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1. **Water Less Urinals (URIMAT)**

Water less Urinals with microbiological Cleaning Systems to improve the hygienic. The exchangeable Urimat MB Active Trap collects the urine and channels it into the waste pipe without flashing, while at the same time sealing in any odours. Fluids are channelled via a vertical membrane straight into the sewage system. Above the membrane there is a microbiological cleaning block which prevents build up of deposits both side the odour seal unit and in the waste pipe. As soon as fluids stop flowing through the membrane and it automatically forms an airtight seal.

After the microbiological Active trap has dissolved, the red surface beneath the transparent, signals that the odour trap has to be replaced (Average after used 8000 times). Average maintenance cost for one use of the urinal is: 15 to 25 paisa.

Picture: The MB ActiveTrap

The water Less urinals can be installed at the schools, Anganwadi, Public Health Centres, Panchayats Office, Community Level Assets, Religious Places, Market Places & Bus Stops. **The Total Number of 8 units (4 Units for Gents & 4 Units for Ladies) can be installed in the above places. As a Pilot basis, each Districts may be installed in 20 different places.**

2. Disposal of Used Sanitary Napkins through User friendly Sanitary Napkins.

Summary of the Product: Sanitary Napkin Incinerator is a product where the used Sanitary Napkin can be disposed off most user friendly and safe way, by burning it at the required temperature. The product is most advance with Auto Cut-off feature and easy to operate.

Design Capacity: Destroys solid sanitary napkins hygienically, Powder coated steel body, User friendly features and easily usable, operates on electricity, burns 150 to 200 napkins per day, can be programmed for cycles/day Burns napkins completely producing only less than 1 gm of ash per napkin. Ash collection tray for easy cleaning, Automatic temperature maintenance, Auto power off, auto thermal cut-off for safety of user, Ceramic insulation for excellent thermal protection, Wall mountable

Treatment Protocol: Using Electric heater, more than 600-degree heat is produced, Mean time when Wet napkin is inserted inside SNI, initially smoke is produced and then napkin starts burning. Napkin which is burnt produces ash, which is stored in the ash tray.

Post Treatment handling Protocol:

1) How much ash is produces: 1 napkin produces 1 gm of ash.

2) what are Ash contents: suspended particulate matter (SPM)

3) what emission during the process: SO2, NO2, CO, CO2

4) how ash can be disposed: Ash can be flushed in the toilet.

Operations and Maintenance Cost: The operation cost is only electricity usage which is 0.3 units per cycle of 14 minutes

Ease of Operations and Management: The product is very easy to use as the used pads are to be just put into the incinerator from the easy loading front door, then after one cycle load of 15- 20 napkins are put in, just press the start button, it will automatically cuts-off once the cycle is completed.

The coverage of incinerators in government and government aided schools in the country is 29.47%. Lack of awareness and means to manage the process not only influences their health and lifestyle, but also leads to absentees and dropout from

schools. As such, it is imperative that to take necessary steps to provide a safe and enabling environment to such girls and supporting installation of incinerators as part of their basic health, well-being and education. **This fund may be utilised to support schools for maintenance of incinerators already installed or in case additional infrastructure is required in the 4652 Higher Secondary Schools of Rural areas and 5786 Panchayat middle schools of Peri urban areas.**

3. Promotion of Home Composting in small towns as an Individual Environmental Responsibility

Summary of the Product: Green Earth Machine (GEM) is an improvised plastic bin for facilitating composting of kitchen waste at individual household level. Bin capacity varies from 100 to 200 lit. and there are few implements for operation. It works entirely on natural process and does not involve inputs of electricity or chemicals or any bio culture, etc. However, to initiate and accelerate biodegradation of organics, one can seed the bin with farm yard manure.

