Welcome to all

SEI DDWS TRICHY

Preparatory workshop for the development of Ecosan Manual for individual household, school and community toilet for "Total Sanitation Campaign"

26 and 27th November 2009 – New Delhi

Society for Community Organisation and Peoples Education

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- **ECOSAN toilet in use in Cauvery plains**
- **Current design**
- **Possible improvements in house hold and Community**

Presented

By

M.Subburaman

Director

SCOPE, Trichy.

SCOPE's experience in the field of sanitation during the period 1990 - 2000

1. **Awareness creation through demonstration, exposure visits, PRA, Sanitation parks, Film show, inter-personal communication, group meetings, street plays, hygiene festivals and hygiene pongal.**
2. **Constructed 20,000 individual house hold bath room cum latrines in Trichy District.**
3. **12 Sanitation Parks constructed in SIRD, RIRD,District head quarters and KILA of Kerala.**
4. **Established a Rural Sanitary Mart and a production center in Trichy and Perambalur.**

Community, School and Anganvadi toielts

1. 9 community toilets constructed by SCOPE in Trichy city Corporation are maintained by the Self Help Groups. Following the success of this, 40 community toilets were constructed by Trichy City Corporation under various schemes and are maintained by SCOPE SHGs

2. School toilet complexes were designed and constructed in 70 schools in Musiri Block of Trichy District.

3. 50 Anganvadi toilets were designed and constructed by SCOPE.

Sanitation scenario in Cauvery plains

1. **Open defecation posed a variety of problems to environment. But worst affected was women, who often suffered silently.**
2. **Dispensing with open defecation pit or septic tank latrines were constructed by those who could have afford**
3. **This also was not satisfactory as it had its own problems.**
4. **Hundreds of poor women living near Cauvery river wanted latrines. Observing the problems/limitations they were hesitant to construct traditional latrines.**

Problems faced

Shifting of construction area from dry zone to Cauvery river banks (high water table areas)

1. A study was conducted by SCOPE about the functionality of leach pit toilets in the river side villages of Musiri Block.
2. The study revealed : The leach pit toilets were overflowing and collapsing frequently since it was high water table/water logging area.
3. The maintenance was very difficult.
4. Septic tanks were constructed without any specifications.
5. Disposal of septic tank sledge was costly.
6. More chances for soil and water pollution (sludge was let into Cauvery river and open spaces).
7. Septic tank latrines were costly.

Limitations of Pit Latrines

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

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

Removal of black water from septic tank with vacuum cleaner tanker

Black water from septic tank being let into Sacred River Cauvery from a tricycle septic tank cleaner from Cauvery bridge near Musiri

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.**

Blackwater gushing out of manhole and Removal of blockage by a sanitary worker.

Solution to any problem

(Open defecation)

Should not lead to a

new problem

If so

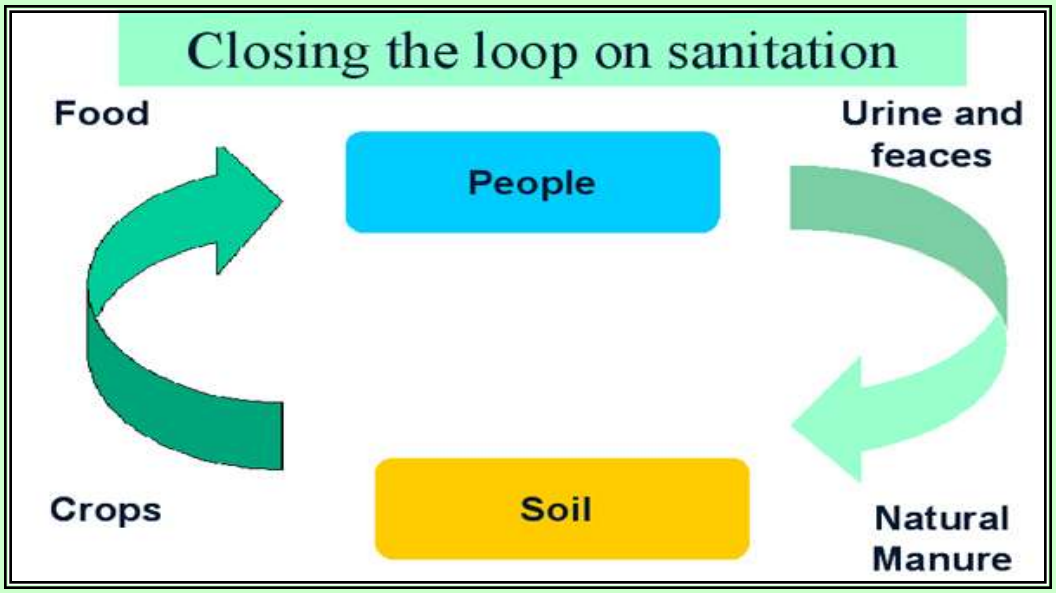
WHAT IS THE ANSWER?

