

# A Review of EcoSan Experience in Eastern and Southern Africa

Many governments and agencies in Africa are exploring the role of ecological sanitation, or EcoSan, within their environmental sanitation and hygiene improvement programs. Despite convincing environmental and economic reasons to support this approach, acceptance of the technology has been very limited so far. This field note reviews experience in Eastern Africa and, with less detail, Southern Africa.





## Introduction

The scale of the sanitation crisis in Africa is enormous: 43 percent of the population of Sub Saharan Africa – over 303 million people – had no access to basic sanitation in the year 2000.<sup>1</sup> Between 1990 and 2000, the number of people gaining access to improved sanitation failed to keep pace with population growth. The combination of poor progress, population growth, extremely weak economies and sometimes civil strife mean that the MDG targets facing Africa, seem almost insurmountable. This clearly means that ‘business as usual’ is not an option.

Many governments and agencies in Africa are exploring the role of ecological sanitation, or EcoSan, within their environmental sanitation and hygiene improvement programs. Despite convincing environmental and economic reasons to support this approach, acceptance of the technology has been very limited so far. This field note reviews experience in Eastern Africa and, with less detail, Southern Africa. The aim is:

- to identify as many successful EcoSan projects and programs as possible and to learn from these experiences; and,
- to understand why take-up of EcoSan has been so limited, and to use this information to improve future sanitation programs.

In its broadest sense, EcoSan ranges from simply planting a tree on a disused toilet pit, through to composting human excreta and re-using the products in agriculture, thereby ‘closing the loop’.<sup>2</sup>



A urine-diversion toilet near Mombasa, Kenya. The urine is collected in the plastic container.

<sup>1</sup> Joint Monitoring Programme for Water Supply and Sanitation, 2004.

<sup>2</sup> ‘Closing the Loop’ refers to the vision of using human excreta (processed in some way) as a fertilizer of crops which provide nutrition for humans.

The work of the WSP affirms that there is a role for a variety of EcoSan technologies in sanitation improvement programs, but this role will vary according to geography, economy, culture, etc. However, the first priority continues to be the need to achieve health benefits through hygienic behavior and improved sanitation facilities; environmental and nutritional benefits can and should follow. This field note reviews what has been achieved to date and identifies some lessons for future projects.

## Measures of Acceptance

The most important factor in assessing the potential for increased use of any sanitation technology is the degree of acceptance in a community, as measured by willingness to adopt or invest in that technology. This field note explores that concept and examines issues that help or hinder acceptance of EcoSan technology. Four measures of acceptance are proposed:

- Are the toilets still in use?
- Are they being correctly used?
- Are they being copied without external support?
- Are EcoSan products being used in agriculture?

**Continued use:** Many sanitation projects get substantial subsidies to 'kick-start' a campaign and this sometimes leads to participation even when people are not fully convinced of the merits of the technology. Active participation can wane with the realization of the technology's requirements. When inappropriate facilities are installed without

consultation or choice they are unlikely to be sustainable.

**Correct usage:** Some sanitation technologies (and especially EcoSan technologies) are more complicated, or demanding of the user, than others. Incorrect usage can cause anything from a minor inconvenience to a major system failure and/or health hazard.

**Spontaneous copying:** Success is demonstrable when there is an increased demand for a 'product', or when the 'product' is replicated without subsidies or specialist inputs. This level of acceptance is essential if a new technology is to become widespread in a community.

**Use in agriculture:** EcoSan technologies in Africa have not been widely embraced for improving agriculture. But some local successes have made a significant difference to the promotion of EcoSan and represent another level of acceptance.

