

32nd WEDC International Conference, Colombo, Sri Lanka, 2006

SUSTAINABLE DEVELOPMENT OF WATER RESOURCES, WATER SUPPLY AND ENVIRONMENTAL SANITATION

Ecological Sanitation Compost Toilets in Sri Lanka: An Appropriate Solution?*Constanze Windberg, Germany, Philippe Barragne-Bigot, Sri Lanka*

Ecosan toilets were introduced to Sri Lanka in 2001. There is an increasing interest in ecosan technologies with NGOs and INGOs and Ministries (Ministry of Urban Development, Ministry of Health). In 2005/6 approximately 50 ecosan toilets were constructed and several upcoming projects include ecosan technologies. However, there is no sound ecosan strategy existing yet. The efforts of the different stakeholders have to be bundled and streamlined. Misconceptions have to be clarified and the limited experiences in Sri Lanka discussed. To facilitate the sustainable introduction of ecosan, UNICEF contracted an international consultant to evaluate the appropriateness of ecological sanitation in relation to the socio-cultural, economic and financial context of Sri Lanka. Preliminary findings are presented in this paper.

Introduction

UNICEF WASH programme in Sri Lanka is providing essential support to line ministries, relevant district government agencies, NGOs and CBOs to meet the water, sanitation and hygiene needs of the Tsunami affected population. The assistance is also extended to include war affected and rural communities in non Tsunami affected areas.

Currently, the strategy is gradually shifting from relief to address construction and development perspectives.

Ecological toilets have already been promoted at pilot scale in Sri Lanka in 2001 (Calvert 2002) as a way to save water, provide sanitation where other alternatives prove infeasible. Several evaluation studies exist but core questions remain. An ecosan strategy is not finalized.

UNICEF and Government counterparts (MoH), partner NGOs (World Vision, Action Contre la Faim, OXFAM, ITDG) and other organizations hired a consultant to evaluate the appropriateness of ecological sanitation in relation to the socio-cultural, economic and financial context of Sri Lanka. The consultant has to answer a series of 16 questions covering technical, social and financial concerns. Preliminary results of the study are summarized in this paper.

Ecological Sanitation

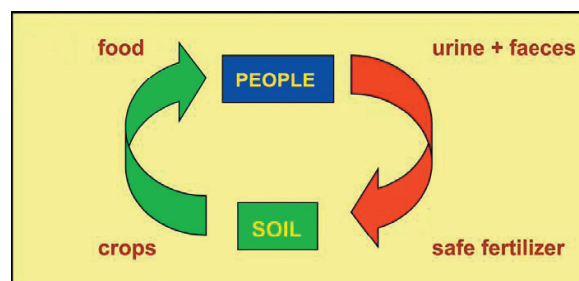
Ecological sanitation (ecosan) is based on the consistent implementation of the “closing the loop approach” (Nutrient Cycling), where urine and faeces are regarded as resources rather than waste. If collected separately and sanitized they can be used as organic fertilizer or as soil conditioner (see Figure 1). Ecosan is a holistic approach towards the treatment of all kind of wastewater – greywater (generated in kitchen, bathroom), brownwater (generated in flush toilet), yellowwater (urine and water), blackwater (faeces and water) – and

undiluted human faeces. It provides viable alternatives to cost intensive and unsustainable central wastewater management solutions as well as to environmentally unsustainable on-site solutions such as pit latrines and septic tanks.

Ecosan approaches facilitate the improvement of sanitation and livelihoods and sustainable natural resource management without contaminating land and water resources (see Figure 1).

Ecosan Toilets

There is a variety of ecosan toilet technologies available, from cost intensive vacuum systems combined with a biogas plant to less expensive single chamber desiccation/composting systems. The on-site low-cost technologies for private households can be grouped in urine-diverting and non diverting systems, and in single and double chamber systems. Ecosan toilets are normally raised above ground.



Source: www.ecosanres.org

Figure 1. Improving sanitation and livelihoods through the ecosan concept

Ecosan Toilets in Sri Lanka

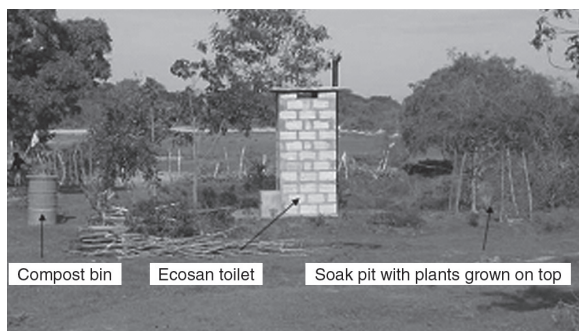
Even though forty urine diverting dry toilets (UDDTs) were introduced in Sri Lanka in 2001 by the National Water Supply and Drainage Board (NWSDB) together with EcoSolutions, UK, the ecosan toilet is still quite an unknown technology in Sri Lanka. Approximately 50 additional UDDTs were constructed in Sri Lanka in 2005/6 by several organisations. Due to the inaccessibility of the Northern and the Eastern regions of the country it is difficult to ascertain how many of these toilets are still in use. In general there is increasing interest in the ecosan technology in particular by INGOs.

