containment and this figure is only increasing. The discharge of untreated fecal sludge from these units into the soil and water bodies has both health and economic implications. Urban Local Bodies lack the resources and the expertise to solve this problem. Lack of proper infrastructure, regulations and treatment systems add to this problem and also perpetuate the human rights issue of manual scavenging.



### PROPOSED SOLUTION

- Hoolock designs, finances, builds and operates low cost and low O&M fecal sludge treatment plants for urban local bodies, i.e. it provides end-to-end fecal sludge management services (from conveyance to treatment to reuse) for towns and cities (under Public-Private Partnership model). Using the self-developed double boosting pumping system, it is

also able to tackle the issues of septic tank accessibility and manual entry.



### KEY BENEFITS

- Very quick to implement: takes less than 2 months to start from the scratch
- Low capital investment: per capita INR 600 and compared to INR 15,000 for sewage treatment plants
- Low resource obligation for ULBs: ULB has to provide no capital and manpower, only monitoring oversight

The Fecal Sludge Treatment Plant in Leh has treated 26,00,000 liters in 15 months of operations. The operations exhibited an operating profit within the first year itself. Hoolock is now setting up similar systems in Odisha and Karnataka.



Picture of Fecal Sludge Treatment Plant at Leh(Left) and Double Boosting Pump used to desludge at distances of greater than 300 feet (Right)



## BUSINESS MODEL

Hoolock receives service fee from the ULB for each desludging conducted. The contract is structured as a pay-for-performance contract. This provides Hoolock to optimize operation costs while maximizing desludging and provides it the space to leverage and to constantly innovate and learn.

On-time Costs (CapEx)	Amount (₹)	Notes (Optional)
CapEx (Construction)	5,00,000*	Includes cost of construction only, not land
Recurring Costs (CapEx)	Amount (₹)	Notes (Optional)
Fecal Sludge Treatment (Per KL)	700*	
Revenues	Amount (₹)	Notes (Optional)
Fecal Sludge Treatment (Per KL)	1,000*	Billed to Urban Local Body which collects money from customers

\* Indicative prices at the time of documentation, please contact enterprise for updated values.

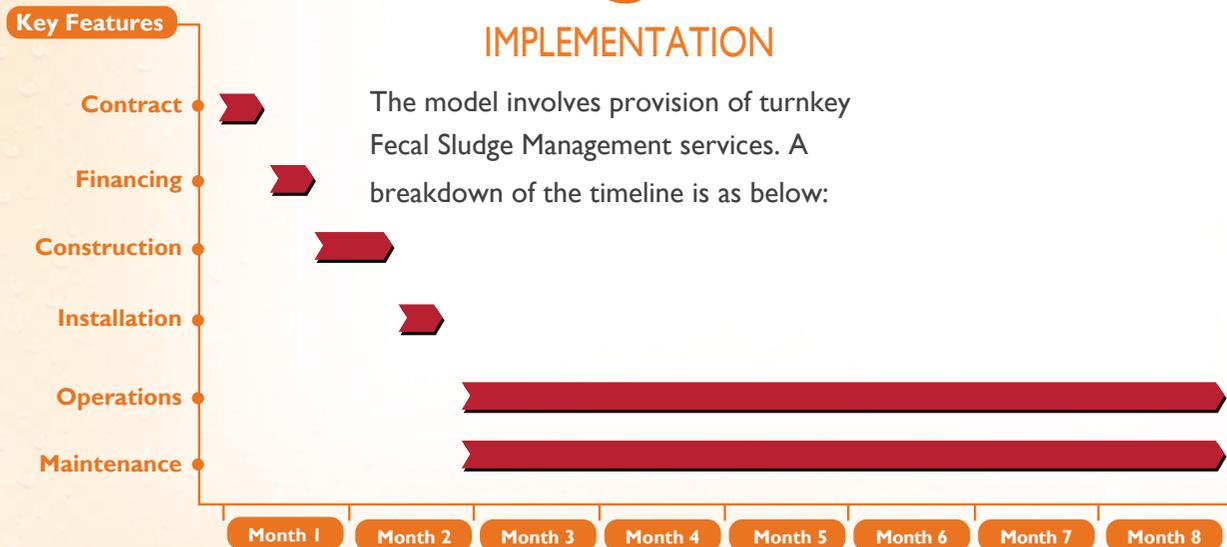


## RISKS & MITIGATION

- There is an absence of institutional and private finance in the sector. The provision of sanitation services is still majorly viewed as a government function and there are also doubts regarding the financial viability of enterprises providing these services and as such finance is systematically absent. To mitigate this, we are developing partnerships with private sector lending institutions to unlock various project financing options.
- The policies and regulations in the field of sanitation are neither well-defined nor enforced. As such, any other private player can provide lower cost services by undercutting quality and safety. We are working with urban local bodies to move towards a standardized and enforceable set of guidelines.
- There is also a lack of trained manpower, both at the operational and managerial levels, in the field of sanitation. Being one



## IMPLEMENTATION



of the first in India in the field of Fecal Sludge Management, we aim to make it an aspirational field of occupation – for operators, engineers and managers.



## ORGANIZATIONAL CHALLENGES/ NEEDS

Financing and policy are the biggest challenges at this moment. We are continuously working with urban local bodies to tackle these issues and develop innovative financing and operational models.



## INNOVATION CASE STUDY

**Support Organisation:** Leh  
Municipal Committee



## REFERENCE

**Mr. Rigzin Spalgon, Administrator, Municipal Committee, Leh**

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rigzinspalgon@gmail.com



Background: Hoolock, in collaboration with Leh Municipal Committee implemented the first Fecal Sludge Management Public-Private Partnership in the country at Leh in August 2017. Till date it has treated more than 26,00,000 liters of fecal sludge.

Hoolock was awarded the first position in Amrut Technology Challenge Category B – preventing manual entry into septic tanks, by the Ministry of Housing and Urban Affairs. The award was for developing the Double Boosting System which can desludge from distance of more than 300 feet, thus preventing manual scavenging and reducing the cost and effort of desludging and at the same time tackling the problem of septic tank accessibility.



dream to deliver

CAYA CONSTRUCTS

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 37,00,00,000 in FY'17-18

**Contact person & details:** Mr. Navneet Garg, Co-founder, CEO

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### PROBLEM

CAYA's complete sanitation solutions address the entire value chain- toilet manufacturing to onsite waste treatment, operations & maintenance to models for sustainability. We are now in the process of establishing scalable-sustainable public toilets.

part of the toilet set-up; capex & regular maintenance can be taken care of. This will reduce the burden on the government and ensure uninterrupted high-quality service.

- Revenue generation can be done through advertising or through other innovative mechanisms like using toilet blocks as e-waste collection center or e-vehicle charging stations etc.
- CAYA's precast monolithic superstructure and onsite sanitation unit make the model easy to scale-up.
- Current pay per use does not ensure regular inflow and users who are not able to pay end up urinating in the open spaces.



### PROPOSED SOLUTION

Hygienic public toilets require continuous finance. By including revenue generation as



Proposed public toilet with advertising options



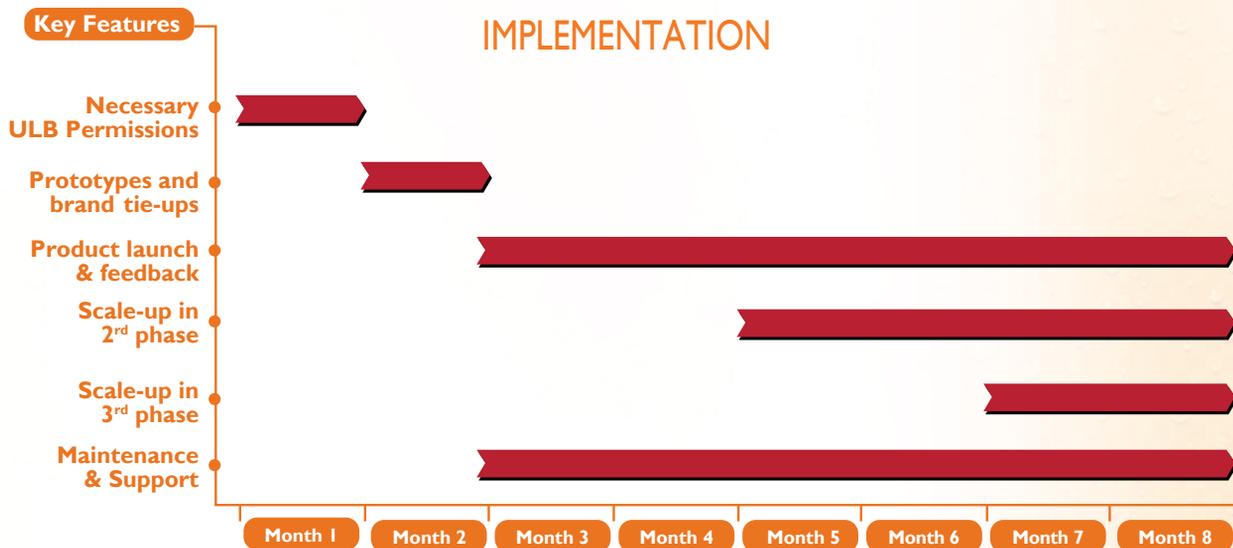
## BUSINESS MODEL

On-time Costs (CapEx)	Amount (₹)	Notes (Optional)
Cost 1	3,00,000	Cost of supply and installation of 1 Cluster = 4 toilet seats
Cost 2	1,00,000	Cost of putting the Advertisement mechanism
Recurring Costs (OpEx)	Amount (₹)	Notes (Optional)
Eg: Staff Costs	15,000	Management staff's salary per month
Eg: Maintenance & Support	48,000	Maintenance cost (per toilet cluster per year)

These costs are based on 500 operational clusters.