Design Capacity: Between 100 - 200 lit. for household level application

Treatment Protocol: It is a natural process involving balancing of food waste and brown waste (e.g., dry leaves, brown paper etc.) (C: N), very little moisture, seeding with soil/compost and occasional sprinkling of Neem khali. Mixing of the contents once a fortnight. Two bins are operated in an alternating cycle of 3 months. Compost is ready in about 4-5 months.

Post Treatment handling Protocol: Note necessary. But one can keep the composted material in sun for 2 days for drying. Sieving / screening is also not necessary in it is for internal use.

Operations and Maintenance Cost and Protocol: Virtually no costs. Maintain a balance of the green waste and the brown waste, ensure little bit of moisture, sprinkle some soil/ old compost

Interference with Ecosystem: None what so ever. As a matter of fact, it produces high-quality home-made compost which will reduce existing pressure/ stress on the ecosystem, especially in the smaller towns in rural India where there are no service providers for lifting of waste.

Home Composting can be initiated at the place where is no feasibility for community level solid waste management and also with the individual own responsibilities. The Home Composting can be promoted initially at the village panchayats on saturation basis.

4. Mobile Septage Treatment Unit

Problem Statement: Presently, in rural areas, truck operators are desludging on-site containment systems and dumping the faecal sludge and septage in drains, water bodies and open areas, causing high level of environmental pollution and health risks. Many Rural Areas are already suffering the consequences in the form of health ailments and serious pollution of water and soil resources. Most of the operators do not decant the septage in treatment plants due to non-availability of the same. In some cases, treatment plants are so distant that it deters the operators to decant there due to high fuel/operational costs.

Scope: As of now there is no on-site treatment products exist in the tamilnadu to treat the effluent of onsite sanitation systems such as septic tanks, WASH Institute has come up with an Innovative product/solution to treat the effluent on the site. As septage extracted from the septic tanks consists 90-95% liquid and 5-10% solid, treating the liquid on the spot addresses the major challenges related to Faecal Sludge and Septage Management (FSSM). The sludge is collected for secondary treatment.

Innovative Solutions-Mobile Septage Treatment Unit: It is a treatment system installed on the bed of a small truck, which is able to treat the contents of septic tanks. The on-site mobile treatment unit works with the concept of solid-liquid separation, sludge thickening and effluent treatment process. While the liquid is separated from the solid, the effluent passes through the treatment process and disposes the treated effluent. The sludge thickening process helps further in reducing the moisture content in the sludge. The solid sludge is collected in centrifuge and it later goes for secondary treatment. The operational capacity of the MTU varies from 3000 to 6000 lits/hr.

Advantages of MTU:

- Capital Investment is lower than the Trucks used by Cesspool Operators
- The Treated effluent's characteristics are well below than the existing CPCB norms of wastewater disposal
- The Operational cost to empty & treat septic tanks (capacity between 3000-5000 litres) works out to be Rs.650/-, which is much lower than the existing market price claimed by the Cesspool Operators.

- Since the MTU can empty & treat 4-8 tanks in a day (depending on the size of the tank), Operators can empty & treat multiple tanks in a single trip, thereby saving fuel costs and preventing environmental pollution.

Treatment Capacity of MTU: WASH Institute has assembled 4 MTUs of which 3 Units are having a capacity of treating 3000 litres per hour. The 4th Unit can treat up to 6000 litres per hour. All the 4 existing units can together treat 15000 litres per hour. The current design of the MTU can empty & treat up to 95% of the total volume of a septic tank. The remaining 5% (which is thick sludge in nature) is left in the tank as sludge blanket for future growth of pathogens in the septic tank. It may be noted that the MTU is designed to empty & treat septage from sealed septic tank only, not from unsealed septic tank or leach pit. The MTU treats the effluent 100% and sludge gets collected in the centrifuge. On an average, the MTU treats 4-8 septic tanks depending on the storage capacity of the tank. At the end of the day, the sludge collected is taken for secondary treatment to drying beds or existing STPs. WASH Institute is converting the thickened sludge into Briquettes (low-cost replacement for Charcoal).