The technology used in Sri Lanka so far is the UDDT. The UDDTs in Sri Lanka are commonly referred to as "compost toilets". The systems are all double vault systems. Photograph 1 shows a newly constructed compost toilet and its immediate surroundings in Hambantota district. The picture also shows a compost bin distributed by local NGOs to several households. A sustainable ecosan concept should be imbedded in a holistic solid and liquid waste management concept.

Before usage the floor of the empty vault is covered with straw. After each use ash is added to cover the faecal material. The material is stored in the first vault until the second one is full. The storage time varies between one and five years. The sanitation process of the faecal material stored in the closed vault is a combination of composting and desiccation. The chambers are closed with bricks which have to be removed for opening. Urine and wash water are drained via a common pipe to a soak pit or a evaporation bed. On top of the soak pit trees or other plants are grown to use the nutrients of the urine (see Photograph 1). However, an active reuse, applying urine or composted/dried faecal material as fertilizer or soil conditioner to the soil, was not observed or documented.

The toilets are mainly outside the house, some are attached to the house and only two or three are inside the house.

Different generations of squatting pans can be seen in Sri Lanka. Photograph 2 illustrates different designs clockwise from the oldest to the newest model. Additional models are just being developed by the NGO Practical Action.



Photograph 1. Ecosan toilet in rural Sri Lanka

Site Visits

In 2001 forty compost toilets were implemented by NWSDB. In 2005/06 approximately 50 compost toilets were constructed by several NGOs and INGOs. 26 compost toilets were inspected in four different districts namely; Colombo, Kaluthara, Matale and Hambantota. Twenty two of these toilets were built in 2001 and four compost toilets were built in 2006. All compost toilets were double chamber urine-diverting systems with squatting pans. Of the 26 inspected toilets only 14 were used, two were not accessible. Three compost toilets were converted into pour-flush toilets; two were abandoned, one compost toilet was demolished, one under construction and one broken.

The sites in Matale and Colombo are densely populated. Toilets are attached to the house or are inside the house, whereas at the other sites toilets were found outside.

Only in Bulatsinthale and Hambantota all existing compost toilets could be visited. In Matale 20 toilets were implemented by a local NGO in 2001/02. However, since the then responsible field officers left the area, the location of only 10 toilets is still known. Of the ten toilets known, seven were visited, two are said to have collapsed, and one is inaccessible in hilly area. The ten compost toilets in Colombo, in Rathmalana and Willorawatta, were installed by a local NGO. At the time of the visit nobody at the office was able to verify the location of the five compost toilets built in Willorawatta.

All the used compost toilets were in a good to very good condition. There was rarely any smell and no flies. Often the urine / wash water pipes were damaged.



- 1) Section for Faecal Material
- 1a) Chamber in use 1b) Closed chamber
- 2) Section for Urine
- 3) Section for Wash Water
- 4) Section for Urine + Wash Water
- 5) Ash
- 6) Water for Washing

Photograph 2. Different squatting pans in Sri Lanka

Compost toilets - An appropriate solution for Sri Lanka?

Ecosan toilets are raised above ground, they do not use water, they are permanent, can be inside the house and no access for gully suckers is needed. Therefore ecosan technologies offer a solution for a wide range of problems, e.g. high ground water table, rocky or sandy soil, water scarcity, dense settlements. But also in areas without any of the afore mentioned problems, the ecosan toilet should be considered as an appropriate and environmentally sound sanitation technology. To get more detailed information on the advantages of ecosan technologies, please refer to the wide range of ecosan literature.

The ecosan approach offers appropriate solutions for every environment. However, ecosan toilets as such are not a guarantee for sustainability. For any chosen ecosan technology to be sustainable depends on political commitment, community awareness and acceptance, and the right marketing approach. Without a demand there is no use for an appropriate technology. Without a favourable political environment there is no incentive for the market.

Compost toilets have to be marketed as an attractive product not only as “silver bullet” solution for poor households or to difficult locations. Different target groups will need different approaches as illustrated in Table 1.

Recommendations

The following recommendations are drawn from site visits and conducted interviews and are not yet comprehensive: the study is still ongoing at the time of writing.

