# Welcome

**Regional workshop on Ecological Sanitation**
**16th February 2008**
**Bangalore**

- Ecosan experience in rural areas..
- The total sanitation campaign-is it possible?
- Ecosan for public toilets
- And the challenge of urban ecosan.


The **NIRMAL GRAM PURASKAR** awarded to SCOPE for its exemplary work on sanitation for the year 2006

- Water the most precious natural resource.
- Demand for water increasing all over the planet
- Every effort should be made to product the q uality and quantity of this resource which has no substitute
- Present Sanitation systems consumes a very high quantity of precious water

**Water Water**
**Every where ……**

Mrs.Medha Patkar, Environmentalist and Social Activist offering pooja for River Cauvery at Trichy on **16th Feb. 2007**

Devotees in the Pushkaram festival in Cauvery

It is often said that the next world war will be on WATER

## The Water War has already begun

**States and States**

**Nations and Nations**

**Districts and Districts**

**Villages and Villages**

**Households and Households**

## SCOPE's experience in rural sanitation

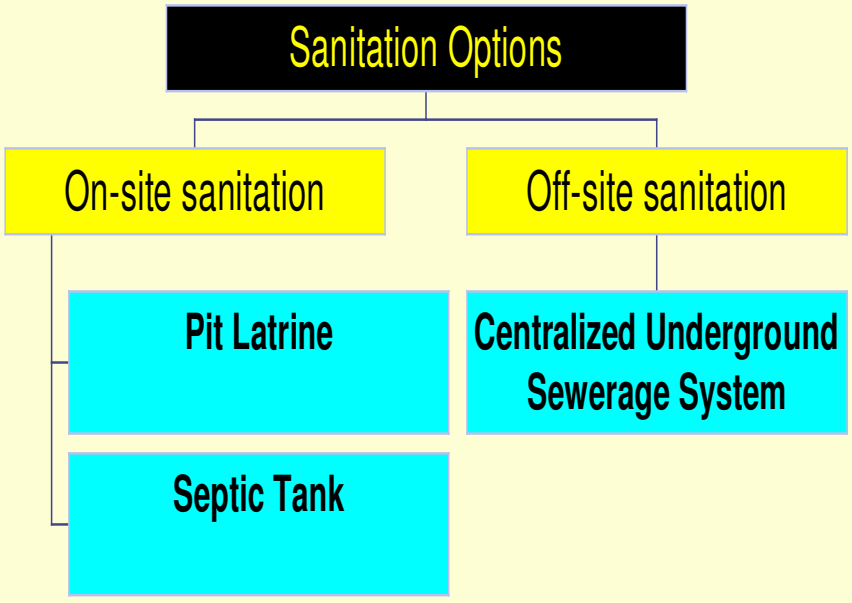
SCOPE found 75 percent of the houses in rural areas had no toilets, and all were resorting to open defecation. Open defecation posed a variety of problems to environment. But worst affected was women, who often suffered silently without even voicing their mental and physical agony.

SCOPE hence decided to concentrate on construction of toilets in close co-operation with state government Total Sanitation Campaign, funding agencies, and other NGOs. It constructed over 20,000 pour-flush pit latrines in Musiri and other areas.

During construction of pit latrines, it often found that hundreds of women living near cauvery river wanted latrines in the area. But pit latrines were not workable since it was a high-water table area close to the river cauvery, which had good flow for about seven months in a year.

# Objectives of Sanitation

- Sanitation is concerned with the safe management of human excreta
- Good sanitation is aesthetically desirable and has important health implication.
- Good Sanitation is vital for balancing one's income properly.




# Limitations of Pit Latrines

- water centered.
- Attracts flies and mosquitoes
- Chances of water and soil pollution – high
- Needs vast area since the pit will get filled up
  and new pit has to be dug
- Flushing very important after every use.

- **Not possible in high water table areas, coastal areas, since the pits will filled up fast and collapse.**

## Removal of black water from septic tank with vacuum cleaner tanker

**Injustice to human being**

**Not only in Musiri but all over the country**

**Black water from septic tank being let into Sacred River Cauvery from a tricycle septic tank cleaner from Cauvery bridge near Musiri on 24th Dec.2006**

Removal of black water from septic tank in barrel mounted on tricycle

Discharging black water into open drain

## Off-site Sanitation

- Centralized Sewerage system is the most prevalent option in this category – mostly in urban areas only.
- Excreta is transported through underground sewage drains from Individual houses to a distant place for disposal using water for transporting from excreta.

**Black water gushing out of manhole**

## WATER – TOO PRECIOUS TO BE WASTED

*Solution to any problem*

*(Open defecation )*

Should not lead to a

new problem

If so

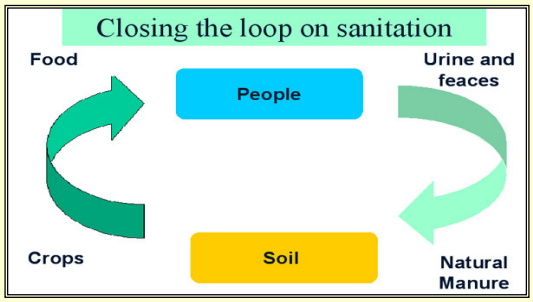
WHAT IS THE ANSWER?