Ecological Sanitation

(Urine Diversion Compost toilets)

- ✓ **It is an innovative model of dry toilet.**
- ✓ **Amount of water used for abulation is very minimal 2 liters as against 10 to 12 liters in other form of toilets**
- ✓ **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 or lime powder, sprinkled becomes a good soil conditioner.**
- ✓ **Urine and wash water each collected separately, are used for irrigating kitchen garden, farms etc.**
- ✓ **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**
- **Users numbered after using the toilet.**
- **First chamber was used 4320 times and when got filled up closed after 15 months.**

SCOPE design – 1 : Two in One model

Kaliyapalayam shows the way

Workshop by Unicef & Mr.Paul Calvert in 2002 at Chennai.
Workshop on ECOSAN by SEI with Prof.Jan Olof Drangert, Linkoping University, Sweden October 2002 at Bangalore.
The Kaliyapalayam initiative was launched under the guidance and advice of Ms.Shantha Sheela Nair IAS. RD Sec, Govt Of Tamil Nadu in 2003.

Access to open defecation land was denied.

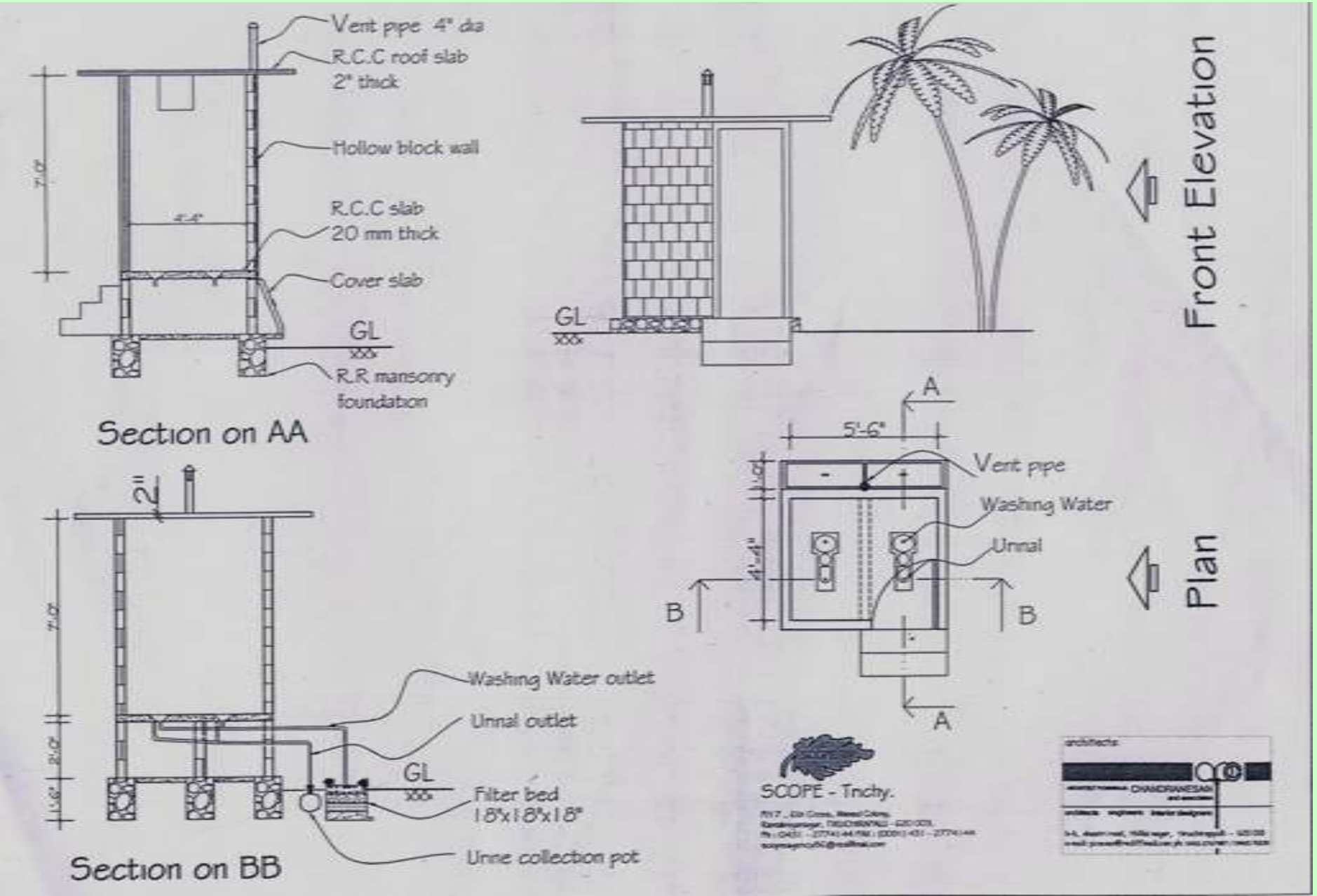
Residents of Kaliyapalayam Village near Musiri, on the banks of the River Cauvery desperately in need of toilets.
Pit latrine unsuitable due to high water table.
Septic tank not acceptable.
Exposure visit to ECOSAN Compost Toilet in Thanneerpandal Training Centre.

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.


rs. Shenbagavalli the pro

Design changed as 3-in-1



Design change (2004)
3 in 1 model

- 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.

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Improvements in house hold toilets.

Urine collection in a plastic can instead mud pot.

The compost collected is being applied in the kitchen garden for good yield.

The rich compost taken from the ECT chamber and used for plants