Capital and Operational Cost: The actual assembling cost of a MTU with the treatment capacity of 3000 litres is Rs.1075000/- and the MTU with the treatment capacity of 6000 litres costs Rs.1375000/-. Including accessories and training, the cost for 3000 and 6000 lits capacity MTU will be 11,75,000/- and Rs.14,75,000/- respectively. The Capital cost includes the cost of the Mini Truck as well (The current cost of Mahindra mini truck is around Rs.5,50,000/-.

The MTU Unit can be installed for the cluster of village panchayats having Households more than 2000 numbers with septic tanks where the existing FSM facilities is not available in 20 kms ranges.

5.ECOMAC PYROLATOR

A unique Garbage Decomposition Equipment, using Magnetic Heat Technology, without using any fuel such as oil or electricity.

Unique/ Key Product Highlights

1. No Electricity/No Solar/No Petroleum Fuel

- Magnetic Heat Technology
- Chimney alone operates on electricity (1HP Consumption Motor) with negligible power

2. Feeding Garbage is the Fuel for the Equipment

3. Reduces Land filling substantially

- Reduces the volume of garbage in the ratio of 200:1 to 300:1 (Ceramic Ash)

4. Total Cost of ownership

- Low Cost of ownership.
- Can be operated by unskilled labors
- Minimal training requirement
- Easy to operate
- Minimal Maintenance support required

Advantages/Merits of – ECOMAC Pyrolator

- It eradicates all septic/poisonous substances (example, Hospital Generic wastes & other contagious substances like virus and bacteria)
- The residual output is Ceramic ash, which can be used for various purposes like home painting and is good for road asphalting.
- Is a unique apparatus for garbage disposal which generates a special Magnetic Heat Decomposition method, without using any fuel such as oil or electricity.
- Reduces the volume of garbage in the ratio of 300:1, 200:1

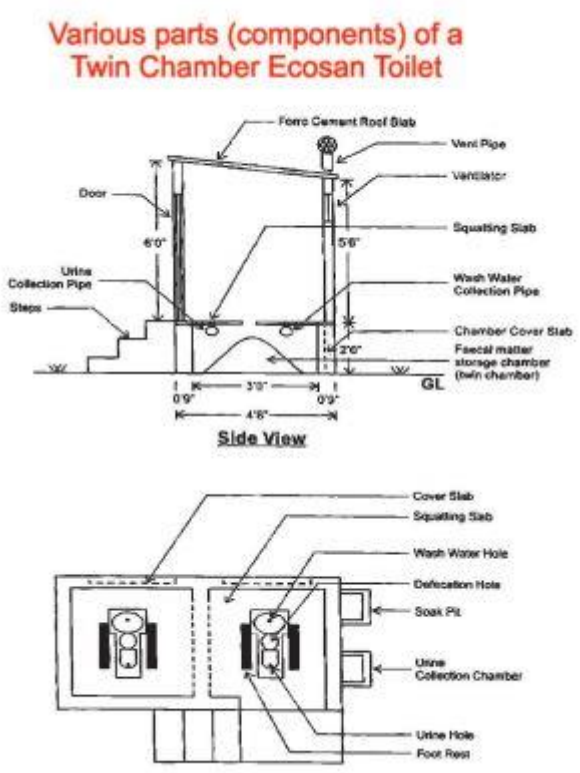
- There is no flame required to burn the organic waste, thus less smoke, even after dumping petrochemicals such as vinyl, plastic, etc.
- Organic wastes residues can be used as a by-product for improving soil conditions and can act as a disinfectant, after mixing with water.
- The duration of decomposition depends on the ratio of moistness of garbage. It is recommended the moisture is maintained below 65%.
- It has been proven that the Toxic substances put in this system revealed that there was no emission of any toxic nature in spite of processing at low temperature (400 C ~ 600C).
- As compared to the incinerators which operate on high temperatures and require secondary combustion system, ECOMAC requires no such operation and does not require higher temperatures as it has the unique feature of Magnetic Decomposition.