## IMPLEMENTATION



## RISKS & MITIGATION

- Funding for the CapEx: This model needs upfront CapEx. CAYA plans to tie-up with corporates for using the outdoor advertisement inventory created from these toilets. This revenue assurance can then be used for generating the CapEx as well as OpEx. Other revenue models would be icing on the cake.
- Getting permissions and rolling out in public places is a challenge. For this we can leverage our relations with over 200 urban local bodies with whom we are working.



## ORGANIZATIONAL CHALLENGES/ NEEDS

- CAYA Constructs is a bootstrapped company that is helping develop solutions and take them to the market. In the last two years, they have worked closely with 200 +cities. CAYA has been involved in largely B2G sales, hence payment becomes due on successful installation.
- This model would need upfront capital to install at least 500 toilet clusters to give the proposition a reasonable scale.
- In addition, CAYA would need expertise to market/access to corporates who would be keen to explore toilets as a branding medium.



## INNOVATION CASE STUDY

80% of CAYA's sanitation products are made in the factory and only 20% work is done onsite. In the last 2 years, this allowed them to

construct hundreds of toilets in a fraction of the time for the urban local bodies and offer users standardized factory quality products.

- For instance, in Jaipur 100 units of CAYA's monolithic superstructures with onsite sanitation units were installed in 2 days as community toilets in the city's largest open defecation site.

CAYA's standardized quality and scalable solution offers a significant advantage to the brands looking for visibility or presence in a cost-effective manner.

- CAYA's sanitation solutions have been installed in over 200 cities. These along with our working relationships with the urban local bodies can be leveraged to offer sustainable public toilets.
- Revenue can be generated via on-toilet advertising or service center or e-waste collection center.
- With an advertisement revenue of around Rs.80/sq. ft at an average, this model is self-sustainable and can fund both CapEx and OpEx for Public Toilets in the country.



## REFERENCE

**Navneet Garg, Co-founder and CEO**

+91 9810048384



## RAVIKAS

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 6,00,000 in FY'18-19

**Contact person & details:** Mr.Ravi Senji P.P, Founderpreneur

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### PROBLEM

- Lack of toilet for women is integrated with menstrual health management.
- All toilets need water to flush, which is a depleting natural resource.
- Sewage and septic waste incur huge capital and recurring operational expenses to process wastes before they are rendered safe.
- A fair degree of maintenance is needed for safe sanitation.



### PROPOSED SOLUTION

The RaVikas toilets are designed to:

- Function with minimal flush, which uses approximately 500 ml of water per user and urinals use approximately 100 ml per user.
- Remains odorless even with heavy traffic.
- Functions with no moving parts and minimal maintenance.

- Integrates napkin digesters, which recycles used napkins for human safe compost.
- Provides huge capital savings on land costs, builds infrastructure towards septic tanks, STP sewer lines and annual saving from maintenance & replacements.
- Return on investments by huge savings on water, electricity, and waste removal with generation of vermicompost.



9-month-old installation at client location ECIL Nalanda Complex Hyderabad (left) and schematic flow diagram (right).  
Source: RaVikas



### BUSINESS MODEL

The business model will be a cash and carry business, with networks of local manufacturers distributors and retailers as in regular sanitation industry. The core model will involve Research, Prototypes, Local Manufacturing, and Marketing & Maintenance.



## RISKS & MITIGATION

- In this model the biggest risk is duplication of the design and process by competitors, which makes raising finances a challenge, once the unit reaches the market. To overcome this, RaVikas is developing franchisee driven local manufacturing marketing and maintenance model where the units will be manufactured at district level, the franchise fee & unit cost being nominal will counteract duplication by providing the unit at extremely competitive prices.
- Another risk would be related to the policy environment. If in the future, the government releases a policy that discourages aerobic digestion units in treating human waste, it will have significant negative impact on RaVikas' business model. RaVikas would need support in making a case for this technology (with evidence and case studies from our clients) to key government officials.



## ORGANIZATIONAL CHALLENGES/ NEEDS

Financing and policy are biggest challenges. The company has been able to install 10 units across India for different types of clients.

Additional support to expand their footprint in other parts of India would provide additional momentum to upscale the plans.



## INNOVATION CASE STUDY

**Support Organisation:** Electronics Corporation of India Ltd. (ECIL), Hyderabad

**Background:** Two units installed at ECIL Hyderabad, where the units' function serving approximately 25 users per day saving approximately 250 liters of water and proving used napkins can be digested within the units.



## REFERENCE

**Prathap Kumar, Senior Technical Officer,  
Engineering services division ECIL Hyderabad.**

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 prathapcivil@ecil.co.in





## GARV TOILETS

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 4,56,00,000 (2017)

**Contact person & details:** Mr. Mayank Midha, Managing Partner

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### PROBLEM

Public toilets in the urban areas face multiple challenges like lack of operational maintenance, proper waste disposal, high cost of operations and maintenance, vandalism etc. This leads to non-usage of these toilets and highlights the need for scalable and replicable solutions in the urban public toilet landscape.



### PROPOSED SOLUTION

'GARV Smart Public Toilet Hubs' made of stainless steel are indestructible. They also use RFID-IoT based self-cleaning technology to address the key problems of vandalism and maintenance in the urban sanitation sector.



### BUSINESS MODEL

GARV enters into 10-year PPP contracts with the Urban Local Bodies. ULBs are responsible for site acquisition, while Garv installs, commissions and maintains the toilets.

Model makes money through advertising and setting up of a community service Sani-kiosk, which delivers multiple products, services along with government schemes to local communities and employ local Base of the Pyramid (BoP) communities. Viability gap funding is sought through a ULB, CSR or a private funding agency.



### KEY BENEFITS

- Quick turnaround time to install new pre-fabricated modular toilets
- On-site waste disposal capability to ensure self-sustainability of the model
- Automated maintenance and vandalism proofing lower operational expenses
- Usage data can be tracked on real time for key data points like number of users, number of hand wash/ flush etc. further helping to design precision-based BCC plans for intervention.



## KEY SUCCESS FACTORS

- Willingness of government bodies to sign the agreement.
- Dispute-free sites for the whole contract period.
- Revenue generation rights from multiple activities through the Sani-kiosk from public toilet site, in order to cross subsidize CAPEX and OPEX for the contract period.
- Working capital arrangement for the orders.



## (NAMMA TOILET) URBANE INDUSTRIES LIMITED

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 14,00,000 (2017)

**Contact person & details:** Mr. R Krishnamohan, Managing Director

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### PROBLEM

There is a lack of sustainable, useable and clean toilet system in urban areas in India. Proper sewage treatment of the toilet waste is also a challenging problem.



### PROPOSED SOLUTION

Namma toilet is a sustainable and clean toilet system for community and public places across urban India.



### BUSINESS MODEL

Namma Toilet can be pilot tested across 5 locations in each of the identified city and studied and replicated all over the city to provide adequate toilets with treatment. The organisation will deploy a team to study/survey the city and its requirements. Based on the study a proper detailed project report

(DPR) will be submitted with details like sites identified, site size, usage pattern, user profile, suitable layout of complex (we have about 70 different layouts to cater to specific needs of the site/users). A detailed cost of project with the implementation pattern will be submitted. On receipt of work order we will implement the project and handover the site to City authorities. Namma Toilet will also send their team to train the representatives identified by authorities for maintenance of the toilets and sewage. The fund requirements will be submitted once the sites are identified and the suitable layout is selected.



### KEY SUCCESS FACTORS

- Land and timely handover of the toilet site encumbrance free to implement the project
- Electricity and Water issues have to be addressed in time
- CAPEX and OPEX for the contract period.
- Working capital arrangement for the orders.



