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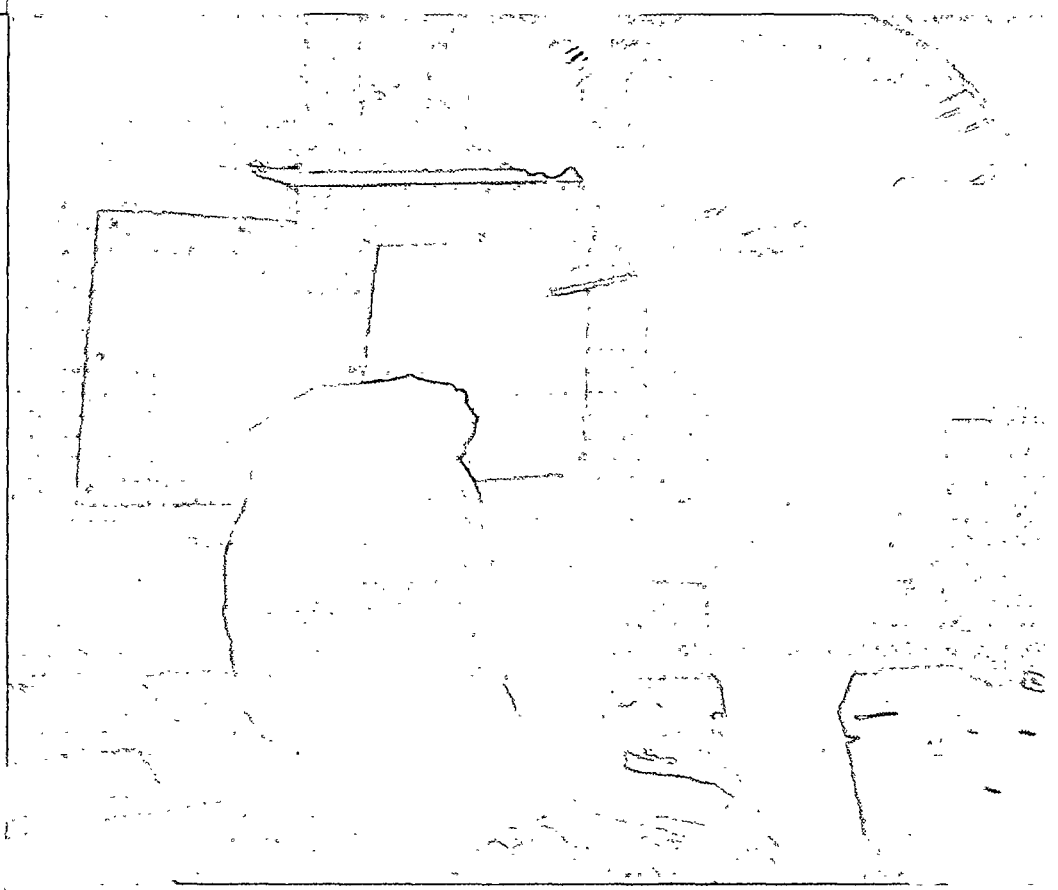
Water and Sanitation Program

An international partnership to help the poor gain sustained access to improved water supply and sanitation services

Identifying Demand Drivers for Sanitation Technologies

The Case of Ecosan in Africa



Africa Region

Ecological Sanitation[2] (Ecosan) has made little progress in Africa despite decades of promotion by donors. The practical and environmental benefits of 'closing the loop' (i.e. recycling the nutrients in excreta) seem remote to most poor African households. This lack of demand for Ecosan in turn makes many sector practitioners question its potential. There are, however, a number of physical conditions – including high water table and hard rocky ground - which can increase the comparative advantage of many forms of Ecosan technology. But beyond these physical conditions there are many factors that influence demand by households that have to be considered as well, such as the presence of small local operators involved in excreta handling. This paper examines a number of physical and non-physical *demand drivers*[3] that may encourage households to adopt Ecosan solutions. It also discusses practical activities within the different *segments* of 'the resource loop' and a number of factors, beyond the household level, that affect the communal adoption of Ecosan and re-use of excreta.

The Sanitation Challenge in Africa

Inadequate sanitation remains a major cause of poor health and poverty in many African households. Sanitation coverage in Africa is lower than in any other region of the world; and it is declining. Recent data shows that the fraction served in Africa actually decreased over the last decade[4]. Poor households in fast growing urban areas are exposed to the greatest risk.