## Ecological Sanitation (Compost toilets)

### What is Ecological sanitation?

- ✓ **It is an innovative model of dry toilet.**
- ✓ **Human waste namely faeces and urine are collected separately, without allowing water to get mixed with them.**
- ✓ **The faeces by process of dehydration helped by ash or sawdust etc sprinkled becomes a good soil conditioner.**
- ✓ **Urine and wash water each collected separately, are used for irrigating kitchen garden, farms etc.**
- ✓ **Amount of water used for abulation is very minimal.**
- ✓ **It is environmentally sustainable. It will not pollute air, water or soil.**

# Ecosan aims at



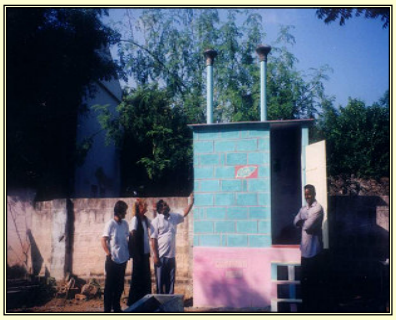

## A holistic approach

- Sanitation needs holistic sustainable Ecosystem approach.
- It involves several cycles to ensure public health.
- Human excreta & wash water are not a waste.
- They are resources to be reused for improving agricultural production and prevent contamination of the environment.
- ECOSAN approach aims at sanitizing the products and not transfer problems from one cycle to another.

## SCOPE's experience in ECOSAN

## First Ecosan Model – at Thanneerpandal

- SCOPE initiated ECOSAN model in Thanneerpandal – Training centre of SCOPE to meet the problems faced by high water table areas.
- Two-in-one model Designed by Mr.S.Paramasivan & Mr.Kalimuthu of Water Aid .
- Size of the chamber made big since it was the first pilot model. Two vent pipes



SCOPE design - 1

## *Thanneerpandal*

- Users numbered after using the toilet.
- Urine, wash water collected in a single pot for raising kitchen garden.
- First chamber was used 4320 times and when got filled up closed after 15 months.


# Kaliyapalayam shows the way

- Exposure to ECOSAN concept seminar by Unicef & Mr.Paul Calvert in 2002 at Chennai.
- Workshop on ECOSAN by SEI with Prof.Jan Olof Drangert, Linkoping University, Sweden October 2003 at Bangalore.

- Residents of Kaliyapalayam Village near Musiri, on the banks of the River Cauvery desperately in need of toilets.
- Access to open defecation land was denied.
- Pit latrine unsuitable due to high water table.
- Septic tank not acceptable.
- Exposure visit to ECOSAN Compost Toilet in Thanneerpandal Training Centre.


Mangalathammal is the first woman accepted for the Ecosan Construction at her residence in Kaliyapalayam

## Reasons for Success at Kaliyapalayam (2003)

- Difficulties of pit latrine and septic tank models understood.
- People happy with working of ECOSAN Model at Thanneerpandal.
- Group dynamics helped in quick acceptance. Key family leader – Mrs.Mangalathammal.
- Demand driven.
- Sharing of experience with senior Unicef and State Government Officials.
- Stakeholders consulted right from selection of model & during construction.
- Full cooperation from house owners - paid Rs.1,000/-.
- Financial support from the Govt. Rs.3,000/- . Total cost – Rs.4,000/-
- Construction materials were easily available and produced at the Production Center of SCOPE.

## Design change (2004)

Drop hole in the middle, urine hole with proper slope in the front wash water bowl in the rear

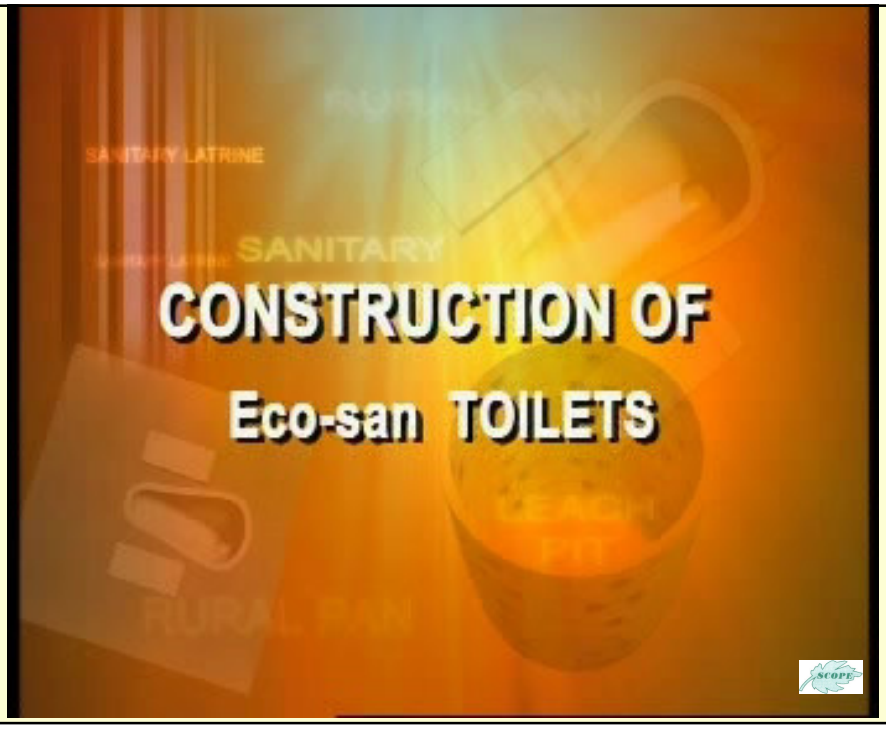
- Urine,wash water and faeces are collected separately.
- Drop hole for faeces in the middle.
- Urine from the urine bowl in front is collected in a mud pot with holes.
- Wash water from the wash bowl at the rear is taken to the filter bed.