## EcoSan Experience in Eastern Africa

### Kenya

EcoSan technology was introduced in Kenya in the late nineties and there are now about six projects in the country. A study commissioned by WSP-AF in 2002 found that less than 100 EcoSan toilets had been constructed (a figure that has now marginally increased). Most construction costs were subsidized by NGOs who introduced three types of EcoSan toilets. (See Box 1)

Most households surveyed were not aware of EcoSan technologies and the opportunities offered by excreta re-use, especially in soil conditioning for improved food production. However, 70 percent of respondents plant foodstuffs - such as bananas - for home consumption on filled-up pits, and 39 percent said they were willing to use excreta as manure in their farms. All

#### Box 1: Types of EcoSan Toilets in Kenya

**Skyloo:** a raised toilet with urine diversion and separate collection of urine and faeces in a permanent structure that requires periodic (6-12 months) emptying of the receptacle and transportation to a composting site.

**Arborloo:** a portable superstructure with no urine diversion, covering a shallow pit that fills in after approximately one year. The superstructure is then moved and a tree planted in the filled pit.

**Fossa Alterna:** two permanent pits with a portable superstructure. When one pit is full the superstructure is moved to the other. The digested contents of the first pit can be safely emptied after a year.

Fossa Alterna and Arborloos work best when quantities of soil, wood ash and leaves are added periodically to produce a balanced compost. Skyloos require some ash to dry the faeces and increase pathogen destruction

groups admitted to a lack of knowledge on excreta re-use but 20 out of 50 focus groups acknowledged they had eaten chickens fed on human waste. Thirty nine percent of respondents said they would be willing to re-use human waste as manure and 27 percent were happy to eat fish fed on human waste nutrients.

In Kisumu region, along Lake Victoria, Skyloos were built as an alternative technology to pit latrines, especially in locations where the water table is high and the community relies on shallow water wells for their water needs. But the Skyloos were not popular in the pilot area, partly due to cultural issues associated with urine diversion and handling of feces. Acceptance has been slow and only 8 out of 15 toilets

constructed are still in use. Recent reports indicate renewed interest in this technology, especially in areas with geo-hydrological problems.

The Fossa Alterna toilet has been well received in two pilot areas in Kisumu. At least 15 toilets are being used in schools and public places such as fish landing sites. A demonstration toilet constructed in a primary school has attracted the interest of parents who want to copy the design in their homesteads.

The Arborloo toilet has been enthusiastically received in Makueni District (a semi-arid region south east of Nairobi) and the initial 3 demonstration toilets have been replicated to 57 within a year. The health and agricultural benefits are clear to the community, and

the Arborloo is considered affordable and easy to replicate: it is constructed using locally available materials, is easy to construct and move (even for women), and does not need a deep pit, which is helpful in rocky conditions. Fruit trees can be grown on abandoned pit sites. In addition, as Arborloo toilets are shallow, there is less likelihood of ground water contamination or collapse during the rainy season.

While it appears that the simplest form of EcoSan, the Arborloo, has been accepted and replicated it is too early to tell whether the Fossa Alterna will be emptied and the contents used in agriculture, or to what extent it will be copied. The Skyloos were chosen to deal with adverse local conditions but the high degree of user involvement has discouraged users.

## Ethiopia

Knowledge Attitudes Behavior and Practices studies by UNICEF (1997) and Water Aid (2003) indicate that contact with human faeces is generally unacceptable in Ethiopia. Even constructing 'a house for feces' is low on the domestic agenda, especially among men. Given this cultural resistance it is hardly surprising that less than 400 EcoSan toilets have been constructed.

SUDEA (Society for Urban Development in East Africa) is the main promoter of EcoSan in Ethiopia. Since 1998 a number of pilot projects, responsible for over 300 toilets, have been undertaken in partnership with local NGOs in Addis Ababa, Jimma, Bahir Dar, Hamusit and



Skyloos in Migosi near Kisumu, Kenya.

Harar. Representatives from the Ministry of Agriculture and Rural Development recently attended an international conference on EcoSan and, with donor funds, established four trial Fossa Alterna toilets in each of two regions.