## (PEE BUDDY) FIRST STEP DIGITAL PRIVATE LIMITED

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 10,00,000 (2017)

**Contact person & details:** Mr. R Krishnamohan, Managing Director

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### PROBLEM

Access to clean public toilets is difficult and usage of unclean toilets is a cause of infection for women. There is a need for an innovation to allow women to access clean public toilets.

urinals for women to help save water and help women access public toilets. Distribution of the product at Government hospitals and women with medical condition through angan waadi / ASHA workers can prevent infections due to the use of unclean toilets.



### KEY BENEFITS

- Allows women to use public urinals without being exposed to infections from using unclean public washrooms.
- If implemented with public urinals, the solution saves water.



### PROPOSED SOLUTION

'PeeBuddy' is a female urination device which allows women to stand and pee.



### BUSINESS MODEL

With the support from the Government; we can create integrated toilets and standing



### KEY SUCCESS FACTORS

- Awareness among stakeholders about the solution.



## CURE – DECENTRALIZED SAFE SEWAGE DISPOSAL MODEL

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 3,80,00,000 (2017)

**Contact person & details:** Dr. Renu Khosla, Director

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### PROBLEM

88% of resettled households in Savda resettlement site defecated in the open, due to lack of available sanitation solutions. This had resulted in the need for a safe collection, conveyance and treatment system outside the house, to enable households to build individual toilets.



### PROPOSED SOLUTION

The solution provides an affordable option for safe disposal and treatment of fecal matter. Innovation has enabled 322 households to have access to simplified sewers linked to a cluster septic tank (CST). Households have built toilets at home, connecting with this safe sewage disposal mechanism. The CST treats the effluent to desirable discharge limits, before discharging into drain.



### BUSINESS MODEL

This Project has 6 main components:

- Design and construction of in-house toilets with access to micro finance and technical support.
- Design, planning and implementation of simplified sewers and a decentralized septic tank to treat effluent.
- Design and planning of an on-site treatment system - a micro-DEWATS.
- House upgrades to accommodate the new toilet and connection to sewer system in semi-pucca houses.
- Community mobilization to ensure the viability, replicability and sustainability of the project.
- 6. Access to finances to facilitate home toilet investments.
- The main customers for this replicable project are government departments like

Public Health Engineering Department (PHED), Delhi Jal Board (DJB) etc.

In partnership with the government and local community, decentralized systems can be implemented for 500 families at a cost of INR 50-70 lakh.



### KEY BENEFITS

- Access to clean toilets at home
- Enhanced productivity, as families saved waiting time at community/ public toilets or open defecation

- Increased household saving and asset ownership from better health and improved productivity



### KEY SUCCESS FACTORS

- Community mobilization and involvement in planning, implementation, and O&M.
- Support of the State Government in approving construction on government lands and rebuilding roads.
- Availability of land for constructing the cluster septic tank.



## VIVIR CONSULTANCY

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** Information not provided by the enterprise at the time of documentation

**Contact person & details:** Ms. Sreevidya Satish, CEO

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### PROBLEM

Fecal sludge management (FSM) is largely done by several unorganized operators along the sanitation value chain. This leads to the irregular or inconsistent:

- Quality of services
- Unregulated pricing
- Livelihood option and recognition for the incumbent operators
- Appropriate collection, transport and treatment of fecal sludge
- Health safety standards being followed
- Disposal at unregulated places
- Monitoring issues leading to financial irregularities



### PROPOSED SOLUTION

To create a self-regulatory ICT integrated platform that ensures fair prices and timely collection, disposal with continuous monitoring mechanism operations of human excreta. The proposed platform will target 3 stakeholders

in an effective manner as in the Operator, the customer and the Urban Local Body. The concept is to create an independent corpus body with only mandate to implement the ICT integrated platform and coordinating the respective stakeholders effectively.

The corpus body has the following objectives:

- On-board stakeholders and partners. Identify vendors
- Source funds/funding partners
- Operations management & Capacity building
- Identify and on-board prospective operators
- Design and implement apt B-plan



### BUSINESS MODEL

Vivir will charge ULBs a consultancy fee to implement this project. There are 3 possible models in terms of funding option and revenue generation possibilities as in:

- Design and construction of in-house toilets with access to micro finance and technical support.
- Design, planning and implementation of simplified sewers and a decentralized septic tank to treat effluent.
- Design and planning of an on-site treatment system - a micro-DEWATS.
- House upgrades to accommodate the new toilet and connection to sewer system in semi-pucca houses.
- Community mobilization to ensure the viability, replicability and sustainability of the project.
- 6. Access to finances to facilitate home toilet investments.
- The main customers for this replicable project are government departments like

#### Model 1

- Truck funded and purchased by Government through aid (or) CSR partners or subsidies.
- Government pays a fixed fee to operator, covering all costs of operator for 3 years
- All revenues are collected by the corpus agency.
- After 3 years the truck is handed over back to operator.

- Fees collected from HH as tax/ trip-based fee.

#### Model 2

- Truck funded by banks, purchased in the name of corpus agency.
- Repayment of loans done by corpus.
- Operator paid fixed fee until loan repaid
- Revenue collected by corpus agency until loan is paid off.
- Revenue in the form of tax from HH.
- Once loan is repaid; truck is handed over back to the operator.
- Operator is paid on KM basis.

#### Model 3

- Truck funded by Banks, in the name of operator
- Revenue collected by Corpus,
- Corpus repays the loan.
- Part of income shared with corpus towards its capacity building and consulting services for
- Govt. makes payments to Operator /Km basis.
- Gov. collects tax from HH or a fixed service fee



## BIOMASS CONTROLS

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 3,20,00,000 (2017)

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### PROBLEM

Lack of safe, clean sanitation is a significant problem in emerging economies. Treatment of solid and liquid waste at affordable rates with little or no access to resources like water and electricity is a challenge.



### PROPOSED SOLUTION

'A better toilet' serves urban communities by providing a safe and sustainable decentralized sanitation solution, which can be scaled to meet the community's needs. The toilet is designed to be self-cleaning, is low maintenance and low cost.

The solution accomplishes three primary functions:

- Disinfects liquid waste,
- Dries and burns solid waste, and
- Converts the resulting thermal

energy into stored electricity.

The solid waste processing uses a combination of mechanical and thermal processes. A mechanical conveyor belt separates and diverts liquid waste while transporting solid waste to a series of components that thermally treats the solid making it pathogen free. Liquid waste is disinfected through electrochemical processes using mixed metal oxide (MMO) electrodes. The disinfected water is suitable for use as rinse water for the toilet or as a fertilizer supplement. The system also improves operational utility, energy efficiency, and cost.



### BUSINESS MODEL

The organization propose to deliver a viable, safe, sustainable and energy-efficient on-site sanitation system along with local partners. They partner for system delivery and provide support to facilitate partnerships, community engagement and acceptance, and O&M. Their partnerships include Tide Technocrats (Bengaluru) and Duke University WaSH-AID. This model can be

scaled-up to serve the communities. The software and mobile monitoring capabilities will simplify operation and maintenance of the system. Estimated project budget is approximately INR 3.49 Cr to INR 10.4 Cr.



## KEY SUCCESS FACTORS

- Clear understanding of the number of end-users, cultural hygiene practices, and local opportunities for water reuse.
- Relationship building with local partners for system support.



## WELDYNAMICS

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** Undisclosed

**Contact person & details:** Vikas Rami, Managing Partner

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### PROBLEM

Treatment of fecal matter at source and reuse of treated water to recharge ground water is and irrigation or cleaning of roads will be addressed through this solution.



### PROPOSED SOLUTION

Distributed Biological Waste Water Management System conducts in situ treatment of fecal matter through distributed system.



### BUSINESS MODEL

Bio Digester with Reed Bed and Grease trap will treat wastewater locally. Treated water will be used in water recharging system. Fecal matter from toilet will get treated in bio digester tank, where all sludge will be digested and pathogens will be destroyed. Final output BOD(70-150mg/L) and COD (250-300 mg/L) and TSS (90-120 mg/L) Coliform (300-350mpn/ml). Kitchen water will primarily treat in Grease trap to remove extra grease

from water. Output of bio digester and reed bed system will feed in to reed bed system which will further improve water quality. Final Water Quality BOD (50-80mg/L) and COD (15-25 mg/L) and TSS (50-80 mg/L) Coliform (0-12mpn/ml). Funds and working model will depend on size of the project. Project up to INR 20lacs will be executed by Weldynamics with funding requirement for larger funds.



### KEY BENEFITS

- Low cost Biological in-situ distributed waste water treatment systems
- Zero Carbon Foot Print
- Treat water locally without use of any mechanical\electrical devices
- Easy to maintain with minimum maintenance cost.
- Locally treated water feed in to water recharging system, improve ground water level
- Fecal sludge is decomposed up to 95% using specially mutated Anaerobic bacteria with virtually no sludge generation.