Mr.Kumar Alok, Director TSC, Government of India visited the Seventhilingapuram village where 250 Ecosan toilet constructed with the support of UNICEF and DRDA, in 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

SCOPE has constructed more than 350 Ecosan toielts in Tsunami hit coastal area of Nagappattinam District with the support of UNICEF & TSC

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

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

No foul smell, no flies

The family members took the compost by their hands without hesitating

Dr. Arno Rosmarine, Prof.Jan Olof Drangert from Sweden and a team of UNICEF open the first ECOSAN Compost Toilet at Thanneerpandal on Nov. 18th 2004 on the eve of "World Toilet Day"

So far 210 Toilet chambers opened and the compost removed in the presence of Government Officials, PRIs, NGOs, Foreign delegates. The compost used in their kitchen gardens.

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.

SCOPE constructed 24 Ecosan individual toilets in the permanent houses at TS Pettai of Cuddalore District 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.

Bio-gas linked toilets in Musiri

Sanitation is a broader term and includes disposal of human waste, liquid waste, solid waste, control of vector diseases, domestic and personal hygiene, food sanitation etc,.. The safe disposal of human waste is most important for improving the public health and economic growth.

Recycling and reuse of human excreta for biogas generation is an important way to get rid of these health hazards.

Biogas is a promising non-conventional energy and it is a better energy from polluting waste, clean and efficient, eco friendly, money saver, time saver, minimizes expenditure on the foreign exchanges on the import of fossil fuels apart from producing enriched bio-manure as bye product for increasing productivity and soil conservation.

