



## PARIVARTHANE VOL.15

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### DRY TOILETS – TOWARDS A ZERO DISCHARGE COMMUNITY

Water the elixir of life; water the source of origin of life; water the most essential thing in life- All said, it is time to retrospect about the availability, the prudent use of this precious commodity, the politics of sharing the intra and inter basin surface water in the rivers and the exploitation of under ground aquifers. To break this vexatious cycle of exploitation, over exploitation, under exploitation in unequal and most unscientific exploitation all should be addressed. This is imperative in the present context of repeated harsh cycles of drought and flood, normal and abnormal rainfall patterns being experienced all over the world again and again due to natural and manmade climatic changes ( el nino, la nino etc., )

The important aspects of water related to urban context:

- Industrial demand
- Urban drinking water needs
- Domestic use in providing basic sanitation

To take the subject of “ Dry Toilets – Towards a Zero Discharge Community” let us see the Cycle of Basic Sanitation:

Problem of personal & Public Health and Hygiene- Many of our country cousins and the peri – urban populace does not have a safe and healthy option for defecation, leading to all the unhealthy urban eyesores making the Human excreta a major source of cyclic pathogens and parasites.

*Symptoms* – when the pathogens enter the re-infection cycle and enter the human body due to unhealthy sanitation practices diarrheal disease and increased child mortality is the end result.

*Solution* – Improved personal hygiene, avoiding open defecation and advocating healthy sanitation practices.

The means and ends -

Flush toilets or Common water toilets – The flush toilet invented by modern civilisation provides us a hygienic and comfortable life. However, the pollution problem brought about with the conventional water assisted sewage system coupled with the untreated sewage polluting ground water, rivers, lakes and coastal areas is enormous.

And water in toilets take 20 – 25% of that used by the family every day.

*“The urban sewage system<sup>1</sup> perishes more from its successes than from its failures. Its greatest and may be only exploit, is proclaimed by the name itself of ‘without smell’; urban sewers and the water closet have succeeded in removing the smell of human waste which impregnated the pre-modern cities. Furthermore it is attributed with having diminished the risks of cholera and typhoid.*

*Ecologists are beginning to evaluate its costs: destruction of aquatic life, contamination of aquifers and the destruction of soil stability due to ground water pumping. The role of concealing remains; thanks to the ‘without smell’ and the sewer system, human waste has been made almost invisible for the inhabitants of “nice” neighborhoods. But by hiding waste, sanitation – as experts call the sewer system and the collection of garbage – has made us impotent to confront waste. All cultures have made the broom into a magical (or shameful?) symbol and that must be for some reason; the broom is an instrument of power over vital space. Sanitation took from us the smell and the broom in one*



sweep" – Jean Robert in *The Ecological Dry f*

- Almost 20 – 25% of the water consumed in an average household is used for the flush toilet / water closet.
  - A family of 5 who uses a water toilet contaminates more and more water to transport less and less excrements in one year.
  - The equation is
- 
- The disposal of the above quantity of excrements of an average family untreated to the dynamic water systems or the cost of treating the sewage or the contamination of underground aquifers are all enormous and this triggering off cyclic problems associated with flush toilets adds more problems than it attempts to solve.

Globally some 80 countries with 40% of the world's population are already suffering from water shortages at some time during the year. This problem is more acute in our urban areas and cities not leave alone our villages.

Dry Toilets- a panacea for all ills of urban sanitation?

Dry toilets:

The toilets which are capable of killing the pathogens and parasites at the point of defecation by the increase in pH, decreasing the moisture content or increasing the temperature of waste. Time, extended time and combinations of these methods work out to enhance the effectiveness of these adverse environmental processes.

In the dirty loads, the excrements, nitrogen and phosphorous are in proportion of 80% and 20% respectively.

The composition of human excrements:

Did you know that a human being produces about 550 l of urine and about 50 kg faeces annually? Urine contains the largest part of the nutrients in the human "residue product", approximately 80 % of nitrogen and 50 % of phosphorous. The urine you produce annually consist except water of among other things:

- 5.6 kg nitrogen (N)
- 0.4 kg phosphorous (P)
- 1.0 kg potassium (K)

With this amount of nutrients you can fertilize and produce about 200-250 kg corn. It is claimed that one person's urine is enough to fertilize his or her own food.