- Save cost of expensive sewage water network by treating waste water locally.
- Scalable from single household to municipal ward



## KEY SUCCESS FACTORS

- Biological systems have limitations against used acidic material
- Behavioural changes are required to communicate to users.





## FLYCATCHER TECHNOLOGIES LLP

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 25,00,000 (2017)

**Contact person & details:** Mr. Kabir Udeshi, CTO

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### PROBLEM

Lack of proper treatment of sewage and solid waste in urban areas.



### PROPOSED SOLUTION

In-situ processing of sewage and wet solid waste into bio-gas and organic fertilizer.

Both sewage and solid waste can be processed at source in a single system.

Sewage flows into a clarifier. The sludge is collected along with crushed solid waste are

fed into an anaerobic digester to be processed into biogas and organic fertilizer. The liquid from the clarifier along with the organic fertilizer are passed through a trickling filter to produce water for recirculation and for plants. The fertilizer from the trickling filter can then be regularly collected and used in plants.



### BUSINESS MODEL

- Service fee to a paying organization.
- Project is estimated to cost between INR 4 - 20 lakhs depending on the scale and complexity of the problem.



## SANITATION IMPACT SOLUTIONS

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 16,52,000 (2017)

**Contact person & details:** Ms. Ishita Chattopadhyay, CEO

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### PROBLEM

Public and community toilets need regular operations and maintenance (O&M) activities. Some of the key O&M areas for toilets are Water, Electricity, Cleaning/ Housekeeping, FSM, solid waste management and repairs. However, this mostly happens today in a non-consolidated way without the evidence or proof from data. This leads to possibilities of costly mistakes, negligence or even misuse of resources.



### PROPOSED SOLUTION

mSanitation solves the issue of accountable service delivery and ensures data driven supply chain management of sanitation services and supplies in a city. The system ensures regular maintenance of government (as well as privately) owned public, community, school and institutional toilets. The system:

- Creates a standardized protocol for maintaining toilets
- Utilizes data for better planning of sanitation facilities

- Provides sanitation services based on local needs
- Increases access and quality of toilets
- Organizes and streamlines network of service providers
- Increases business opportunities among sanitation service providers

mSanitation is specially designed for government bodies to map, organize, monitor and manage a large number of service providers and managers. Government officials can log into their dashboard and generate monthly statistic reports based on issue type, location, manager or provider to monitor overall progress.



### BUSINESS MODEL

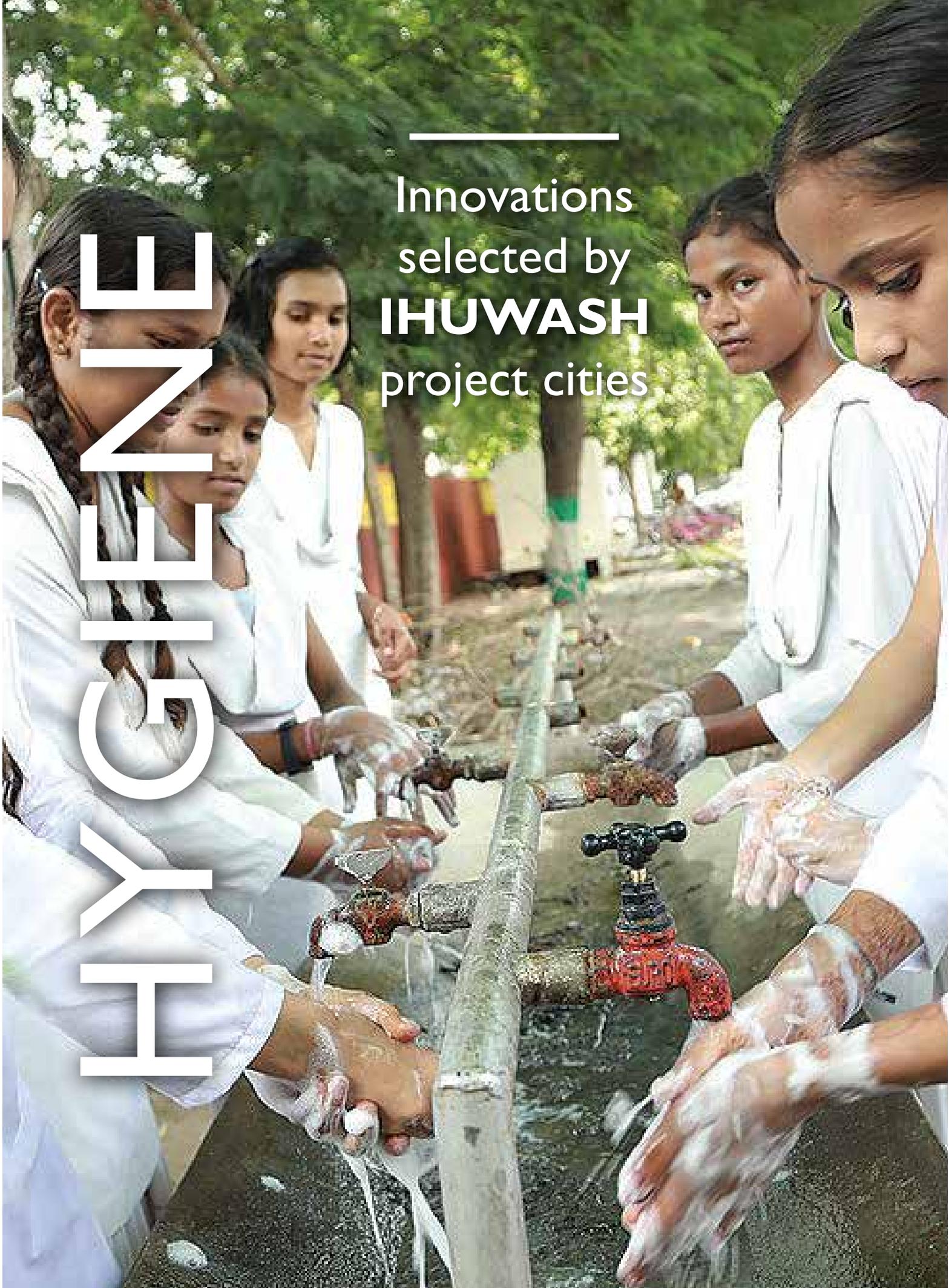
mSanitation on average costs INR 650 per toilet complex per month. In addition to this monthly management fee, there will also be one-time training and setup fee expenses. For efficient operations, a minimum of 100 toilet complexes are needed in a cluster. The model primarily depends on funds from the ULB, in addition to this CSR funds to subsidize costs can also be explored.



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Innovations  
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# BOONDH

## (BOONDH) MENSTRUOID INNOVATIONS PRIVATE LIMITED

**Government Schemes / Incubation Support** Information provided by the enterprise

**Annual Turnover** ₹ 9,00,000 (FY' 17)

**Contact person & details:** Ms. Bharti Kannan, Founder

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### PROBLEM

Most girls and women in low-income communities do not have access to affordable menstrual hygiene related products, services or information. As a result, menstruation is still surrounded by superstitions and stigmas with 80% of mothers' believing menstruation is a disease; according to a Dasra Report. Further, there is a lack of waste management solutions within all communities for menstrual waste.



### PROPOSED SOLUTION

Boondh makes menstrual hygiene related products, services and information more relevant, affordable and accessible to girls and women in low-income communities, with impetus on sustainable ways of menstrual management, including a local supply chain of reusable, economic and environmentally friendly products.



### BUSINESS MODEL

ULBs to engage Boondh as their menstrual health service provider/partner covering their costs. Boondh will also monitor the program and impact throughout the entire project period. Boondh will also build a local revenue model around sales of the reusable products based on potential manufacturer of reusable cloth pads within the community, thus also improving local livelihoods.

Major Costs	Amount (₹)	Notes (Optional)
Train, hire and retain local team	5,00,000	Per year
IEC sessions V 2.0	2,000	Per session (total of 450)



### KEY BENEFITS

Boondh hosts a series of menstrual hygiene management (MHM) programs and interventions through schools, colleges and low-income communities that:

- Effectively engages and empowers girls and women to take control of their menstrual health.