Ecomac Pyrolator

- **The Ecomac Pyrolator can be installed in the peri urban panchayats generated above 10 tonnes of waste/day.**

6. ECOSAN TOILETS

Ecological Sanitation or Ecosan toilet is based on the principle of minimizing the loss of nutrients in human wastes and using such wastes, including urine for agriculture purpose. It is closed -loop system, which treats human excreta as a resource. In this system, excreta is processed on site until is free of pathogenic organisms. in the system, faeces and urine are collected separately in containers. Urine is used in the agriculture land directly, where as faeces are stored for 6 months or so, to degrade it and its use in agriculture. In this system, water is not used for cleaning purpose. To prevent foul smell, dry ash is put after each use of toilet, in the container. Degraded human waste is directly used for agriculture purposes.



If ecological sanitation could be adopted on a large scale, it would protect our ground water, streams, lakes and seas from faecal contamination at the same time less water would be consumed. Farmers would also require less chemical fertilizers, most of which is washed out of the soil into water, thereby contributing to environmental degradation. Since in rural areas, more agricultural land is available, therefore, Ecosan toilet system can be made a productive sanitation system for such areas. The system is also suitable for high water table areas, and also for, flood prone and rocky areas, where conventional pit toilets are not suitable.

Advantages of Ecosan Toilets

1. It saves water
2. Protect ground and surface water from contamination
3. Recycles valuable nutrients
4. Contain and sanitizes excreta
5. Creates no waste
6. Does not smell
7. Provide no place for mosquitoes to breed
8. Self-contained and can be totally managed by the family.

The Ecosan Toilets can be installed in costal districts where the water table is high as of the requirement is 28241 toilets and also in Group house construction at community level.

7.Tiger Bio filter for Faecal Sludge & Septage Treatment

The Tiger Bio Filter Technology for Faecal Sludge and Septage Management is a sustainable and environmental friendly faecal sludge treatment technology. The Tiger Bio filter is a vermifilter-based faecal sludge treatment technology. It is a novel and unique faecal sludge treatment system which utilizes specially bred earthworms and microorganisms for consuming faecal sludge and converting it to compost. The earth worms used in the bio media filter unit are a species capable of compositing waste. Trapped sludge matter is consumed by earth worms as an energy source for metabolism and reproduction. The worms typically consume the sludge organic load in 24 hours and making bed available for next loading.

This system is optimizing for most efficient earthworm activities. The process is entirely natural and requires no power or chemicals to be added. This makes the technology very economical to install and operate. Treated faecal sludge is directly converted to vermicompost without the need to handle unsafe sludge. The effluent from the Bio filter can be used for irrigation. Optionally, with added treatment such as sand and activated carbon filtration and disinfection, the effluent can be used for flushing and washing.

The Tiger Bio Filter can be installed for the cluster of village panchayats having Households more than 2000 numbers with septic tanks where the existing FSM facilities is not available in 20 kms ranges in continueous process with mobile treatment unit.