Governments, communities and households are yet to commit adequate financial, material and human resources to sustain sanitation promotion in pace with population growth. Further deterioration of sanitary conditions will occur unless diverse solutions for improving sanitation are adopted.

These problems cannot be solved by the use of conventional urban sanitation technologies, which cost far more than the urban poor can afford. One of the challenges in increasing coverage is to identify and understand the incentives that will trigger demand by households for improved sanitation.

All footnotes on page 4

The Ecosan Argument

Ecosan technologies are characterized by a number of attributes including those in the box below (See box). *Minimal use of water and re-use of excreta nutrients* are positive characteristics. Limiting water use and increasing nutrient access for food production are key Ecosan objectives.

Attributes of Ecosan

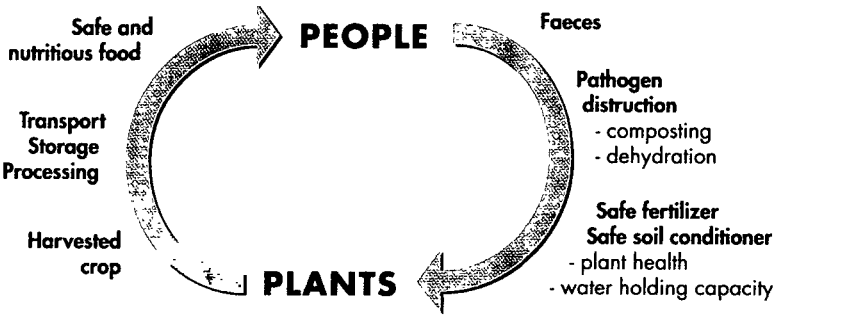
- On-plot
- Minimal use of water
- Dehydration/aerobic composting (with or without urine separation)
- *May* require drying/bulking material (ash, dry soil, lime, crushed sea shells etc.)
- *May* be above ground to facilitate contents removal
- Nutrients and sanitized excreta as end-products

Some promoters of Ecosan stress urine and faeces separation for nutrient re-use and soil conditioning as essential requirements of an Ecosan solution. This reflects the global environmental "vision" of *closing-the-loop* (Figure 1) while managing excreta. Unfortunately, such a global vision does not always address the practical requirements of its implementation. Detailed analyses of the activities in the segments of the expanded loop (Figure 2) reveal the critical drivers that influence household demand for Ecosan.

One of the important lessons that has emerged in sanitation promotion is that poor households will invest in new latrines for reasons of dignity, privacy, status, and convenience rather than for benefits of health improvement alone.

Just as improved health is not, by itself, sufficient to create demand for low cost sanitation, the benefits of excreta re-use may not, by themselves, be sufficient to trigger demand for Ecosan from poor households who face many more

Figure 1
The organic/nutrient loop: faeces ⇨ food



Steven Esrey & Ingvar Anderson: An Ecosystem Approach to the Management of Human Waste: Recent Developmemets in the Ecological Sanitation (Presentation by Ingvar Anderson, Roundatble Meeting on Ecosan, March 2001, Nairobi, Kenya)

critical challenges in every day life. But these benefits could be important in environments where subsistence farming is significant and the practice of excreta re-use is culturally acceptable to households, individual farmers and communities

The Vietnamese "double-vault" dehydrating toilet was designed and promoted in response to the direct agricultural use of fresh excreta by most farmers. This practice was so entrenched that public health officials were hard-pressed to ensure that households would leave excreta undisturbed long enough to achieve the required dessication and conditioning before use.

Experience shows that many African households do not yet accept direct re-use of urine and do not wish to undertake excreta-based composting. However, there are a few recent cases (eg. Kisoro, Uganda) where urine is diverted to soak-pits and the addition of ash to faeces is done properly with encouraging results. In Kisoro, public Ecosan toilets were observed to have minimal smell and *near-zero* flies, an improvement over many public toilets based on other technologies[5].

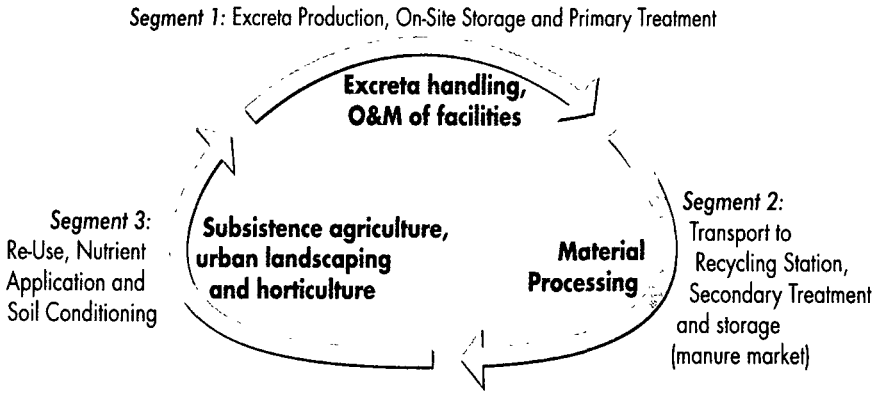
Assessing Demand Drivers for Ecosan

As shown in Figure 2, the Ecosan loop contains three distinct segments:

- Onsite storage and treatment
- Offsite transport, storage and treatment
- Application for reuse

Closing the loop requires linking the different conditions, processes and activities of each ***segment,*** and examining how these affect existing household coping strategies, preferences, and social arrangements. The remainder of this paper presents practical examples of this process.

Figure 2
Closing the loop: Segments and Main Activities



Examples of Demand Drivers

Physical Drivers in Segment 1

Geo-hydrological conditions:
There are examples of households building raised pit latrines to overcome flooding in areas that have a high water table. In hard rocky areas pit digging is difficult and expensive; if the rock is fissured, there is also the risk of contaminating groundwater if unlined pits are used. In these cases, aboveground sanitation with offsite removal of waste is required in any event and Ecosan can be an attractive option.

High-Density Housing Areas:
In many congested urban areas, locating pit latrines is difficult because of the digging involved. The ease of retrofitting Ecosan toilets, above ground, into existing structures is an advantage.

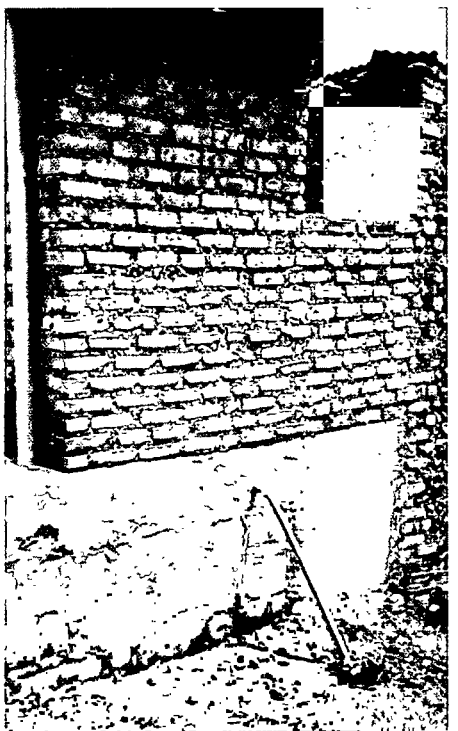
In a number of areas, with the twin problem of high water table and congestion of buildings (for example

Van's Biological (Compost) Toilet can easily be retrofitted into an existing building. (Accra, Ghana)

low-income areas along the coastline of Accra), retrofitting of Ecosan toilets provides desired solutions for households. While alternating VIP latrines with offset pits have also been used, they demand both periodic desludging and skill in digging under existing structures. Where there is no room for pits, the VIP option is simply not appropriate.

Examples of Drivers in Segment 2:

Small local operators:
The handling of stored excreta by individual householders raises concerns of both safety and cultural acceptability. Small-scale operators can, however, be developed or encouraged to provide these services in a safe and professional manner at reasonable cost. (Such enterprises are particularly likely to be viable in informal urban settlements). Small operators can also be involved in the processing and transportation services required for the marketing of manure. Some private operators, in Accra, Ghana, provide O&M services



An option for hand rocky (fissured) terrain where excavating cost can be prohibitive and pit latrines lead to pollution of springs. (Kisoro, Uganda)

after installation, including removal of partially stabilized material, replacing materials (e.g. mulch) in toilet chambers and further processing and handling of the compost.