**Mr.Kumar Alok, Director TSC, Government of India, opened the ECOSAN Compost Toilet at Sevanthilingapuram on 28th June 2005**

## First HCEST constructed in the first floor of a house in Musiri Town (Sept.'06)

**A view of the HCEST with separate pipe line for mud pot and filter bed.**

**Mrs.Shantha Sheela Nair, I.A.S., inspecting the HCEST on 17th Sept.'06**




**Problems of Permanent house construction and pit latrines in coastal areas – Nov 2006**


**First Ecosan toilet at Akkaraippettai in Tsunami hit area of Nagai Dist, with the support of care-India.**

**Water logging – No Problem for ECOSAN Toilet**


**Mrs. Shanthi, a SHG leader, who constructed the first Ecosan toilet in her house and she opened the 50th Ecosan Individual Toilet at Kameshwaram**

Mr.G.Radha, Project Officer, DRDA, Nagapattinam watering the plants near the 100th toilet in Kameshwaram in January 2007


A. Amutha, I.A.S., opened the chamber of the first ecosan toilet at Mrs. Shanthi's house at Kameshwaram village (Tsunami hit area)


## Total Eco-Sanitation Campaign-is it possible?

**Now the question of giving a thrust to Ecosan movement as a part of total sanitation campaign or exclusively as Total Ecosanitaion campaign.**

**Ecosan was born as a result of the problems and challenges of the three existing forms of human waste disposal in the country, namely, pit latrines, septic tank toilets and centralized underground sewerage disposal schemes prevalent in big cities and towns. Ecosan model is specifically suited to certain geographical regions which have special problems. It is most suited for high-water table coastal areas as in case of tsunami hit areas. Flood prone areas where pit latrines will be damaged during every flood. Also in water scare, hilly rocky areas as well as desert regions, where available of water is very limited.**


**SCOPE conducted a rally on the "World Toilet Day" on 19th Nov. 2007 to make awareness of the Total Sanitation at Vellure of Musiri Block.**

**Ecosan toilet will appear costly in the outset. But it is a one time investment, and it has several long term benefits in the field on economics, environmental sustainability, agricultural production and food security and freedom to women from the indignity of open defecation.**

**Considering these factors, Ecosan construction could be encouraged either as component of the total sanitation campaign, or a separate Ecosan total sanitation Campaign can be launched.**

**SCOPE constructed 24 Ecosan individual toilets in the permanent houses at TS Pettai of Cuddalore Distric on behalf of Bharathi NGO.**

**The Ecosan movement is ideal for coastal areas, flood prone areas, hilly rocky and water scarce areas. In these areas since no other form of toilets would function instead of total sanitation campaign, total ecosan campaign should be launched. And the higher incentive for construction should be given, since the cost of toilet is higher.**

**The module should include training for construction of masons, and adequate social preparation with latest IEC tools, since the usage differs. An orientation for all officials in charge of the programme on how ecosan presents an integrated solution starting from individual dignity to ensuring nation's food security is a must.**

## IEC activities to promote Ecosan

**Ecosan-Festival at Kameshwaram**

## First Toilet Beauty Contest in India- Kameshwaram, July, 2007


**Eligibility for participating in the contest was restricted to the first batch of the 100 Ecosan toilet families, who are using the toilets properly, and maintain the kitchen garden watered by the urine from the toilet well and keep the toilet and its environment neat, clean and hygienic.**

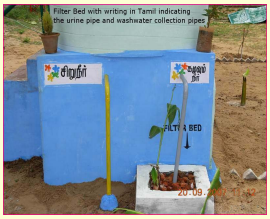

A Toilet Beauty Contest held at Kameshwaram by SCOPE, and the best maintained Tsunami hit area of toilet owner got the First prize of Rs. 5,000/-

## Cash awards for the Beauty Contest

| | 1st Prize | 2nd Prize | 3rd Prize |
|---|---|---|---|
| "Best Garden" | Rs. 5,000/- | Rs. 2,500/- | Rs. 1,000/- |
| "Best Outside Decoration" | Rs. 5,000/- | Rs. 2,500/- | Rs. 1,000/- |
| "Best Inside Decoration " | Rs. 5,000/- | Rs. 2,500/- | Rs. 1,000/- |

All the 100 participants were given each one stainless steel pot (Kudam) in the Toilet Beauty Contest at Kameshwaran on July14, 2007 at Nagapattinam district.