Mr. Stan Massen, WASTE, Netherlands inaugurating the toilet linked bio gas plant in a individual house toilet by adding the cow dung

- **In the field of renewable energy, biogas technology refers to systems designed to turn organic waste products into usable energy. Biogas is a kind of gas that is produced during the anaerobic processing of organic matter such as manure, plant matter, or even municipal waste materials. Biogas typically consists mainly of methane, with a significant proportion of carbon dioxide, and smaller quantities of other gases such as nitrogen and hydrogen.**
- **Many people are familiar with hydrogen as a potential fuel source, thanks to its promotion as a potential alternative fuel, and all of us consume hydrogen every day, in the water we drink and the foods we eat.**
- **SCOPE has been constructed 10 Bio-gas linked toilets in Musiri.**

TEST REPORTS

COMPOST

ENVIRONMENTAL MONITORING SERVICE

Aurobindavan, 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, Thannerpandal 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

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

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.

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.

Involving of stake holders like Govt. Officials, Funding agencies, NGOs, and the local people from the beginning itself will lead to success.

Mr. Somanath, Secretary to CM,
Tamil Nadu
visited ECCT, Musiri

Dr. Gopal, I.A.S., Director,
Town Panchayats, Tamil Nadu
Cutting the bunch of Banana
Which raised in ECCT, Saliyar
Street, Musiri, by using the urine
as liquid fertilizer.

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

A separate toilet for the aged persons in Musiri ECCT

Inner view of the toilet for Aged

Mrs. S.S. Nair's visit to ECCT, Musiri

1. **Urine is collected through a sand and charcoal filter then stored in a tank below ground level.**
2. **The wash water is let in to a filter bed and then supplied to the nearby farm for the cultivation of Banana.**

Transportation of Urine from ECCT to research field

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

Taking advantage of the availability of urine in the Musiri ECCT, TNAU studied the "potential of source separated human urine as liquid on fertilizer crop".

Two harvest of paddy completed and the result from TNAU is encouraging.

Banana research using urine as a liquid Fertilizer

1. **Urine application – dripping system**
2. **Measuring the growth of plant**
3. **Dist Collector harvesting the Banana bunch**