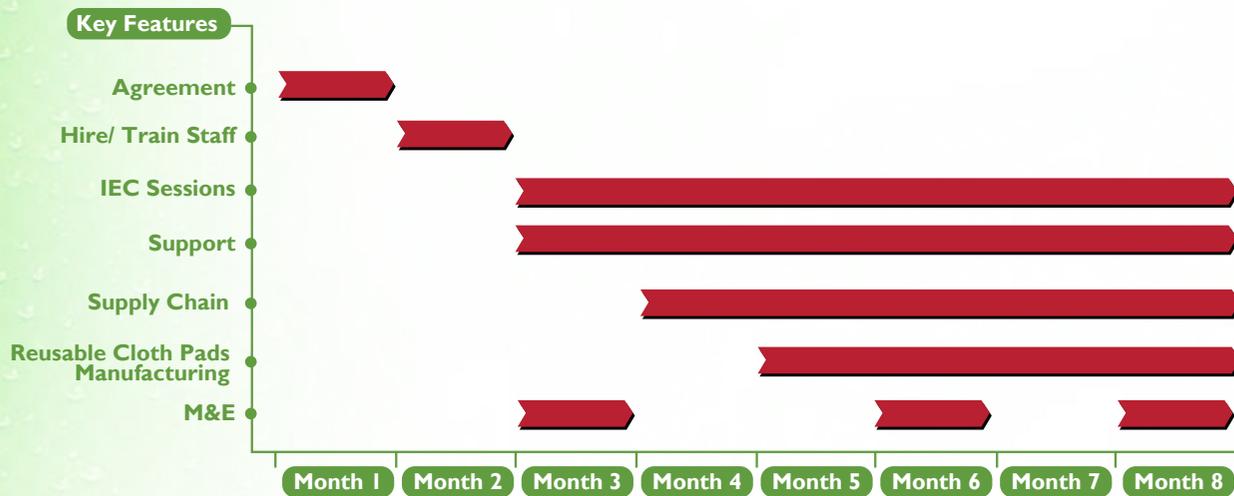
- Its sustainable menstrual health products and information are affordable and accessible
- Boondh also provides support to use them.
- Team of local staff, micro-entrepreneurs or women SHGs are involved in the activity



Boondh menstrual cups (left), women and girls interacting in a Boondh IEC session (middle & right)



## IMPLEMENTATION



## RISKS & MITIGATION

- Funding is required to set up community operations with rigorous trainings, development of peer/community leaders and supply chain. Boondh is addressing this by raising social investments and tie-ups with local CSR bodies.
- Collaboration with government machinery including the local public health delivery system, education system, and waste management system is the need of the hour. Boondh is now working with urban local bodies (ULBs) to achieve this.





## LUMINOCITI NETWORKS PRIVATE LIMITED

**Government Schemes / Incubation Support** Information provided by the enterprise  
**Annual Turnover ₹** Information not provided by the enterprise at the time of documentation.

**Contact person & details:** Mr. Shishir Miglani, Founder

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### PROBLEM

There is a systematic disconnect between the medium's administration is engaging citizens and way they are consuming information in modern day. There has hardly been any innovation beyond social media in this segment. Such engagements are much required in order for systems to work, funds to be collected (bills repayments), tax compliances and informing citizens on the welfare schemes. There is a huge cost outflow by Governments in this segment, which is hardly utilized to the level of 24%, thus a whopping 76% of funds used for the purpose does not deliver accumulated return on investment (ROI).

**A broken Citizen Engagement** is the problem that we are trying to resolve by connecting administration with citizen in real time and saving huge cost of awareness creation in the process.



### PROPOSED SOLUTION

The solution is an app and platform focused on solving some of the deep-rooted, yet most critical challenges of day-to-day administration, which impact the lives of millions around. Some of these challenges are:

- Engagement with the citizens
- Too many communications channels & Legacy IT Infra
- The desire to be heard and seen (via print, TVCs, Social Media etc.)
- Information overloaded citizens
- Failure to monetize idle city assets
- Compliance reminder and subsequent slower revenue collections
- Inability to reach out to grassroots for city promoted schemes
- Pro-active traffic updates within city and crime prediction



## BUSINESS MODEL

ULBs to engage Boondh as their menstrual health service provider/partner covering their costs. Boondh will also monitor the program and impact throughout the entire project period. Boondh will also build a local revenue model around sales of the reusable products based on potential manufacturer of reusable cloth pads within the community, thus also improving local livelihoods.

On-time Costs (CapEx)	Amount (₹)	Notes (Optional)
Cost 1	3,00,000	Cost of sensors (250-400 nos.)
Cost 2	10,00,000	Command Center infrastructure.
Recurring Costs (OpEx)	Amount (₹)	Notes (Optional)
Eg: Staff Costs	1,00,000	3-member team to handle a small city is required at command center
Eg: Maintenance	25,000 per month for less than 50L population 50,000 per month for population 50L-1.4Cr	Our solution is cloud-based platform available on SaaS model. No development, infrastructure and maintenance cost for administration



## KEY BENEFITS

Using Luminocity's platform; City administration gain following advantages:

- Connected people - One Nation, One App

- Highly personalized unified messaging system and IoT based context driven delivery
- Increases citizen engagement by as high as 3 times
- Helps in making revenue collection more predictable with timely alerts, reminders via notifications to users
- Saves citizen awareness cost by 30%
- Helps to reach out to the ground level
- Creates systematic and intelligent work flow system
- Helps in Monetization of idle assets
- Helps to gauge Citizen Sentiment via various tools
- Provides machine learning feedback to validate the real civic situations in city
- Provides actionable insights to take corrective actions pro-actively
- Real time feedback on team and sentiments in city to administration

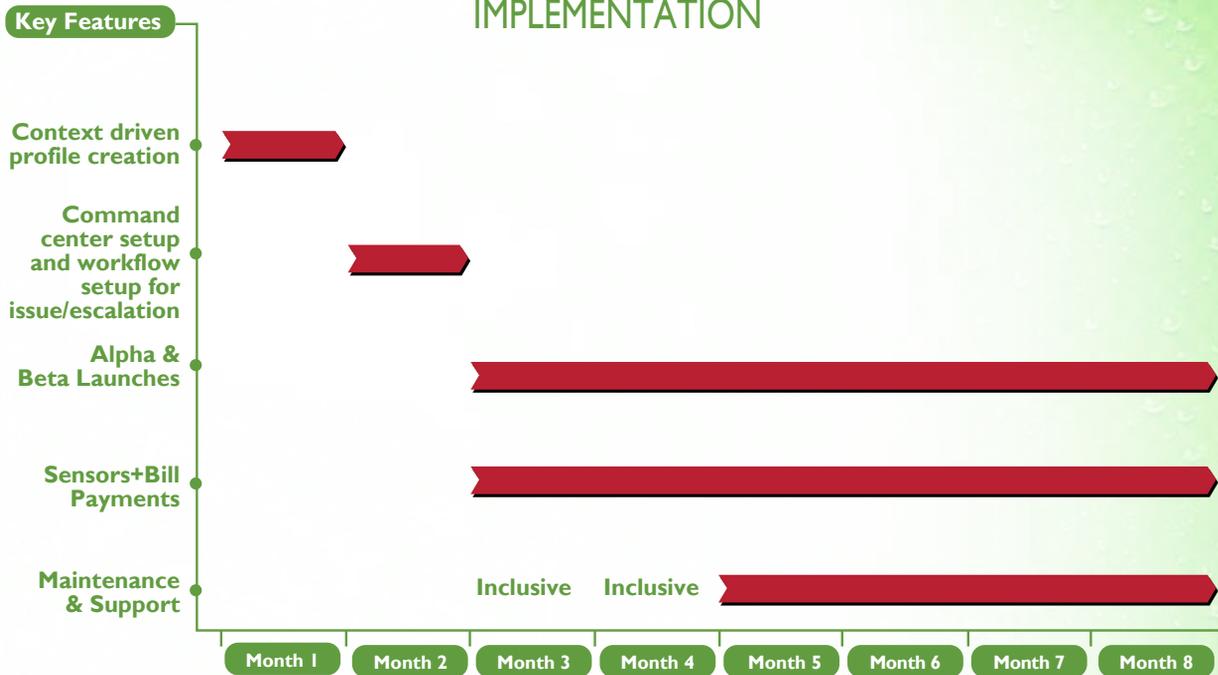


The solution can be applied to any large community and makes them smarter, connected with modern context driven technology. This can be used to following used cases:

- City Administration for Citizens
- RWAs for Residents
- University for Students Engagement
- Large township management



## IMPLEMENTATION



## RISKS & MITIGATION

- Most probable risk of the system is its non-use by the command team, since there is a gestation period between system implemented and actionable insights. They tend to use less overtime. If Command center does not focus on work; there be no new content available for citizens to consume and hence the overall usage is expected to be impacted.
- Conducting regular training program with command center team and initiating citizen engagement activities in co-operation with administration and inter connecting more city stakeholders to allow more interaction on mobile application.



## ORGANIZATIONAL CHALLENGES/NEEDS

- Lumonicity is facing a typical problem of delay of timely closing of the pilot committed. There is a long-time lapse for pilot implementation, that it makes the product unaffordable at some point.
- Pilots mostly are sought without a cost implication for a period of three months and this period can easily stretch to a year in government scenario. This is expensive for a self-funded startup.