In addition, all the 100 participants also got a prize


**First Ecosan Toilet-cum-Bathroom complex with Solarlighting and Rainwater harvesting facility**

**A kitchen garden is raised behind the toilet complex and it will use the compost created in the ecosan toilets, and the maintenance by Kameshwaram panchayat.**

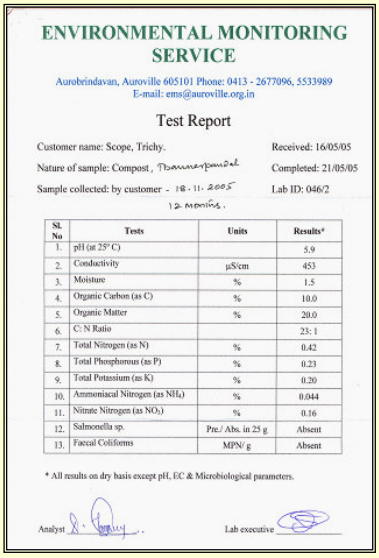
## No foul smell, no flies

**The children of the family too took the compost by their hand without hesitating**


**Prof.Jan Olof Drangert opens the first ECOSAN Compost Toilet at Thanneerpandal on Nov. 18th 2004 on the eve of "World Toilet Day"**

# TEST REPORTS

## COMPOST



ENVIRONMENTAL MONITORING SERVICE

Aurobrindavan, Auroville 605101 Phone: 0413 - 2677096, 5533989
E-mail: ems@auroville.org.in

Test Report

Customer name: Scope, Trichy. Received: 16/05/05

Nature of sample: Compost , Thanjavur Dist Completed: 21/05/05

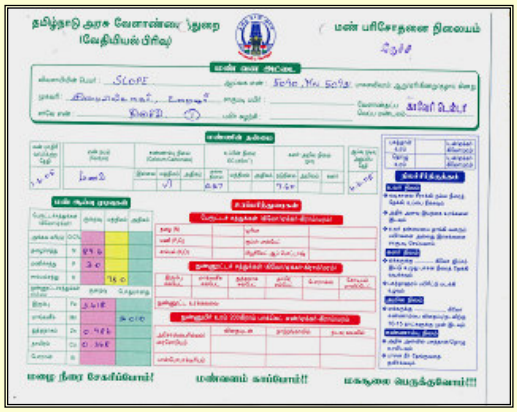
Sample collected: by customer - 18.11.2005 Lab ID: 046/2

12 months.

| Sl. No | Tests | Units | Results* |
|---|---|---|---|
| 1. | pH (at 25° C) | | 5.9 |
| 2. | Conductivity | µS/cm | 453 |
| 3. | Moisture | % | 1.5 |
| 4. | Organic Carbon (as C) | % | 10.0 |
| 5. | Organic Matter | % | 20.0 |
| 6. | C: N Ratio | | 23: 1 |
| 7. | Total Nitrogen (as N) | % | 0.42 |
| 8. | Total Phosphorous (as P) | % | 0.23 |
| 9. | Total Potassium (as K) | % | 0.20 |
| 10. | Ammoniacal Nitrogen (as $NH_4$) | % | 0.044 |
| 11. | Nitrate Nitrogen (as $NO_3$) | % | 0.16 |
| 12. | Salmonella sp. | Pre./ Abs. in 25 g | Absent |
| 13. | Faecal Coliforms | MPN/ g | Absent |

* All results on dry basis except pH, EC & Microbiological parameters.

Analyst Lab executive



**E.Coli – Nil** **Organic Matter- 20 %**

**Salmonella- Nil**

**C: N Ratio – 23:1**

## COMMUNITY TOILETS

- **Community toilets have a critical role to play in areas where there is no land for construction of individual household toilets.**
- **However in public places like stadium, railway stations, bus stations, public and private sector institutions, there is need for provision of more urinals than toilets.**
- **In certain specific localities as in the case of river banks,tourist centers, temple complexes etc., public toilets have to be built since they are places of large congregations of people, both men and women.**
- **In such places there is not only justification but necessarily for construction of public toilets.**

## Ecosan public toilets

**Community toilets should not be just a place for defecation**

- **It should be a place for community activities like**
- **Reading newspaper,**
- **Facility for children to play**
- **A place for elderly people to chat etc.**
- **Sanitary Napkin Incinerator for women.**
- **Once these provisions are incorporated it will ensure**
- **Better public participation in the operation and maintenance.**

**First Ecosan Community Compost Toilet (ECCT) in the country at Musiri** :

**SCOPE constructed Two ECCTs in Musiri. Both are located very close to the river Cauvery on the main roads through which people go to the river to take bath, as well as for defecation.**

**There were two community toilets, both of them highly dilapidated condition and this made many people to go to the river for open defecation.**

**To prevent the same and provide a basic amenity to the devotees SCOPE decided to construct ECCTS.**

## Construction of First ECCT at Musiri by SCOPE

Beautifier lighting the Pancha Bootha Environment lamp

Mr. Lucas Dengel of Auro Annam, Pondicherry at Musiri ECCT

Inner view of the ECCT at Musiri

## ECT for the aged & Handicapped

**Western type closet with urine diversion for handicapped and the aged**

**Urine is collected and stored in a tank.**

**The wash water is collected in filter bed and then supplied to the nearby farm for the cultivation of Banana.**

**The ECCT at Musiri is maintained by local women SHGs**

## Exposure visit by Govt. officials and other NGOs

Mrs. Shantha Sheela Nair, I.A.S - 17th Sep. 2006

A team of Government officials from Bihar 12th July 2006



*"Use toilet and get paid "*

**This is the first time in the world that toilet users are being paid as against pay and use toilets.**

The urine and faeces are so rich in nutrients for farm production that they are worth buying. Those who use the toilets are paid 10 paise per use to the Ecosan toilet, on a monthly basis.