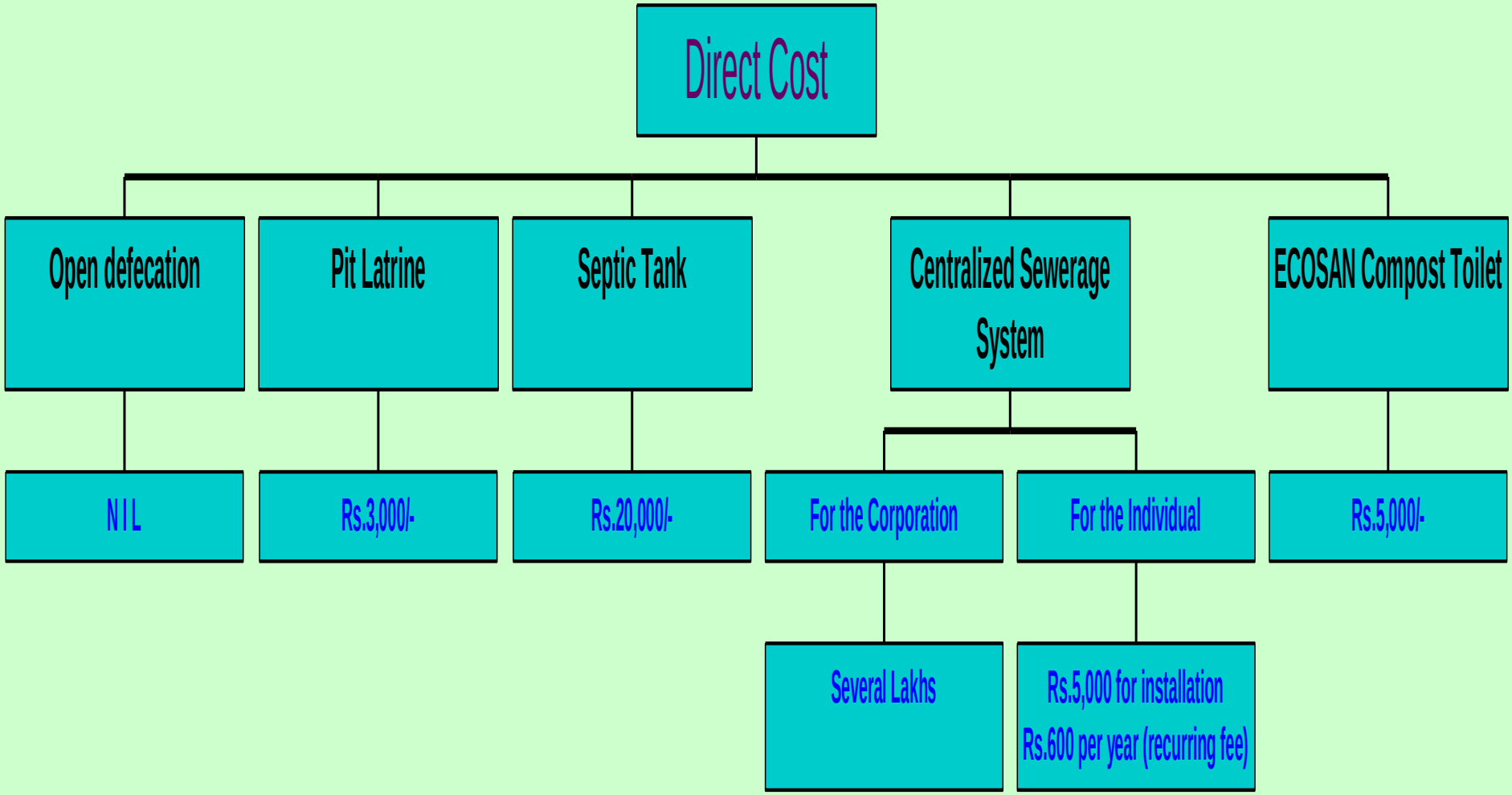
The First compost chamber of ECCT opened By Mr. V.Post of Netherlands in the presence of MSTP President Mr.V.C. Sudhakar in Saliyar Street, Musiri.

1117 kgs of Compost taken out

Ecosan toilets in schools

SCOPE constructed 10 Ecosan toilets in schools at Nagapattinam District, Musiri, Trichy city, Mamallapuram and Krishnagiri district. The collection of urine is being used for growing garden, paddy field etc.