When urine in one form or another ends up in water it fertilizes different organisms, mainly vegetation and various algae. An abundant amount of nutritious sewage water is one of the reasons why so-called blue-green algae (cyanobacteria) and the flowering of algae have increased. It is estimated that the amount nutrients found in one litre of urine is enough to produce about 1 kilogram of algae, provided that all the phosphorus and nitrogen oxides in the urine are used to the maximum.

AN ATTEMPT TO CREATE A ZERO – DISCHARGE COMMUNITY<sup>2</sup> -

Many of the areas in Finland, which are having a population less than a million, are not connected to a municipal sewage system. In addition to this the holiday settlements where the floating population is higher, here the phosphorus content in the human excrements in more than 1 and ½ times than the average produced by a community. They wanted to conserve the aquifers and seawater from environmental degradation from human sewage pollution and a group called Agenda 21 group was formed in the



municipality of vastanfajard to create a zero discharge community.

The project has received EU and national funding to carry out the project "A Non-Discharge Community" together with the other financial supporters, Västanfjärd Municipality, Natur & Miljö (The Finnish Society for nature and Environment) and the local Farmer's Guild. The aim of the project is, on a long term of some 15-20 years, to diminish discharge of nutrients in the wastewater to such a level that the recipient waters not shall suffer any more. The first step is to collect information about ecological toilet and discharge solutions, adaptable to recycling. For this purpose, model households have been supported by the project. Different types of urine separating and composting toilets are being tested and experiences has been gathered and documented. More information is needed about urine separation and composting toilets, about well functioning resorption beds, about "green boxes" and about other possible alternatives- Not to mention that, especially for holiday makers it is a "good turn" to use their well cared- for outdoor toilets!

#### Ecological sanitation

The future action shall be aimed at improving the sanitation aspect of urban and peri urban populace not leaving behind the rural areas incorporating the aspect human waste not polluting the water system, under ground or dynamic. So the ecological dry toilets, nutrient recycling and composting toilets are the focus point for development and adoption breaking the social, economic and unsustainable municipal sewerage system operating as of now in our municipal areas.

#### The principle/ working of Dry Toilets:

THESE TOILETS WORKS TO ACHIEVE TWO FUNDAMENTAL PRINCIPLES TO GUARANTEE URINE DIVERSION AND ADEQUATE DESICCATION IN AN ALKALINE ENVIRONMENT. The dry toilets consists of two vaults: one in use and the other inactive. There is primary separation of urine and the excrement

by separating the urine and sending it to a shallow cavity for reintegrating with nutrients in the soil, thus fertilizing the nearby soil. And secondly, the excrement, which falls into the chamber, must be covered with lime or ash and soil after each use. In this chamber factors contributing to the destruction of pathogens are reduced due to the lack of humidity achieved by the separation of urine and non-use of water for flushing. This human excrement gets converted into organic soil conditioner (compost), free of pathogenic bacteria's. Dry toilets produce about 500 litres of dry fertilizer of a family in one year.

#### Conclusions:

- With the scope for development and application of this ecological dry toilets coupled with a strategy for utilizing the nutrients collected through recycling the limits for the application and adoption of dry toilets is endless.
- Development of dry toilets taking into account the user pattern and preferences coupled with some incentives for adoption at the individual household level and on a mass scale, it has lot of developmental challenges
- In terms of the entrepreneurial activity it will generate and the ecological advantages it produces as a byproduct are really worth giving it a try at the earliest.
- Developing this technology by applying at a model scale or prototype level to study the options for replication on a larger scale.

The techno-economic feasibility of dry toilets on a mass scale and the social acceptance of this with protecting the environment as a major focus shall be tried out.

*Source: Compendium of Best Practices, 2003 Edition, Crisil Infrastructure Advisory, Page165-167.*

#### FEED BACK

Dear Commissioner / Chief Officer & All other ULB Staff,  
We hope this issue of 'Parivarthane' was useful and



informative to you. We look forward to your suggestion and feedback. You can suggest any topics of Urban Sector, to be published in the future volumes of this topical paper.

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