## Ecosan Urine Diversion Toilet Complex at Schools

**Features of EUDTC, at Kameshwaram, P.R. Puram.**

- Two blocks – one for boys and one for girls.
- Each block has two toilets and 20 urinals.
- Urine from both blocks collected in two barrels.
- Collected urine led by pipe to adjacent cashew garden.
- Cashew plants and mango trees watered with diluted urine in the ratio 1:10 (water)

EUDTC at Kameshwaram


EUDTC at P.R. Puram

**An Ecosan child friendly FRP toilet pan designed by SCOPE, released by Union Minister for rural Development, Mr. Raghuvansh Prasad Singh in a conference at New Delhi.**

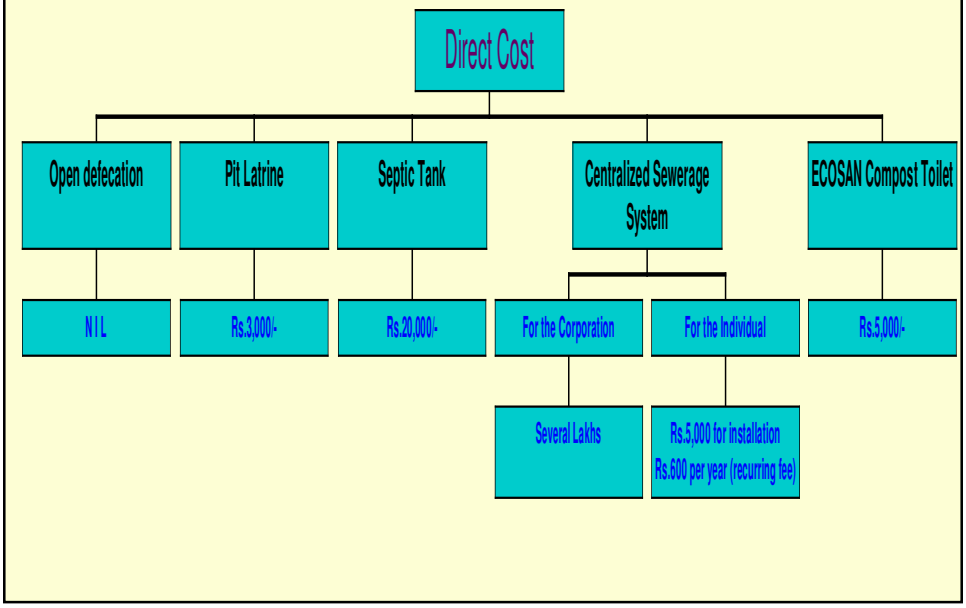
School children of P.R. Puram actively participated while constructing
of toilet at the school

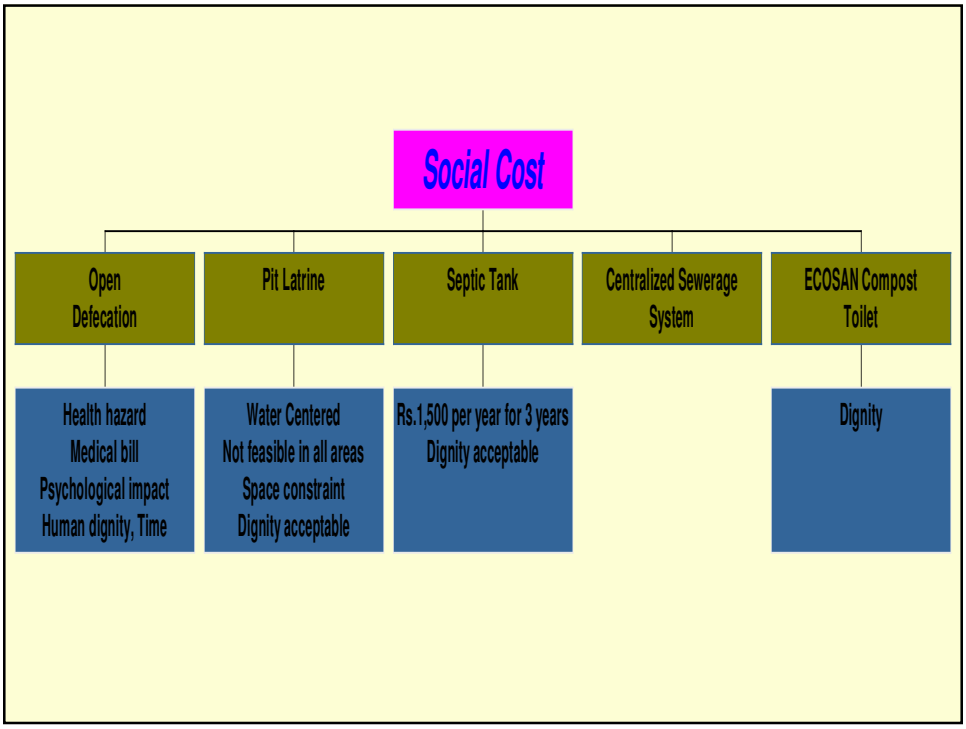
## Sanitary Napkin Incinerator provided in Eosan toilets