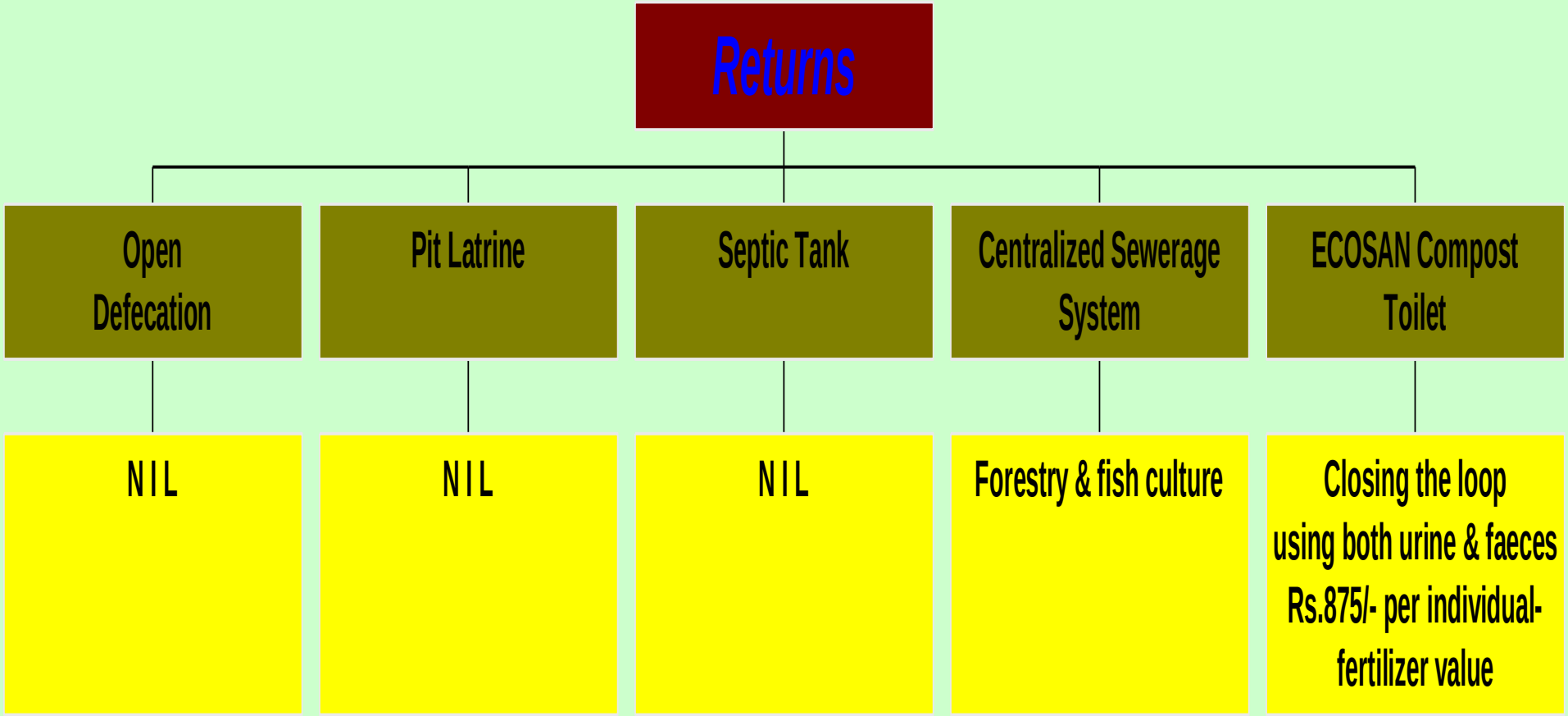
Comparative Cost of Toilet Models




Social Cost
Open Defecation
Pit Latrine
Septic Tank
Centralized Sewerage System
ECOSAN Compost Toilet
Health hazard
Medical bill
Psychological impact
Human dignity, Time
Water Centered
Not feasible in all areas
Space constraint
Dignity acceptable
Rs.1,500 per year for 3 years
Dignity acceptable
Dignity

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
N I L
N I L
N I L
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 environmental friendly and sustainable model of toilet.

Advocacy and Training Programmes

Unicef & PLAN have recognized 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 Tamilnadu, Andhrapradesh, Orissa, Maharashtra, Rajasthan, Uttarpradesh, Bihar, Utharanjal and Jarkhand.

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.

First Toilet Beauty Contest in India- Kameshwaram- July, 2007 (First of its kinds in the world)

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.

Three prize category for Best Garden, Best Outside Decoration and Best Inside Decoration. Prizer were Rs. 5000/-, Rs.. 2,500/-, and Rs. 1,000/-

The inside drawing picture shows, that a lady showing how to put the Ash powder in the drop hole of the Ecosan Toilet.

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

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.

"Use toilet and get money "

- The brain behind this concept is Mrs. SS Nair IAS

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.