## INNOVATION CASE STUDY

- The platform is in beta proof of concept stage with City of Celina, USA and Dwarka sub city Delhi.

- App is presently in beta testing phase and so far, the engagement amidst closed user group has been highly targeted and focused with complete personalization



## REFERENCE

Michael Montgomery, Mayor of Celina.



# हकदर्शक Haqdarshak

**HAQDARSHAK EMPOWERMENT SOLUTIONS PRIVATE LIMITED (HESPL)**  
Government Schemes / Incubation Support Information provided by the enterprise

Annual Turnover ₹ 3,00,00,000 (FY' 17)

Contact person & details: Mr. Aniket Doegar, CEO

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## PROBLEM

Low-income communities don't always get maximum benefit out of all the government schemes designed for them. There is a huge gap in awareness. On the other hand, government bodies find it hard and costly to directly connect with low-income families.



## PROPOSED SOLUTION

To set up a network of Haqdarshaks who can:

- Use the mobile app to identify relevant schemes for citizens each household in specific city areas.
- Help families with application support - document creation, verification, submissions and follow-ups.
- Employ local micro-entrepreneurs as Haqdarshaks and help them earn additional income



## BUSINESS MODEL

Charges a service fee of INR 2.5 lakhs plus taxes to recruit, train and oversee a team of 10 Haqdarshaks.



## KEY BENEFITS

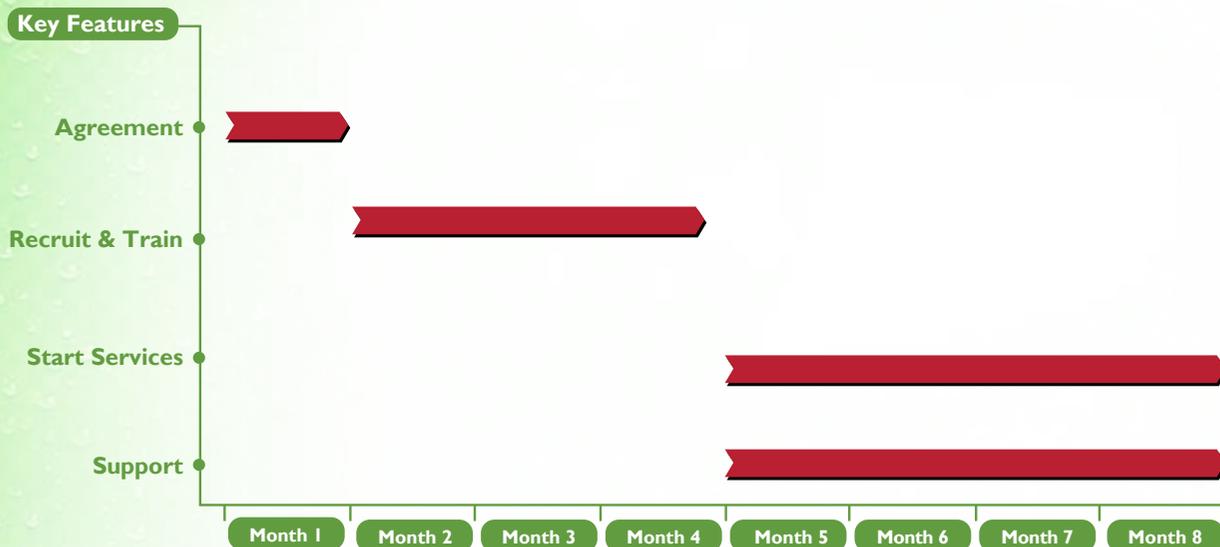
- Increase awareness of government solutions and schemes among low-income households.
- Cost-effective solution to communicate with and engage low-income communities.
- Reduces non-application rates through localized Haqdarshak application support.
- Additional income stream for the trained local Haqdarshaks.



Haqdarshak mobile app in use (left) and a local Haqdarshak screening an application (right). Image Source: Haqdarshak Empowerment Solutions Private Limited



## IMPLEMENTATION



## RISKS & MITIGATION

- The model is based on pay per service. There could be initial resistance from citizens to pay. Hence, they are working out models wherein the screening (first step of scheme information, eligibility-wise) is free, and then for the applications; the mobile app prescribes the upper limit of fee and then the entrepreneur can decide the final amount to charge to the set limit
- Building trust is an issue because citizens are providing personal and critical information and documentation to a company coming from another country. They are partnering with large organisations and CSR firms, which have worked in communities and have a trusted presence to address the situation, who will be able to provide them with their network and support.

- Monitoring the on-ground Haqdarshak's operations is often a risk. They have Haqdarshak employees who are the coordinators and monitor the progress. The monitoring and evaluation process ensure quality check.



## ORGANIZATIONAL CHALLENGES/ NEEDS

- Funding for operational capacity building
- Attracting tech talent to social impact startups is a challenge as the pay can't be matched with a conventional startup or an established set-up.



## INNOVATION CASE STUDY

- Haqdarshak has partnered with the Department of Information Technology, Government of Rajasthan to integrate the technology with the E-Mitra

- centres - the local CSC centers, which provide citizens basic services.
- The integration has been completed with 44,000 E-Mitra centres across the state. When citizens come to these centres, they can screen themselves and know about eligible welfare schemes

- The next step is to request for Haqdarshak application support
- The service incentivises the E-Mitras and helps increase the penetration of government schemes



## REFERENCE

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## JATAN SANSTHAN

**Government Schemes / Incubation Support** In November 2018; we were short listed for the Social Innovation Conference by the Pune International Centre. As a part of their programme; we are currently receiving mentoring and networking support.

**Annual Turnover ₹ 14.5 Cr in FY'17-18**

**Contact person & details:** Lakshmi Murthy, Additional Director/  
Smriti Kedia, Program Lead

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### PROBLEM

Disposable napkins composed of polymer-based materials, gels, dioxins and other chemicals affect communities in multiple ways. Our innovation; Uger cloth pads are re-usable and reduces the negative health and environmental impact from the growing use of disposable sanitary napkins, which is now urgently required in the current contemporary contexts of most consumer items that are just “use and throw”.



### PROPOSED SOLUTION

- Significant reduction of menstrual debris from disposables

One user in a 24-month time frame	Number of pads discarded	
	Disposable pads – 300	Uger cloth pads - 6

- Disposable menstrual products swell after absorption of fluids, choking sewers. Uger

cloth pads do not cause this problem, as the material is biodegradable.

- Chemicals in disposable products have been known to cause rashes, boils and other skin problems. Uger pads made of cotton fabric, is nonirritant, and breathable.



### BUSINESS MODEL

Uger follows the below mentioned three models in our business:

- Awareness and Training: This focuses on breaking the silence around the subject of menstruation and promoting menstrual health through training users to make informed choices on products. Jatan charges for these sessions, which are conducted across geographies (rural and urban).
- Make your own Uger pad: Users are trained to make their own pads. This may be for both commercial and non-commercial purpose.
- Sales of Uger pads: Currently priced at INR 720 (Prices may vary) for pack of 6 pads.

Major Costs	Amount (₹)	Notes (Optional)
Train, hire and retain local team	5,00,000	Per year
IEC sessions V 2.0	2,000	Per session (total of 450)



## KEY BENEFITS

Uger products are sustainable. They have the following benefits:

- **Environment** – the cotton fabric products decomposes within 4 – 6 months causing no negative environmental impact.

- **Health** – Products causes no allergies, no itching, boils and abscesses.
- **Social** – Uger aims to provide dignity, promotes “no waste” and “reuse”

