



Swachhalaya Public Urinal for Swachh Bharat Hackathon: Toilet Technology



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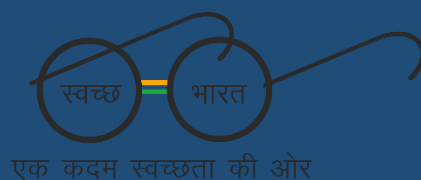


Table of Contents:

1. Summary
2. The Challenge
3. Efforts Made So Far
4. Gaps / Issues Not Resolved
5. Solution
 - a. How It Works
 - b. Materials Used
 - c. Key Benefits and Features
 - d. The Science & Technology Behind it all
 - e. Business Model (Sustainability)
6. Swachharthi (Team)

Summary:

A public urinal that is:

1. **Free to use for all**
2. **Affordable** to fabricate and install (<Rs. 10,000 per unit)
3. **Scalable:** Mobile and compact yet durable product
4. **Hygienic:** Eliminates the problems of stinking and eyesore
5. **Sanitized:** eliminates breeding grounds for mosquitoes and insects
6. **Eco-friendly:** Helps in increasing green cover in urban centers
7. **Self-sufficient revenue model** to furnish maintenance costs

The Challenge –

Affordable and easy to maintain public urinal systems aimed at eradication of communicable diseases caused due to breeding of mosquitoes and insects in the public areas frequently subjected to open urination.

It is not only extremely annoying to see men taking a leak by the walls as and when they please, it is a surmounting health hazard. While various attempts to dissuade people from urinating in the public have been undertaken, what remains unattended is the underlying problem – the lack of clean, hygienic public washroom systems which is usually attributed to high maintenance costs.

Efforts Made So Far –

- 1) Increasing public awareness:
 - a) New Delhi Municipal Corporation – “No Peeing in the Public Campaign” aimed at propagating the issues at hand through mass online and offline publicity during the CWG.
- 2) Pick up the “*Aam Aadmi Jhadoo*”:
 - a) Ugly Indians – Disappointed by the stinking and dirty walls in their vicinity, this group of aware citizens undertook the responsibility of cleaning, re-painting the wall and planting plants in front of the wall. This helped to make it a clean and green place. The idea was then propagated through pictures and videos on various social media platforms in anticipation of mass replication.
 - b) Divine Intervention – “Local residents’ association installed tiles in neighborhoods, in the hopes that people would refrain from peeing on a picture of a God or within the God’s benevolent but omniscient gaze. It’s an ingenious way to keep the roads – or at least that particular stretch of road – free of pee.” – theatlantic.com
- 3) Public humiliation for public urination:
 - a) The Clean Indian – “The anonymous activist group has a simple solution to the problem, they roam around Mumbai with a water tanker rightfully named as 'The pissing tanker', and spray water on individuals who are indulging in the act of urinating in the public. They claim, 'The solution to public urination is public urination, by the pissing tanker' and so attack the offenders with a giant water cannon, which indeed makes for a funny sight for onlookers.” – DNA India
 - b) People of Rajasthan – “A civic body in Rajasthan announced Rs.500 reward for students who raise awareness against urinating in public. The Jhunjhunu Zila Parishad used volunteers to embarrass people who relieve themselves in public places. The volunteers blow whistles or beat drums if they find a person urinating or defecating in public.” – CNN IBN
- 4) Installation of Public Toilets: Pay – per – use Sulabh Sauchalayas

Gaps / Issues Not Resolved –

- 1) Unavailability of public toilets: India's rural development minister Shri Jairam Ramesh recently said, "The country needs toilets more than temples. Almost half of the homes in the world's largest democracy do not have one." As per common opinion, Indians have been hallmarked as lacking civic sensibility and hence at the surface level it seems to be a problem of attitude but if one dwells deeper in to the problem, it is the lack of basic infrastructure that has aggravated this issue over time.
- 2) Issues with present infrastructure:
 - a) Maintenance Costs – The well-off can very readily pay and use the public toilets and hence the operators need not worry about the high maintenance costs. "There is, however, a class angle. Those with money have secure housing and therefore do not need to worry about public toilets. They can walk with confidence into hotels or shopping malls when they are out, and otherwise having toilets in their homes. For the poor living in informal housing without individual toilets, public toilets are a necessity. If, on top of that, they must pay each time they use it, the burden becomes heavy. Also, User charges in slum toilets – Rs.20 per family per month -- are clearly not going to generate adequate revenue to cover operations and maintenance." – infochangeindia.org
 - b) Corruption – The issue of operations and maintenance seems to clog even the best – designed toilets. In several places, toilets have been taken over by the local thugs or moneylenders who charge whatever they please and virtually make the toilets centers of harassment.