The Impact of Paying money to users of the toilet

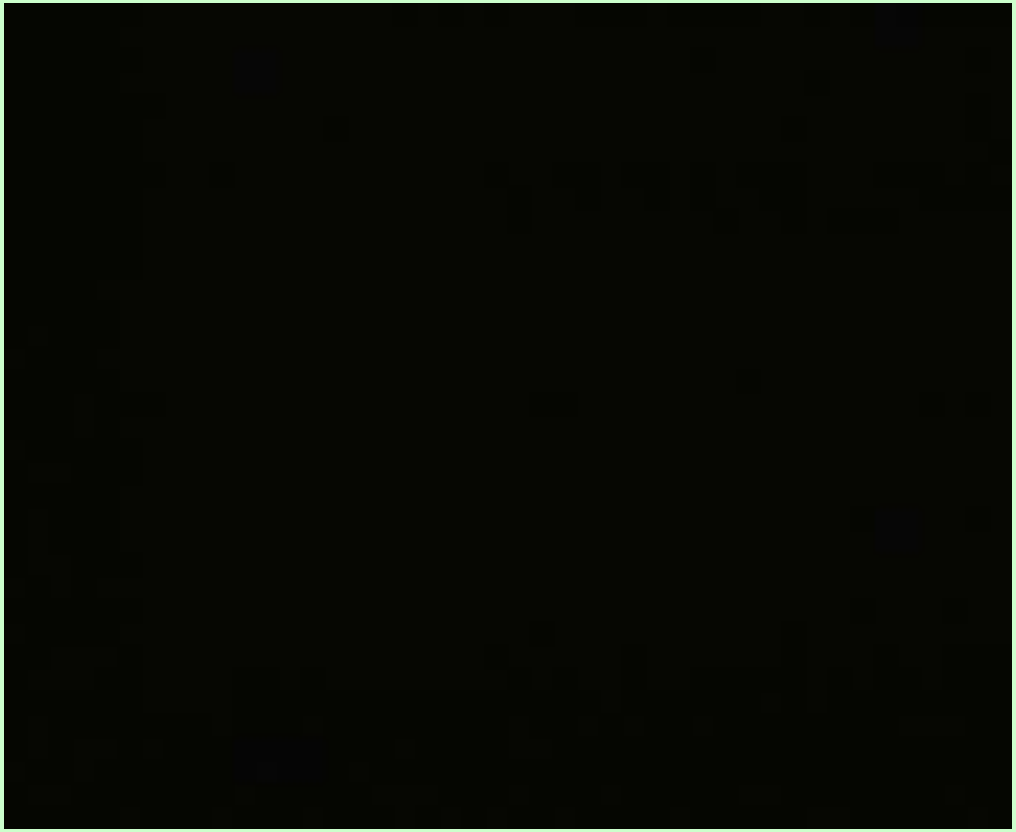
The users started thinking why these people are paying for our human waste. That mean it must be valuable one. So in Individutal toilet owners also started collecting the urine from their toilet and using for their agricultual purpose. The demand for construction of Ecosan Individual toilet is increased by receiving 300 application by MSTP.

This scheme is become very popular all over the world by the publicity of several magazines, daily news papers, by all the Tele medias from India, and in other countries like Bloom Berg , Singapore, CNN.com Aisa, and also BBC, London.

Because of this the President of MSTP, and the Pioneer Lady of Ecosan Mrs. Mangalathammal, invited to partcipate in 3rd SACOSAN conference at New Delhi, to share their experience about the commuity toilet and “use and get money” scheme.