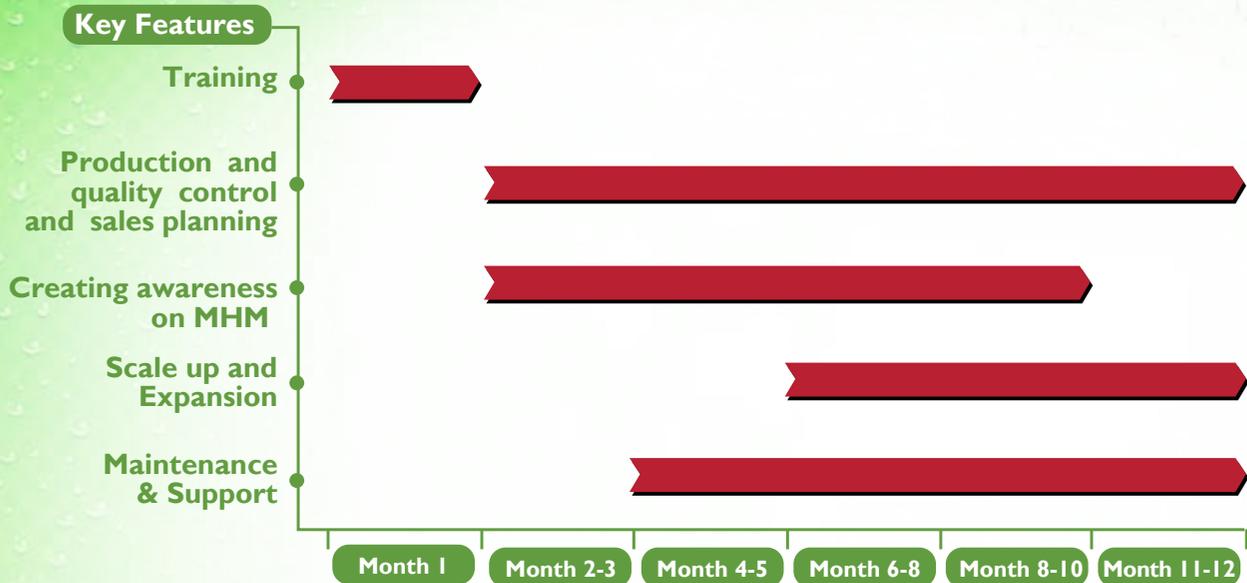


Figure above: Uger Insert pad - with holder straps, towels and buttons



## IMPLEMENTATION

Major Costs	Amount (₹)	Notes (Optional)
Machinery, tools, furniture	300,000*	We recommend that an existing stitching group be identified -so that the cloth pads add on to the range of existing products
Training costs (awareness, stitching, marketing) training	200,000*	1 training - awareness /stitching cloth pads. 1 refresher within 3 months of production for quality check and support. Training on basics of marketing and running centre.
Material support	200,000*	Material for 4000 pads to be provided initially sales of which will generate rotation funds for the SHG and generate income.
Consultancy cost	200,000*	Jatan's consultancy costs
Salary of 6 people	200,000*	For 1 year
Running of production unit	150,000*	For 1 year
Marketing, awareness and support sales	200,000*	Recruiting marketing team and training team on marketing and awareness on MHM



## RISKS & MITIGATION

- There have been barriers in adoption. Uger cloth pads are reusable and need to be washed and hung out to dry in the sun. Users aspire for products that do not require any maintenance.
- Attractive advertisements from companies promote the incorrect notion that cloth is unhygienic, pushing user to aspire for disposables. Additionally, disposable pad manufacturing companies withhold information by not declaring the nature of raw materials or chemicals in their products.
- Intensive campaigns to promote sustainable products and sensitizing government agencies/policy makers, informing policies are the ways to overcome barriers.



## ORGANIZATIONAL CHALLENGES/ NEEDS

- Outreach to policy makers, funding to expand work and knowledge.
- Working with the government, which has been actively distributing disposable pads without critical consultations with stakeholders in the field.



## INNOVATION CASE STUDY

- Ministry of DONER and IIT Madras under STINER Project invited Jatan Sansthan to set up four cloth pad production units in the states of Meghalaya, Assam, Arunachal Pradesh

- **In Manipur:** Production training programmes completed. One production centre already initiated in Tura District, Meghalaya November 2018, three others to start February 2019
- **Rajasthan:** Assisted with the launch of the state government MHM policy (a convergence of multiple government departments) i.e. State level launch in Jaipur, district launches Bhilwara, Sawai Madhopur
- **Bihar:** Setting up production unit in Bhagalpur with Jeevika SHG groups. The SHG runs with government support.



## REFERENCE

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## SAAHAS ZERO WASTE

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 34,00,000 in FY'17

**Contact person & details:** Ms. Divya Tiwari, CEO

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### PROBLEM

Improper waste management in India has led to various problems in terms of air, water and soil pollution. Barely 35,600 metric tons (MT) or a quarter of the 1.43 lakh MT of garbage generated every day in Indian cities gets processed (CSE, New Delhi). That is, nearly 75% of municipal garbage in India is dumped without processing. The situation in rural India is even worse, with hardly no waste collection mechanism.



### PROPOSED SOLUTION

The solution is a proper waste management system, which could include the following steps:

- Awareness and sensitisation campaigns to bring about a change in how waste is perceived.
- Train people on segregating waste at source in their homes.

- Set up dry waste storage unit, and infrastructure for composting.
- Distribute bags for dry waste collection from homes to encourage waste segregation
- Train local waste collectors for efficient collection & handling of source-segregated waste.
- Collect wet waste daily and dry waste once/twice a week, separately
  - Ensure maximum resource recovery by:
    - Composting of wet waste
    - Sorting of dry waste to send for recycling
    - Send non-recyclables to cement factories for co-processing

It can be done in both rural and urban areas. It is better than the existing mixed waste collection mechanism, where resource recovery is minimal.



Dry waste being segregated by kids at source into a dry waste storage bag at a household in Billari (left) and wet waste composting at a Saahas facility (right).



## BUSINESS MODEL

To set up the infrastructure; Saahas requires either CSR funds or the Municipality funds at city/town level and Panchayat level funds from Swachh Bharath Mission.

Revenue can be generated by the Sale of recyclables, upscaling waste, service fees from waste generators like households, bulk generators, events, fairs etc.

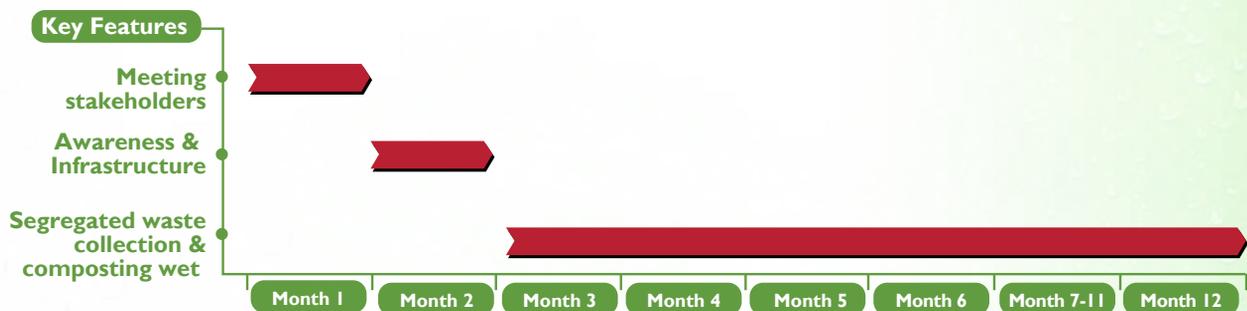
The model can be replicated both at panchayat and municipal levels. For a rural setup; to handle dry waste for 11 villages of 1250 households or 6000 population, one-time cost (CapEx) of INR 7 lakhs (0.7 million), and recurring cost (OpEx) of INR 3-4 lakhs (0.3 – 0.4 million) per year, is required.

Details are provided in the following table

Major Costs	Amount (₹)	Notes (Optional)	Sources of income	Amount (₹)
Collection vehicle	3,00,000	Tata Ace	Sale of recyclable dry waste	12,000
Storage/sorting infrastructure, consumables	3,00,000	Dry waste collection centre	User fee at 30 per household, 80% recovery	3,60,000
Awareness materials, events, etc	1,00,000	To involve community.		
Staff Costs	2,50,000	Salary of 2 people		
Fuel, Maintenance of vehicle and unit	50,000	Running costs		
Handling of non-recyclables	80,000	4 loads in a year to cement factories		



## IMPLEMENTATION





## RISKS & MITIGATION

- Land is always an issue, for starting operations. Local authorities can take over private land, when needed.
- Getting acceptance from residents to pay user fee to meet the OpEx is a risk.
- Lack of monitoring and community ownership will derail the program.



## ORGANIZATIONAL CHALLENGES/ NEEDS

- The two important challenges or needs that our organization is struggling with are:
- Lack of options for resource recovery from non-recyclables.



## REFERENCE

**Information not provided by the enterprise at the time of documentation.**

- Gradual increase in the percentage of non-recyclables in dry waste across the years



## INNOVATION CASE STUDY

One example of where our model is being implemented is the Orohalli Village Panchayat, with the support of a CSR funder called Juniper Networks. Monthly, nearly 1500 kg dry waste is being diverted from dumping or burning. Nearly 18 tons of dry waste has been handled in the previous year.



## (ODF MONITORING) DEXTER DRONES

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ Information not provided by the enterprise at the time of documentation.

**Contact person & details:** Mr. Vishal Kapoor, Director

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### PROBLEM

Monitoring and surveying defecation practices of a community can be challenging, costly and time consuming. Existing survey schedules do not give comprehensive overview of the ground realities.



### PROPOSED SOLUTION

The Solution will periodically review/monitor/ assess the wards/ study locations that are being declared Open Defecation Free (ODF) using night vision cameras installed on a drone. This will give key officials valuable real time feedback on a regular basis. This model will work in the following way:

- Identify study area, which has been declared ODF.
- Get approval of concerned authorities as they plan to deploy a drone to capture high-resolution image(s) of the study

area keeping in mind the privacy and concerns of the local population.

