

## Composting Toilet – The Bangalore, India Experience

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**The Millennium Development Goal:** Signed by member countries and accepted by the UN in September 2000, the millennium development goals set targets to be achieved by 2015. Target 7 is to ‘Ensure environmental sustainability’. Specifically Target 7 C is

**Target 7c: Reduce by half the proportion of people without sustainable access to safe drinking water**

- 7.8 Proportion of population using an improved drinking water source
- 7. Proportion of population using an improved sanitation facility

Source : [www.undp.org.in](http://www.undp.org.in)

**Karnataka State:** In India (population 1028.61 million) Karnataka is the 8<sup>th</sup> largest state in India with a population of 52.85 million in 2001. Bangalore or Bengaluru as it now called is the capital city.



The Census of India 2001 reports also the type of toilet access to households in the state. In 2001 82.60 % of the rural households reported no toilets and 24.80% of the urban households reported no toilets. Lack of access to household toilets is clearly a predominantly rural phenomenon.

i R Type of Latrine within the house:	Total	%	Rural	%	Urban	%
R.1 Pit latrine	1,368,797	13.4	632,514	9.5	736,283	20.7
R.2 Water closet	1,907,116	18.6	311,500	4.7	1,595,616	44.9
R.3 Other latrine	561,113	5.5	217,245	3.3	343,868	9.7
R.4 No latrine	6,395,107	<b>62.5</b>	5,513,914	<b>82.6</b>	881,193	<b>24.8</b>

Source: Census of India 2001

**TOTAL SANITATION CAMPAIGN:** To combat the practise of open defecation and to bring access to safe sanitation the Total Sanitation Campaign (TSC) was launched by the Government of India in 1999. As the department website explains 'Total Sanitation Campaign is a comprehensive programme to ensure sanitation facilities in rural areas with broader goal to eradicate the practice of open defecation. TSC as a part of reform principles was initiated in 1999'. ([www.ddws.nic.in](http://www.ddws.nic.in)). It should be noted that the Total Sanitation Campaign is meant for rural areas and not for urban areas. After identifying a slightly different and higher figure from the census for households lacking toilets, 5.558 million as opposed to 5.513 million, the state through the TSC has been able to ensure the construction of 2.087 million toilets for rural households.

The typical design adopted by households in a vast majority of the case has been the twin pit pour flush toilet with a single pit.

In terms of the Total Sanitation Campaign figures (as on June 2009) for the state of Karnataka progress has been

Total toilets to be built	5,558,061	Actually built	2,086,956 ( <b>37.55%</b> )
Below Poverty Line HH'S	2,507,923	Below Poverty Line HH'S	987,542 ( <b>39.38%</b> )
Above Poverty Line HH'S	3,050,138	Above Poverty Line HH'S	1,099,414 ( <b>36.04%</b> )

**Of the total number of over 2 million toilets built less than a 1000 of them have been the Urine Diverting Dehydrating Toilets.**

The state expects that the Millennium Development Goals will be reached and the targets exceeded by 2015 in the rural sector.

**Composting toilets in Karnataka:** The first urine diverting dehydrating toilets (UDDT) in India were built by Paul Calvert as early as 1994 ([www.eco-solutions.org](http://www.eco-solutions.org)). His work has influenced almost all subsequent works on what are now called UDDT's but are also known as eco-sanitation systems or eco-san. His 'Eco-pan' was the first pan developed as a source separating squatting pan in India, where traditionally most Indians are squatters and washers. In Karnataka one of the first eco-san UDDT was built in 2003 where the pan was sourced from China. It was a urine separating pan but had no anal wash area. This was designed in Bangalore by Architect Chitra Vishwanath and manufactured by a company called N-Fibro Private Limited in Fibre-reinforced Plastic. The pan has undergone several refinements based on feedback received from women wearing the 'sari' a traditional Indian dress and has now become the eco-squat. ([http://www.youtube.com/watch?v=2h3eqg-0n4M&feature=channel\\_page](http://www.youtube.com/watch?v=2h3eqg-0n4M&feature=channel_page)).

There are Urban UDDT 's now operational in about 20 households only across the state. These toilets are always alternate to a regular conventional pour flush type and are embedded in the context of ecological architecture i.e. homes built of earth, harvesting rainwater, using solar energy, composting kitchen waste and other ecological measures. They are never standalone UDDT toilets.