Kitten Kindles

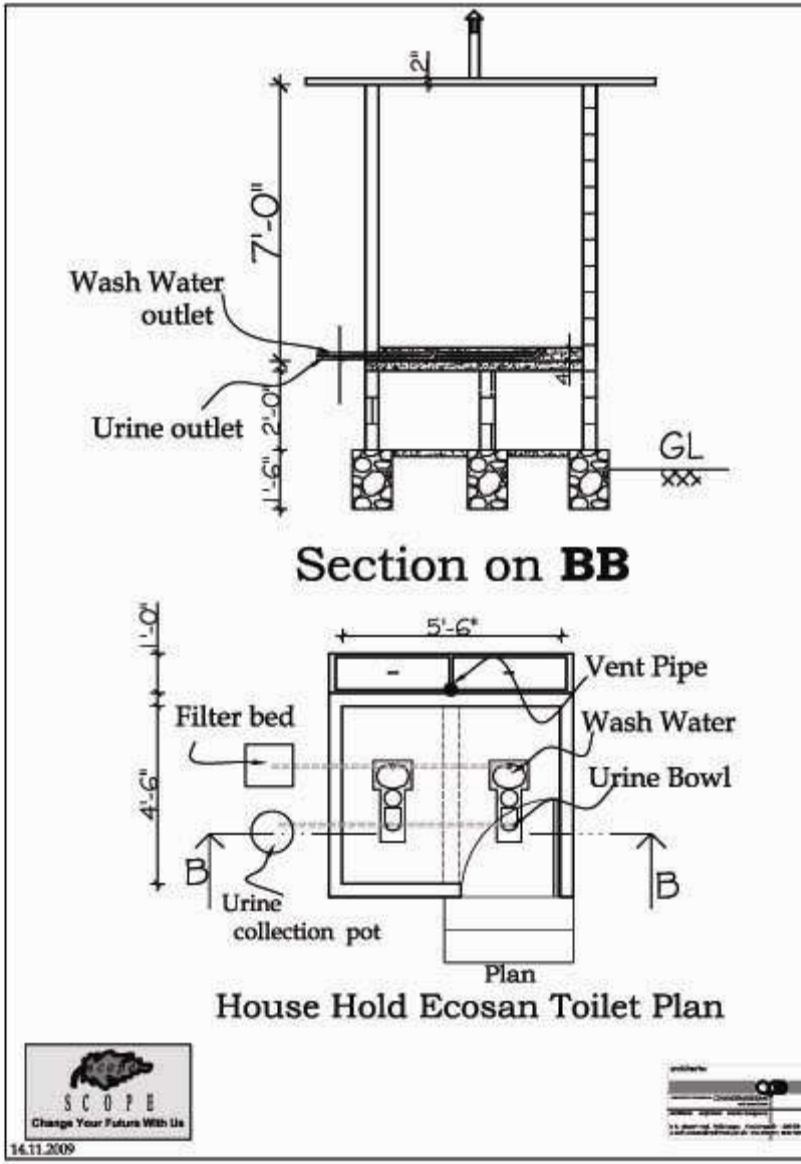
The school student and his playmate the little kitten wanted to answer natural call. The young boy rushed to the cover of a tree, and when he watched his friend, was totally shocked. He saw the animal friend digging a pit, defecate and carefully close the feces with the soil. With a sheepish look he rushed to the toilet.



We human beings have to learn a lot from out animal friends.

Recent changes in Ecosan models

In this new design the urine and wash water collection pipes are fitted above the squatting slab level to avoid Any leakage inside the compost chamber which will lead to foul smell and O & M is easy by using this model.



Extracting STRUVITE from Human urine

Scaling up Ecosan through IEC activities

IEC activities to promote Ecosan

Ecosan-Festival at Kameshwaram

Kameshwaram a Tsunami hit coastal village in Nagappatinam district of Tamilnadu today has 350 Ecosan toilets which are functioning well Last three years

Adding Urea in the Ecosan compost chamber will increase the quality and reduce the time for composting

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

Exposure Dialogue Programme

4 German delegates- a Member of Parliament, Journalist, Senior Development Manager, and an Ecosan Expert stayed for 3 days in Musiri

They closely involved with the activities of the family during their stay, besides learning how the Ecosan movement was progressing.

- **THINK OF ECOSAN FOR NEW HOUSES / FOR CHANGEOVER**

- **IT IS EASY TO CONVERT OPEN DEFECATION TO ECOSAN.**

Challenges before us:

Ecosan toilet construction, usage, post construction phase etc. are very different from conventional toilets – pit latrines and septic tanks. Intensive training should be given to the masons, to the users and supervisory staffs for the successful working of the toilets. Post construction monitoring is very essential for at least one year, so that the family will know when to close the first chamber, use the second chamber , remove the compost etc. If there is a mistake in any one of the three aspects, the system will not succeed.

- **Sustained IEC is necessary to remove the Social prejudices.**
- **It should be further backed by continuous data bank creation on the basis of research by reputed organist ions and acceptance of the same by regulatory bodies like the government.**
- **Co-ordination of different stake holders is very necessary and should be properly facilitated.**
- **Successful best practices models should be created in different geographical locations and by different agencies.**

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

Be Proud of

Being an

Indian

Jai Hind