Examples of Drivers in Segment 3:

Subsistence farming and alleviation of household poverty (nutrient application and soil conditioning):
There is potential for re-use of nutrients and sanitized excreta, especially in semi-arid areas, and peri-urban food corridors adjacent to large urban towns. Food sufficiency often contributes to alleviation of health-poverty.[6]

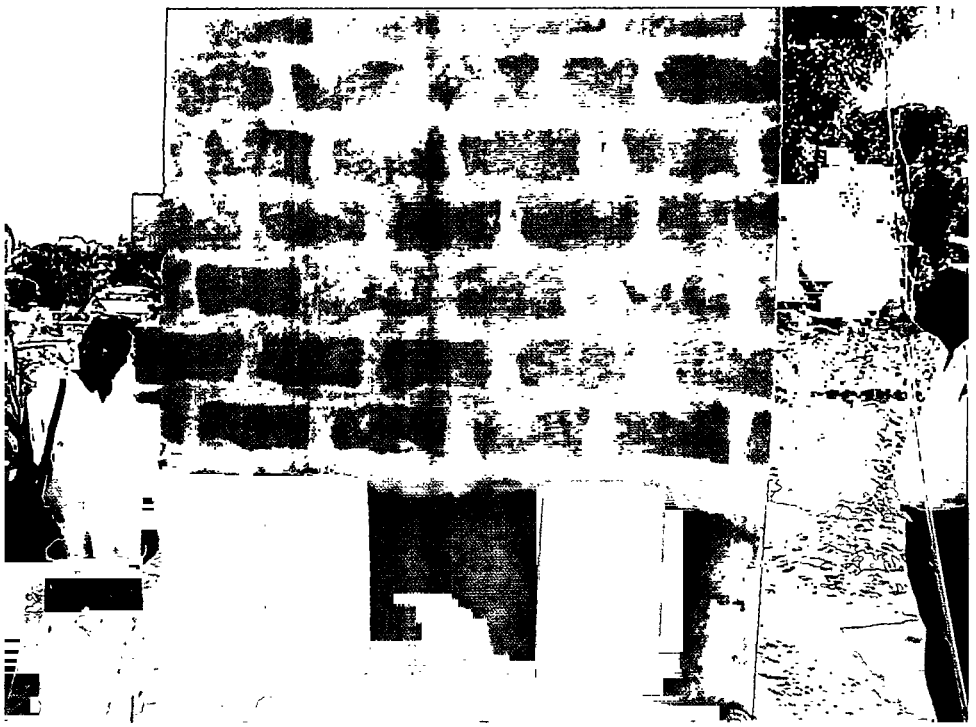
It is when all the activities of the segments of the loop are practically achieved, in any given situation, that closing-the-loop really occurs.

Implications for Future Work

WSP-AF will identify and study such practical examples of demand drivers for innovative and low-cost technologies that can improve services for the poor. Studies will also be carried out to compare various performance indicators, including costs, for various designs and other technologies (including Ecosan). Understanding the comparative merits of Ecosan and other sanitation technologies is essential if effective sanitation coverage is to be attained.

Other areas of WSP-AF's work will include:

- Country-level studies and consultations on issues of demand and experiences in the use of innovative sanitation technologies and their impact.
- Follow-up roundtable discussions/ workshops with analysts and practitioners on re-use, its link to subsistence farming and household poverty alleviation and health improvement.
- Consulting and networking with organizations and stakeholders supporting R&D in re-use and innovative sanitation technologies to exchange lessons on demand drivers for improved services.



An appropriate option for high water table conditions (Dar-es-Salaam, Tanzania)

- Sharing and disseminating knowledge to influence policies on the appropriate use of innovative technologies.
- Documenting and disseminating case studies on the impact of sanitation projects that have re-use components on subsistence agriculture and how they affect the poverty and health of poor households.
- Carrying out case studies on the roles and effect of small-scale independent providers in innovative sanitation technologies.

WSP-AF aims to contribute by sharing its experiences in sanitation promotion by relying on its comparative advantages of field presence and ability to forge networks so that more stakeholders become engaged on the sanitation question in Africa.

FOOTNOTES

1 This paper summarises main points of the Roundtable Discussion on Ecosan organized by WSP-Africa in March 2001 in Nairobi, Kenya

2 Ecological Sanitation, in this paper, refers to the on-plot handling (with or without urine separation) of excreta with minimal use of water so that urine nutrients and sanitized material are end products.

3 Demand Drivers refer to "the physical and non-physical factors associated with a technology, which influence household (and community) choice and use of that technology."

4 Global Water Supply and Sanitation Assessment 2000 Report (2000) WHO & UNICEF: Geneva.

5 Field Notes; L. Salifu, Kisoro April 2000.

6 "Does Urban agriculture help prevent malnutrition? Evidence from Kampala., FCND Discussion Paper #45, IFPRI, Washington DC, 1998" - Maxwell D, Levin C, CseteJ., Quoted in Ecological Sanitation - Closing the Loop to Urban Food Security and Well-being, Stephen Esrey & Ingvar Andersson (Presentation by Ingvar Anderson, Roundtable Meeting on Ecosan, March 2001, Nairobi, Kenya)

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