**UDDT PAN on an urban roof**



**UDDT Faeces and Urine collector**

Research work has also been undertaken to develop various kinds of pans and also bamboo based substructure and superstructure for the composting toilets.

The three pot earthen composter the 'kambha' proved very useful for composting the dessicated faeces in an urban context.([www.dailidump.org](http://www.dailidump.org))



**The key role of Arghyam:** Arghyam ([www.arghyam.org](http://www.arghyam.org)), a Sanskrit word meaning 'offering', is a trust founded by the philanthropist Rohini Nilekani. She has created an endowment of Rs. 1500 million ( approx. US \$ 37.50 million) with a vision to fund safe sustainable water and sanitation for all. Arghyam provides Grants to organizations which can illustrate/ensure social, institutional, environmental, technological & financial sustainabilities through on the ground projects in the following Grant Theme Areas:

- Integrated Domestic Water Management (IDWM)
- Groundwater Management
- Sustainable Sanitation
- Wastewater Management

It is perhaps India's first foundation to focus exclusively on water and sanitation funding and has picked sustainable sanitation as a key thrust area. It has provided grants to demonstrate the application of UDDT's in many parts of India.

One of the first grants made by Arghyam was to support the work of Dr.G.Sridevi of the University of Agricultural Sciences, Bangalore. She became India's first Ph.D. ,under the guidance of Dr C. Srinivasamurthy of the Department of Soil Chemistry, with a specific focus on Eco-san with the title 'Study of Anthropogenic liquid waste on soil properties and crop growth". The engagement of the University of Agricultural Sciences was strengthened with the starting of a Centre of Excellence on nutrient reuse from sustainable sanitation again with an Arghyam grant and also supported by the Stockholm Environment Institute and UNICEF, New Delhi.

The Centre of Excellence is now functioning with the second Ph.D. candidate pursuing his study on the long term impact of the application of human urine on soils. A permanent demonstration field of one hectare has been set up in the campus to showcase urine application and its effect on various crops and vegetables. Every year around 150,000 farmers are shown these methods of sanitation and fertilizer reuse.

On plot trials have been carried out on various plants and crops including on bananas, papaya, citrus and maize. Vegetable crops are being researched for urine dosage and response.

**Integrated Domestic Rural Water Management and the UDDT:** Most villages in the state of Karnataka are dependant on deep groundwater drawn through bore wells. The sustainability of the bore-wells are under threat both due to over pumping of groundwater as well as due to quality issues emerging from nitrate contamination. Arghyam supported the NGO MYRADA for an integrated domestic rural water management project which looked at ensuring financial and ecological sustainability of water and sanitation in the habitation context. Three villages have been selected for this model implementation. Every house in these three villages will have a UDDT toilet and a rooftop rainwater harvesting system. Over 75 % of the households have already implemented these units and the households are satisfactorily using them.

**Other implementation of UDDT :** UDDT toilets have since been built in the North Eastern states of Manipur and Nagaland, in the flood prone state of Bihar , in Andhra Pradesh and in Gujarat.

Trial runs have been going on with the peepoo bag ([www.peepoople.com](http://www.peepoople.com)) as a safe sanitation alternative.

**Communication and dissemination:** The new media channels such as youtube <http://www.youtube.com/user/zenrainman> and twitter/twibes are quite popular <http://www.twibes.com/group/ecosan>. Traditional media such as newspapers and Television channels have also extensively covered the composting toilet in the vernacular language Kannada.

**Conclusion:** Composting toilets or urine diverting dry toilets have just started gaining acceptance in India and particularly in the state of Karnataka. The key concern is costs. A recent survey of water and sanitation practice all across the state revealed that cost is the primary determinant of a household owning a toilet. The cost of a FRP pan

ranges from Rs 900 /- to Rs 1800 /- and the cost of a completed toilet ranges from Rs 8500/- to Rs 14,000/- (1 US \$ = Rs 47/- ) This is quite expensive in rural Karnataka. Costs will have to come down to Rs 4500/- or thereabout for them to become competitive and viable with the conventional single pit toilet.

Capacities will need to be built as well as awareness created and quickly. Government programmes have targeted all households having toilets by the year 2015. Composting toilets will need to capture this wave and reach out especially in ecologically relevant area. Acceptance has been slow and steady and mainstreaming in the Integrated domestic rural water Management paradigm offers the best option.