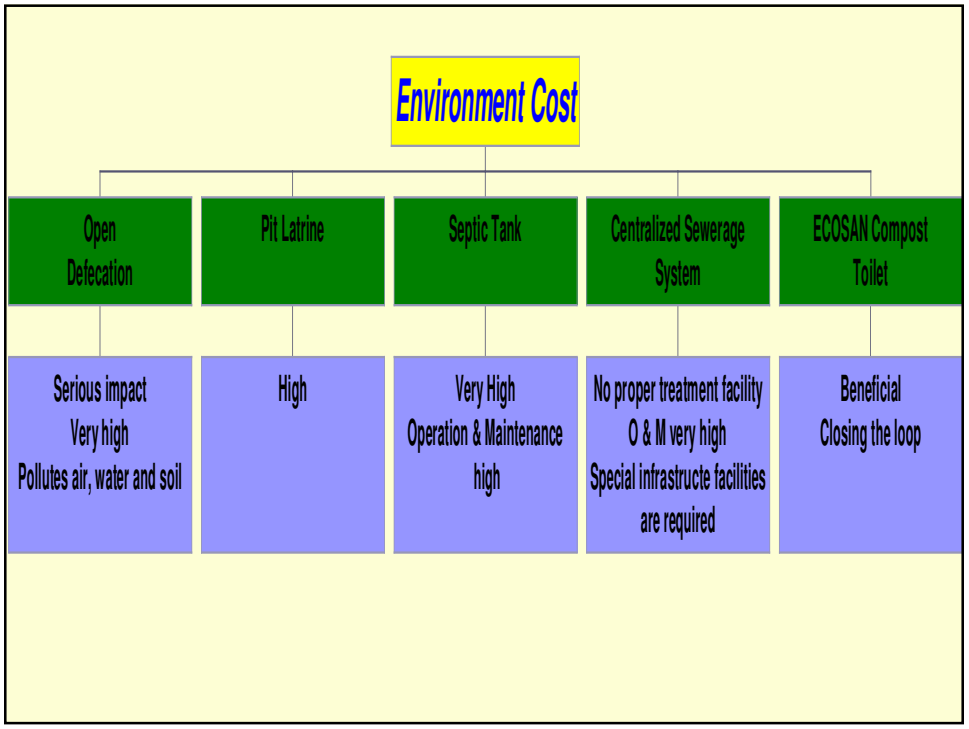

It has been established that one of the main reasons for the high dropout among girls in schools is absence of toilets, and facility to manage themselves hygienically with enough privacy during menstrual period

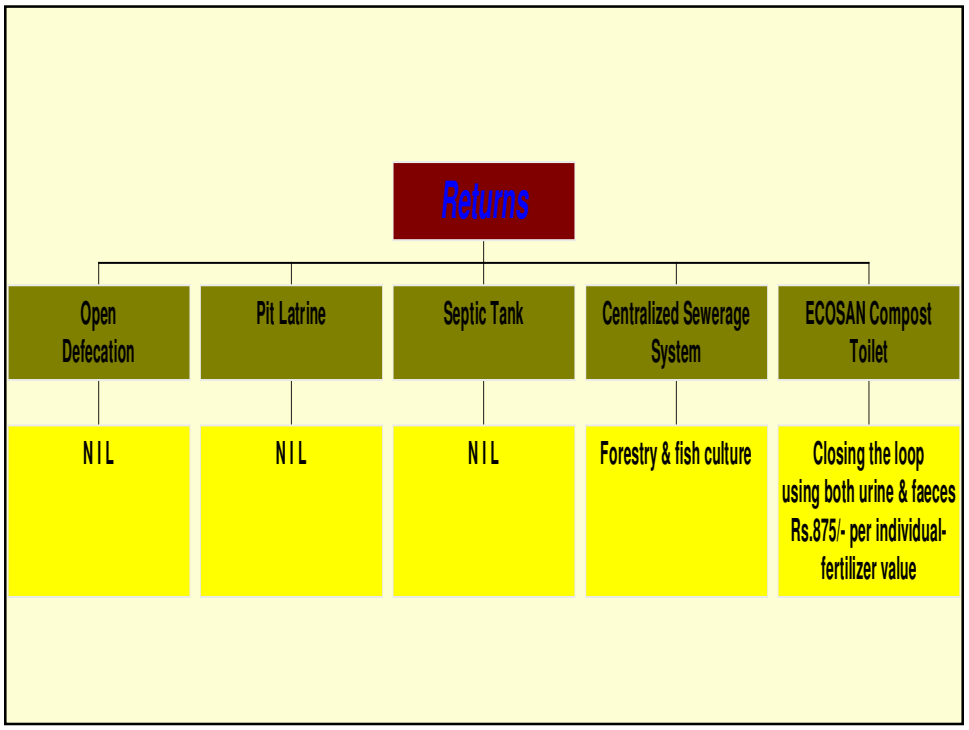
An innovative low cost technology incinerator has been developed for proper disposal of sanitary wastes. This design is simple, safe and cost effective. The incinerator burns / incinerates wastes like soiled cloth, cotton waste, sanitary napkins, paper towels etc.,. The waste gets converted into ash and other non-hazardous residues. It is user friendly and manually operated.