Solution –

I have designed a public urinal that is affordable to install, easy to maintain, environment friendly and free to use. It directly increases green cover and has a scalable and self-sustainable revenue model to take care of operation & maintenance costs. [Fig. A]

How it works [Fig. B, C, D]:

- Step 1. Pee in any of the 3 urinals installed on one unit
- Step 2. Part of urine gets absorbed by soil, through which the plant extracts essential nutrients for its growth [Fig. B]
 - a. The fragrant plant of Lemon kills the stinky smell in the surroundings
 - b. Increases green cover
- Step 3. Urine flows down the layers of sand and rocks to reach primary collection tank [Fig. B]
 - a. Urine is discharged to local sewage system [Fig. C]
 - b. Urine flows down to secondary collection tank (SCT) [Fig. D]
 - a) Urine is extracted from SCT by collection van
 - b) Tested at laboratories for contamination
 - c) Packaged and sent to local farmers to replace chemical urea as fertilizer
 - d) Organic food without use of chemical fertilizer is consumed by public
 - e) Repeat from step 1



Fig. C) Flow of Urine: Disposal of urine to sewage system



Fig. D) Flow of Urine: Collection of urine for use in Agriculture and Pharmaceutical Drug Manufacture

Materials used:

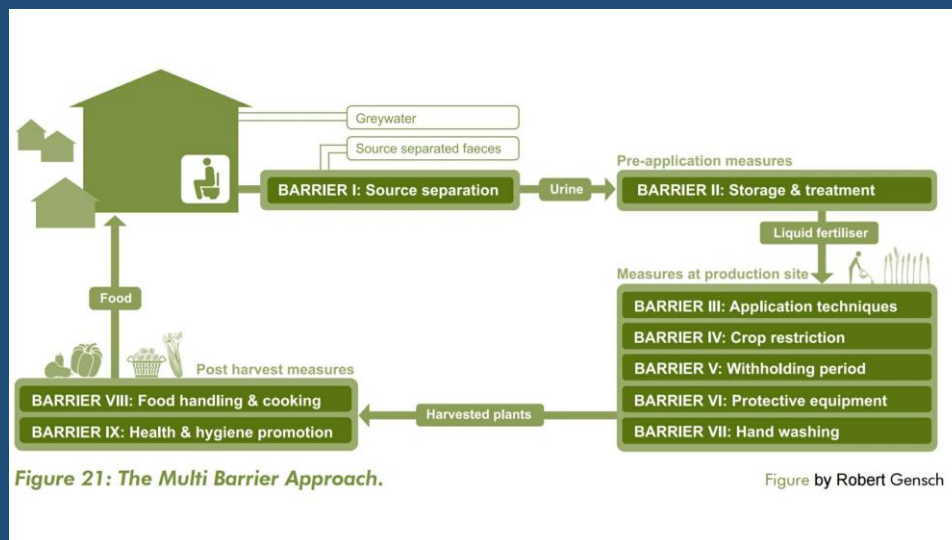
1. PVC structure
2. Nitrogenous fragrant plant

Key Benefits and Features:

1. **Free to use for all**
2. **Affordable** to fabricate and install (<Rs. 10,000 per unit when manufactured at mass)
3. **Scalable:** Mobile and compact yet durable product
4. **Hygienic:** Eliminates the problems of stinking and eyesore
5. **Sanitized:** eliminates breeding grounds for mosquitoes and insects
6. **Eco-friendly:** Helps in increasing green cover in urban centers
7. **Self-sufficient revenue model** to furnish maintenance costs

The Science & Technology Behind it all:

1. Exploiting the natural capacity of urea as a fertilizer for nitrogenous plants:
 - a. Urine is a well-balanced nitrogen-rich quick-acting liquid fertilizer.
 - b. Urine contains the highest levels of nutrients among all the human excreta and yields considerable amounts of nitrogen, phosphorus and potassium. These are the most essential nutrients for the growth of plants, and substantially all micronutrients.
 - c. Collection system for urine is designed to eliminate the risk of fecal cross-contamination.



2. Urine as source of synthesizing Life-saving drug- Urokinase.
3. Utilization of strong scents of plants to overcome the stench of urine.
4. GPS tracking enables mobile application to provide location of each urinal to public. This gives opportunity for public to give feedback about maintenance or hygienic issues at each toilet.

The rendered images of the 3-D model are attached. Its walkthrough will be given during the presentation.

Business Model (Sustainability):

1. Urine Fertilization:
 - a. Economic value of urine as fertilizer: Rs. 600 per person per year
 - b. Collection capacity from Indian Urban Centers (19 Cr Men):
Rs. 1.1 Lakh Crore (\$1.8 Bn) per year
 - c. Collection capacity from Indian Rural Centers (43 Cr Men):
Rs. 2.56 Lakh Crore (\$4 Bn) per year
2. Urine as raw material for Pharmaceutical Industry
3. Advertisement Space

Swachharthi (Team):

- **Raghav Palriwala: IIM Indore, Innovator and Social Entrepreneur**
- **Team Cargopod Solutions: Experts of Pre-Fabricated and Portable Public and Private Utilities**
 - **Vaibhav Mehta: B. Arch. Manipal University, Architect and Entrepreneur**
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