- Information captured on the drones will be relayed to the central server (from multiple study areas/villages/GPs), which will then be analyzed as per the checklist for any outdoor defecation.
- Captured information will be stored and measured against the subsequent data collected concurrently for the study area
- Corrective action suggested to concerned authorities



### BUSINESS MODEL

Solution will charge a consultancy fee to implement this project. Cost to be borne either by the ULBs or through CSR funds. cost (CapEx) of INR 7 lakhs (0.7 million), and recurring cost (OpEx) of INR 3-4 lakhs (0.3 – 0.4 million) per year, is required. Details are provided in the following table



## NSMILES INDIA PRIVATE LIMITED

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 3,000,000 (FY'17)

**Contact person & details:** Nageswari BH, Co-founder & EO

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### PROBLEM

Negative mental health impacts many Indians in almost every family. A closer look at the key statistics reveal that unmanaged stress, and lack of a stable career are the top reasons for depressions, anxieties and suicides in India. 55% graduates are unemployable. 46% employers suffer from some form of stress. 87% Indian Women are stressed. The second most reason for students' suicide is exam stress.

Existing systems are ineffective in measuring and nurturing human behaviours, capabilities and their mental health. There is a need to create solutions for personalized care for early detection of stress and its cause, and provide solutions to enhance overall mental well-being of individuals using digital platforms.



### PROPOSED SOLUTION

Our solution helps detect possible identification of stress and related risks by means of self-reported assessment tools. The tools also aim to educate the users

on the importance of mental health care through the reports. Further a practical tool is recommended for self-management and for nurturing mental well-being using positive psychology, mindfulness and Cognitive Behavioural Techniques (CBT) with just a practice of 10 mins per day.



### BUSINESS MODEL

The assessments solutions are custom built for India and specific life events. The price of the assessments varies between INR 350 to INR 1000. The self-care app is priced at INR 200 per month. The group remedial sessions are priced between INR 3500 to INR 10,000 for 8 week's session per student.



### KEY BENEFITS

The solutions are customized to the current life situation; making them more personalized to the user:

#### School offerings:

- Academic Assessment: Provides personalised recommendations to students to develop better study strategies, attitudes

and habits to reduce stress, and build resilience to achieve academic excellence.

- Career guidance: A personality, Interest and Aptitude assessment mapped provides personalised career guidance.
- Stream selection: Aids students after grade 10 to make the right decision about choice of streams for 11th and 12th based on their Interests and aptitude.
- Career guidance for Government school and Uneducated youth: Picture based skill assessment mapped for 38 skill sectors of National Skills Development.

### College offerings:

- RISE assessment: RISE assessment helps engineering students discover their Innate talents, soft skills, job readiness and wellbeing. Provides step by step guidance to build careers.
- Students' wellbeing assessment: Assessment measures 9 problem areas of students like depression, anxiety, risky behaviors, anger, hopelessness, thoughts on suicide, etc.

### Wellbeing assessment:

- First of its kind in India that gives a measure of holistic health including Physical health, positive behaviors/changes in Mental health, Community, Social, Career, Spiritual, Family and Financial. It provides fair indication on strengths and key habits to build and enhance mental wellbeing.
- This survey can be given to all working employees, Government officials, Police, IAS officers, ministers and medical professionals to measure their wellbeing and provide habits to build to achieve optimal wellbeing.
- Using Happy Being App can improve self-care as it helps in coping with stress, and the self-management tools of the App can support in building resilience and improve mental well-being.
- Graded support based on assessment results helps for early depression and anxiety detection.



## 2E KNOWLEDGE VENTURES PRIVATE LIMITED

**Government Schemes / Incubation Support** Information not provided by the enterprise  
at the time of documentation.

**Annual Turnover** ₹ 60,00,000

**Contact person & details:** Mr. Vineet Kumar Goyal, CEO

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### PROBLEM

Pollution caused by waste food in cities.



### PROPOSED SOLUTION

Setting-up a Collection System and Processing System for Food Waste in India based on a similar technology generated in Europe. The proposed technology solution converts the processed / ready food waste of heterogeneous nature into energy.



### BUSINESS MODEL

Earn a service fee for managing food waste. Customer segments are Malls, Function Halls, Food Processing Parks and Hotels. In addition, generate energy by processing the waste food.



## MAYA FOUNDATION

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 1,19,93,899 (FY'17)

**Contact person & details:** Dr. Gangopadhyay, Secretary

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### PROBLEM

Lack of sound menstrual hygiene and disposal of menstrual related waste.

- Promote low-cost menstrual hygiene
- Eco-friendly disposal of menstrual waste
- Awareness on socio-behavioral changes



### BUSINESS MODEL

Will raise funds from ULBs, CSR bodies and donors to implement this program.



### PROPOSED SOLUTION

The foundation will distribute nominally priced eco-friendly sanitary napkins to:



## WORLD STEWARD

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ Information not provided by the enterprise at the time of documentation.

**Contact person & details:** Mr. Hank Patton, Chair

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### PROBLEM

Finding additional revenues for WASH projects and outcomes is a challenge for ULBs. On the other hand, potential funders do not have a standard outcome-based framework that they can trust, measure and invest in.



### PROPOSED SOLUTION

Green Bonds help solve these problems. It is designed to capture new project revenue through the bundling and sale (securitization) of standard measurable low-cost outcomes to specialized markets outside the local service districts.



**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 3,00,00,000 (FY' 17)

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## PROBLEM

Children in underserved communities face severe problems in adopting good WASH practices. Some of them include safety, security, health of mother and child, girl child absenteeism in schools due to menstrual hygiene practices. By losing out on opportunities to help these children adopt healthy behaviors; we also lose out on creating a progressive and an equitable society.



## PROPOSED SOLUTION

Katha creates unique content in local languages; specifically designed for underserved communities that addresses the above-mentioned problems. Few examples of this content are:

- WASH storybooks kit (Grades 1-2, 3-5, 6-8 and 9-12)
- Water Sanitation and Hygiene reading leagues
- Audio content for women in the communities

- Learning tools for children in the communities: Toys, Community events to celebrate landmarks
- Community Awareness Campaign: A strong hygiene education program addressing behavior
- Change on a comprehensive level in women and children.
- Encouraging a thorough understanding of the impact of good hygiene practices with active
- Participation in community

We will provide quality content for women, children and teachers focusing on importance of good WASH habits. We will also focus on software programs that create awareness and increase community adoption of WASH behaviors through children.



## BUSINESS MODEL

Katha creates a set of custom designed reading, audio and video content. Most of the content related costs are borne by external funders, CSR bodies and social investors. ULBs share the resources such as access to public schools as well as pay a part of the implementation costs.

## EMPOWER FOUNDATION

**Government Schemes / Incubation Support** Information not provided by the enterprise at the time of documentation.

**Annual Turnover** ₹ 40,22,636 (FY'17)

**Contact person & details:** Ms. Syed Namra, Senior Project Coordinator

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### PROBLEM

People living in underserved communities face severe health hazards due to inaccessibility, unaffordability, and unavailability of safe drinking water, unhygienic sanitary living conditions. This leads to the following key problems:

- Water contamination
- Waterborne diseases
- Open defecation-unhygienic living conditions
- Health and environment hazards
- Other health issues



### PROPOSED SOLUTION

The Empower intervention is divided into the following awareness generation sessions to educate masses about various ways to deal with these issues.

- First session will entail awareness of consumption of unsafe drinking water and provide solutions such as low-cost methods to purify water.
- Second session will educate people about the linkage between poverty and unhygienic living condition
- Third session will focus on eradicating the issue of open defecation and its related issues. The aim is to facilitate behavioral change among target beneficiaries.



### BUSINESS MODEL

Empower will charge INR 7,500 per session that caters to a group of local residents. This can be implemented either as a government awareness project or as a CSR project in local communities.



### Supported by:

The United States Agency for International Development (**USAID**) works to end extreme poverty and promote resilient, democratic societies. USAID is an independent government agency that provides economic, development, and humanitarian assistance around the world in support of the foreign policy goals of the United States. Leveraging India's growing financial and human resources, USAID is harnessing the strengths and capabilities of both countries to tackle development challenges not only in India, but worldwide. In all sectors of its activities, USAID builds private sector partnerships to foster in-country sustainability and ownership, with a focus on issues such as health, urban water and sanitation, food security, early grade reading, and women's empowerment as a cross-cutting issue.  
[www.usaid.gov/india](http://www.usaid.gov/india)



### 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)



### Implementing Partners:

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)

### 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).



**Mysuru** 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.



# IHUWASH

Innovation Hub for Urban Water, Sanitation and Hygiene Solutions in India  
Supported by USAID  
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For more details, contact:

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