# Comparative Cost of Toilet Models




Environment Cost
Open Defecation
Pit Latrine
Septic Tank
Centralized Sewerage System
ECOSAN Compost Toilet
Serious impact
Very high
Pollutes air, water and soil
High
Very High
Operation & Maintenance high
No proper treatment facility
O & M very high
Special infrastructe facilities are required
Beneficial
Closing the loop


Returns
Open Defecation
Pit Latrine
Septic Tank
Centralized Sewerage System
ECOSAN Compost Toilet
NIL
NIL
NIL
Forestry & fish culture
Closing the loop using both urine & faeces Rs.875/- per individual-fertilizer value

| ECOSAN COMPOST TOILET | | | |
|---|---|---|---|
| **CONSTRUCTION COST Rs. 10,000/=** | | | |
| | | | **No. of members in a family - 6** |
| | | | **Usage period of Toilet - 20 years** |
| | | | |
| **EXPENSES** | | **INCOME** | |
| Usage of Water @ 3 litres per person | | Urine Collection | |
| 3 x 6 x 365 x 20 years = 1,31,400 @ Rs. 0.10/= | 13,140.00 | 800 ml x 6 x 365 x 20 years - 35040 liters x Rs. 0.20/= | 7,008.00 |
| | | | |
| Usage of Ash @ 150 gm per person | | Compost | |
| 150 x 6 x 365 x 20 years = 6570 kg @ Rs. 0.75/= | 4,928.00 | 500 Kg x 16 time - 8000 kg x Rs. 1.50/= | 12,000.00 |
| | | | |
| Repairing works - 2 time once in a 21/2 years | | | |
| Rs. 50 x 16 | 800.00 | | |
| | | | |
| **TOTAL** | **18,868.00** | **TOTAL** | **19,008.00** |
| | | | |
| | | Kitchen Garden (Banana, Greens, Vegetables) | |
| | | Rs. 100/= per month x 12 x 20 years | 24,000.00 |
| | | | |
| | | Compost | |
| | | 500 Kg x 16 time - 8000 kg x Rs. 1.50/= | 12,000.00 |
| | | **TOTAL** | **36,000.00** |

| ECONOMICS FOR MAINTENANCE OF SEPTIC TANK TOILET | | |
|---|---|---|
| | | |
| | Construction expenses - Rs. 15000/= | |
| | | **No. of members in a family - 6** |
| | | **Usage period of Toilet - 20 years** |
| S.no. | Particulars | Rs. |
| 1 | Usage Water for Flushing - 12 litres per day | |
| | 12 x 6 x 30 x 12 x 20 - 5,18,400 literes x Rs. 0.10/= | 51,840.00 |
| | | |
| 2 | Cleaning material for toilet like phenoyl, acid, brush | |
| | Rs. 500/= per year x 20 | 10,000.00 |
| | | |
| 3 | Removal of Sludge | |
| | once in three years Rs. 1500/= x 6 | 9,000.00 |
| | | |
| 4 | **Repairing Work** | |
| | Once in three years @ Rs. 1500/= x 5 | 7,500.00 |
| | | |
| 5 | Water usage for Urination | |
| | 3 x 6 x 2 = 36 litre | |
| | 36 x 365 x 20 = 2,62,800 x Rs. 0.10/= | 26,280.00 |
| | | |
| | **TOTAL** | **104,620.00** |

## ECOSAN – most sustainable and Cheapest model

- While cost of construction and maintenance of septic tank is over Rs.One lakh, ECOSAN Compost Toilet fetches an income of **Rs.36,000/-** in the same period.
- It is very clear that ECOSAN Compost Toilet is the cheapest most environmentally friendly and sustainable model of toilet.

## Challenges of Urban Ecosan

The country is now passing through an accelerated development phase. Urbanization is the special feature of the present trend. Hence Ecosan has a key role to play in urban areas, and more so in peri-urban areas close to the urban areas. These areas lack and will lack for a long time to come safe, sustainable sewerage disposal schemes. A pilot Urban Ecosan model project could be launched in these areas.

The challenges of ecosan in urban areas is more difficult in one sense. The mindset of people who are using the flush and forget system cannot be changed easily. But due to lack of proper method to dispose off the black water in front of each apartment or houses, they would sooner than later accept if a suitable model made available.

## Constraints :

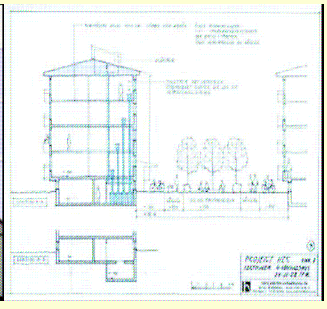
- **Easy to use, cost effective toilet model for urban houses should be made.**
- **A pilot project to make urban people understand, it is workable in urban area also.**
- **To convince urban people urine and compost for marketable for their nutrient value.**
- **Scientific backing by research of the safe nature of the product.**
- **Change the mind set of officials of all related departments, like education, health, agricultural sanitation, water supply department.**
- **Fertilizer value based on agricultural research should be established.**
- **Make education initiatives by commercial and local bodies officers.**
- **To convince all stakeholders it is not for the poor or rural or slum dwellers but for the rich urban and all interested in environment sustainability.**
- **Make farmers to know ecosan importance from the point of view of the farming community as a very rich product for organic farming.**