8. Soil Bio Technology (SBT) for Sewage Treatment

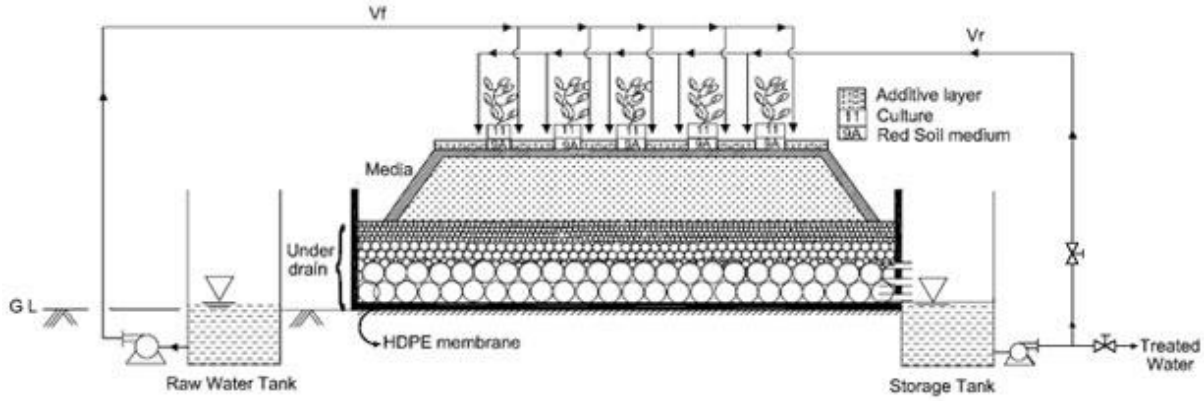
This technology has been developed by IIT, Mumbai. SBT engages three fundamental process of Nature – Photosynthesis, respiration and mineral weathering. This is achieved by soil micro-organisms which are regulated by soil micro –organisms (geophagus earthworms).

Primary and Secondary treatments are achieved in the SBT. The organic & inorganics in waste water is consumed and converted into useful byproducts and simultaneously water of desirable quality is produced. SBT thus removes BOD, COD, Ammonia, Nitrogen, Nitrate nitrogen suspended solids bacteria, colour, odour. The SBT is ideal for treating waste water less than 5 MLD.

Soil Bio Technology (SBT) is an efficient process of synthesis to completely utilize solids and liquids. It is economical in capital and recurring costs. It has a simple looking construction, free from conventional electro-mechanical systems which are prone to breakdowns. It efficiently integrates the physical, chemical and biological processes into a single aerobic system based on natural biophysical and bio-chemical principles. A specified additive is added in a predefined proportion. SBT is a synthesis process which harnesses the energy, carbon and other elements of the waste and converts them to precious "Bioenergy" products like vegetation, energy rich soil, complete Bio-fertilizer and water. It offers a bacterial removal of approx. 99.99 % thus ensuring a healthier environment in a sustained manner without any side effects.

Some of the salient features of SBT:

- Rejuvenation/creation of soil.
- Can be utilizable for all sorts of organic and inorganic molecules present in the effluents.
- No req. of electricity and chemical (Electricity requirement only for pumping).
- Generate Bio-energy
- Little space area as per requirement per person (100 litre per day) is 0.021 m2



The Soil Biotechnology Unit can be installed in the peri urban village panchayats with grey water generation of more than 500 KLD. Best suitable in the region of less space for grey water management

Cost Estimation for the work proposed under Swachh Bharath kosh

S.No	Technologyies proposed	NO of units	Amount per unit	Amount (in lakhs)
1	2	3	4	5
1	**Water Less Urinals (URIMAT)**		**Rs. 6,000 (Only the Urinals)**	
2	**Disposal of Used Sanitary Napkins through User friendly Sanitary Napkins**		**Rs.19,833 (one full incinerator only)**	
3	**Promotion of Home Composting in small towns as an Individual Environmental Responsibility**		**Rs.6,000 (Two 200 litre bin and microbial solutions)**	
4	**Mobile Septage Treatment Unit**		**Rs.13,00,000 (Including Vehicle and Septage unit, solar dryer may be procured separately)**	
5	**Ecomac Pyrolator**		**Rs. 60,00,000 (only the Pyrolator)**	
6	**Ecosan Toilets**		**Rs.25,000 (one full complete Individual toilet)**	
7	**Tiger Bio filter for Faecal Sludge & Septage Treatment**		**Rs. 25,00,000 (12 bio filter Beds)**	
8	**Soil Biotechnology Treatment Unit**	**15 KLD**	**Rs. 15,00,000 (collection tank, processing tank, storage tank, motor)**	
Total amount to be proposed				