Table 1. Approaches according to target group

Target group	Approach
Population with low income	Present compost toilets as at least as modern as the pour flush toilet and has all the same advantages and still, depending on design, is the most cost effective option with the additional potential of income generation through the use or selling of the compost.
Population in Water Scarce Areas	Present compost toilets as the technology which has the advantages of a pour flush toilet, but does not need water.
Population in areas with collapsing soil, rocky ground, high ground water table	Present compost toilets as the technology which has the advantages of a pour flush toilet, but does not require any underground pit.
Population involved in agricultural activities	Present compost toilets as the technology which has the advantages of a pour flush toilet, but does also produce valuable fertilizer.
Population of middle or upper class with none of the above mentioned issues	Present compost toilets as the fancy new arrival from Sweden. Upmarket versions have to be available.

Creation of demand

The existing pilot studies in Sri Lanka do not include any strategy for the pilot project to go to scale. Not enough attention was paid on creating and also meeting a potential demand. Table 1 illustrates possible approaches to create demand in different target groups. Actual approaches have to be site specific and are normally a mixture of given approaches. Ecosan toilets will be always one option out of several others. Since the most commonly used technology in Sri Lanka is the pour flush toilet, it is used in Table 1 as the technology an ecosan toilet would have to compete with.

To market compost toilets as a modern facility some changes of the design should be considered which would facilitate the functioning and acceptance. Particularly the location of the urine/wash water pipes should be altered to prevent damage. Small changes like changing the height of the steps, attaching a handrail or closing the vaults with a door instead of bricks will make a big difference towards user friendliness.

Asking people if they know compost toilets, they often answer “Yes” and refer to an ancient technology used by their forefathers. After further discussions these “ancient technologies” are found to be pit latrines. To have ecosan perceived as a modern and desirable technology, it is very important to take existing perceptions as the one above into account and discuss appropriate approaches for the introduction of ecosan. An open hole with a cover, which looks like the cover for the pit latrine will not be very successful.

The users have to be informed that an in house option is available. According to interviews with a wide range of stakeholders, ecosan users and non-ecosan users, a seat riser, also called “commode”, is the preferred option. However, it seems not to be known by any level of stakeholders that a commode is also possible with composting toilets. A seat riser should be developed locally and presented as an option to the users. To increase the attractiveness of compost toilets the options to develop a ceramic squatting pan or/and commode have to be explored.

Compost toilets should not be an option for the poor only!

The trainers have to be trained on different designs and options and should themselves not consider composting toilets as an inferior technology or merely as an option for “poor people”.

Implementation of pilot ecosan projects

The selection of the target group and location is crucial for the success of the project. As mentioned before the target groups should be from different social backgrounds. Scattered demonstration sites with single toilets are normally not very successful. It is better to have a whole settlement equipped with an ecosan technology. As such the toilet is not perceived as “the odd toilet handed over to poor people”.

In the aftermath of the Tsunami several housing schemes still have to be implemented. Already finished housing schemes very often lack basic infrastructure such as sanitation. The planning of resettlement areas offers a very good chance to implement ecosan technologies on a big scale and therefore avoid problems which arise on the small scale. Management and storage options as well as reuse of the material can be organized in an easier way on a large scale than a small scale.

It appears that there is no knowledge about the use of urine as fertilizer. Implementing bodies assume a reuse is not possible in Sri Lanka. However, the interviews carried out so far, show that at grass root level people would be willing to experiment. The future users of composting toilets should be at least informed about this possibility.

Ecosan is at a cross road of different sectors and should be therefore interlinked with other projects, such as solid waste management, livelihood, home gardening, agriculture trainings, nutrition, HIV/AIDS, woman empowerment and more.

Monitoring has to be taken seriously and should be an integral part of any pilot project. It should not happen that the location of pilot projects is not known. Well thought and consistent follow up actions are crucial for the successful introduction of a new technology.

Policy

At this stage it can be said, that there is a strong political commitment. The ecosan toilet (dry compost latrines) is recognized by the Ministry of Urban Development and Water Supply as a safe sanitation option in the revised National Policy for Rural Sanitation. However, the relevant regulations and guidelines also have to include ecosan toilets as an option and the information has to be passed down to the staff in the field. Every Ministry has to be informed, including the Ministry of Agriculture and the Ministry of Education. The Public Health Inspector (PHI) attached to the Ministry of Health (MoH) approves toilet construction. Without the PHIs approval no compost toilets can be built legally. Therefore a circular issued by the MoH should be distributed stating compost toilets as an authorized option.

Summary

Compost toilets can be an appropriate technology for Sri Lanka. There is a big interest in implementing ecosan by IOs and INGOs and there is political commitment. This commitment has to be followed by action. Compost toilets will only be a sustainable solution if the demand is created and met by Sri Lanka itself and not by IOs or INGOs.

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