## Erdos Eco-Town, Dongsheng, China

**I had been to China recently to participate in international sustainable sanitation conference, when the Erdos urban Ecosan sector with ecosan toilets in about 480 apartments (four story buildings).**

### Principles :

**Toilet in each home at the eco-town is connected to a faces bin in the basement, through a hard plastic tube of 280 mm in diameter. The bin is replaced every one to two months. Fecal material emptied is transported to the eco-station, where heated composting is carried out and high quality fertilizer produced at the end of the process. This fertilizer can be safely used in agriculture in order to reduce the input of chemical fertilizers and to improve the safety feature of food.**

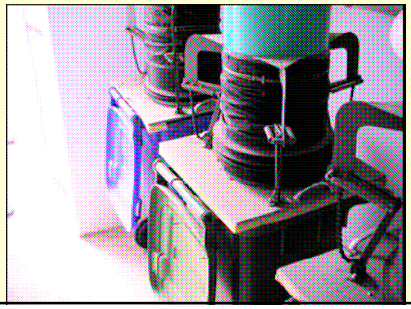


## How to use :

**Step one : Push twice the dispenser lever for adding addictives, to form a layer of addictive at the bottom of the feces bowl before use.**

**Step two : After use, again push twice the dispenser lever to convert feces with the addictive, to avoid the feces soil the bowl while dropping.**

**Each time after urination, pour a small cup of water in the urinal, to form a water lock at the "S" section of the urinal.**



## First Urban Ecosan Workshop in India On 6th Nov 2007 – at Thiruchi, conducted by SCOPE

- Prof. Rosemarin of Swedish Environment Institute, Stockholm, and his team were the consultants and were in charge of the workshop.
- Mr. Valentine Post, from WASTE of Netherlands and partners of WASTE in India, Bangladesh and Sri Lanka also attended the workshop.
- Mr. S. Paramasivan, country director, WTN, and Mr. Lucas Dengel, Auro Annam were presented.
- About 70 delegates from government departments, flat promoters, Bharathidasan University Research Scholars, P.G. Professors, and women's forum, students, etc. attended the workshop.
- The workshop was inaugurated by dr. M. Ponnavaikko, Vice Chancellor of Bharathidasan University.

## Research :

- Urine is liquid fertilizer, and used for agriculture purposes in many countries.
- In India the TNAU, a premier agricultural university has conducted research on urine on different crops, and found it to be very promising.
- Getting urine in India in sizable quantities is very difficult due to open defecation by over 65 percent of population.
- It is not possible to collect urine from 35% of households who have pit latrine, septic tank or centralized sewerage system where water is mixed with urine and faeces .


## Research in paddy field at Musiri, using urine as a fertilizer

**Taking advantage of the availability of urine in the Musiri ECCT, TNAU is now studying the**

**"potential of source separated human urine as liquid on fertilizer crop",**

**in 0.25 acre plot from Oct. 27th 2007, in Musiri.**

**The site is divided into 30 plots where the crop is raised under different dosages of urine, other fertilizers, etc.**

**The crop condition is monitored closely daily, and various parameters recorded.**

**Now the crop is ready for harvesting, research is going on and result is expected by this month**

## Advocacy and Training Programmes in other states in India

**Unicef has appointed SCOPE as technical Consultant for dissemination of ECOSAN concept.**

**Training masons for Eocosan construction in all the Sates of the country.**

**Training programmes have been conducted in States like , Andhrapradesh, Orissa, Maharashtra, Uttarpradesh, Bihar and Jarkhand.**

## Gavandari Village Maharashtra

## Oct. 16th - 19th 2006



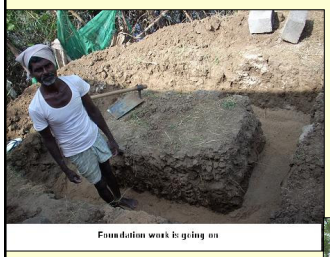

## On the banks of the River Ganges in Rusthambur Village, Bihar



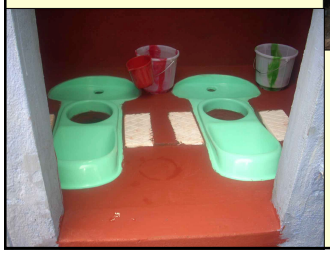
Feb. 20th - 23rd 2007


Masonry Training for SHGMembers at Patna

## Masonry Training Programme in Andhra Pradesh



Foundation work is going on




## Exhibition at Panipat in Haryana State

**HH the King of Netherlands looking at the ECOSAN products exhibited by SCOPE at Haryana.**
**Mrs. S.S. Nair I.A.S. explaining the features of Ecosan.**

## Need of loud voice

**Indian scientists who have sent several satellites into space, and also made rockets to launch missiles will not find it difficult to make a simple toilet model if only they are told of our need.**

**We have to make our voice loud and clear enough to make all stakeholders understand what is their role in making our planet greener, safer and environmental friendly for future generations, by making them realize the role of sanitation and ECOSAN.**


SCOPE

**Society for Community Organisation and Peoples Education**

P/17, Ahmed Colony 6th Cross, Ramalinga Nagar,

Woraiyur Trichy – 620 003.

Phone : 04321- 2774144  Mobile : 9443167190

E-mail : scopeagency86@rediffmail.com, scopeagency86@gmail.com

Website:
scopetrichy.com
scopetrichy.org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