SUDEA promotes an integrated EcoSan system for household sanitation and home gardening in which urine is diverted and used as a fertilizer, and feces are collected and composted with other organic household waste. The system has been through different stages of development and is now utilizing ceramic pedestal style toilet pans with an integral urine diversion system. Men are encouraged to use a jerry can fitted with a funnel and a valve achieved with a floating expired light bulb (dubbed the 'eco-lily').

The urine-diversion unit is located above ground on a stepped platform with a large receptacle (such as a plastic container) under the pan to collect feces. It is important for users to add ashes to absorb moisture, neutralize odor, and stop fly breeding. When the receptacle is almost full the contents are covered compost heap for three months before being used in the garden.

### Box 2: EcoSan in Ethiopia

SUDEA an international NGO established in 1992, defines the technology as an integrated, ecological system for household sanitation and home gardening to safely introduce the re-cycling of human excreta and other organic household refuse while avoiding contamination of water, soil and air. The home garden is designed to improve the economic and nutritional status of the family.



The 'eco-lily'.

Superstructures have been built using a variety of materials including hollow concrete blocks, burnt bricks, wood panels and corrugated iron sheets. The typical cost is US\$100, including jerry can and eco-lily, and this is fully subsidized by SUDEA.

Using urine as a fertilizer and decomposed feces as a soil conditioner is a new concept in Ethiopia and the EcoSan approach was originally met with considerable mistrust. This discouraged the uptake of using excreta-based compost for agriculture.

Beneficiaries cited a clean, healthy environment, diversified food and some income, space efficiency, and no external removal cost of feces, as reasons why they supported EcoSan. Disadvantages included high maintenance, strong smells produced

by incorrect use of the urine diversion system, and lack of space and time for urban agriculture.

In one densely settled area several users preferred people other than themselves to take away the feces, and many others had stopped using the toilet. Within one block of 100 houses with urine-diversion toilets built for families relocated after a fire, 45 percent of households were not practicing urban agriculture.

On the other hand, in Asko-Gulelle there was enthusiastic commercial vegetable growing following intensive agricultural training and the supply of implements and seeds. Only 4 out of 29 households had discontinued participation and strong local interest in EcoSan was



A urine-diversion toilet in Ethiopia.



Fossa Alterna latrine in Ethiopia.

reported though there has been no spontaneous, unsupported copying. The Ministry of Agriculture and Rural Development has fully subsidized the materials for 8 Fossa Alterna toilets but beneficiary households contribute labor. Specialists cast the reinforced concrete slabs, the pits are lined and the superstructure made from concrete blocks or burnt bricks. The pits can be left for at least 12 months before emptying to ensure pathogen die-off.

## Uganda

Excreta reuse in Uganda is not a new concept: bananas and fruit trees have traditionally been planted on filled traditional pits. However, the EcoSan concept, as it is known today, only began in 1997, with the South-Western Towns Water and Sanitation Project (SWTWSP). Through the Ministry of Health (MoH), EcoSan is cautiously promoted as one of the options for

problematic environments such as collapsing soils, high rock or water table. The current standpoint of the MoH is that - for health reasons and to prevent pathogen transfer - reuse of feces should not be promoted until proper handling systems are established and widely disseminated.

The Ministry of Water, Lands and Environment, through the Ministry's Directorate of Water Development (DWD) plays a leading role in promoting urine diversion toilets as a means of protecting groundwater and has constructed a number of these toilets countrywide, with a concentration in the south west.

By May 2003, a total of 506 EcoSan toilets had been constructed in South Western Uganda. Of these, 437 are household, 36 are institutional and 33 are public facilities. Currently, the urine-diverting dehydration toilet (or Skyloo)

is the most widely promoted, because it does not affect groundwater, can be built above ground and enables reuse of urine without minimal health risks.

A number of development partners involved in sanitation projects promote EcoSan or feature the technologies as options in a project. Key reasons for this include:

- A desire to sponsor sustainable sanitation solutions;
- The protection of water resources;
- Supporting agricultural production and sustaining biodiversity; and,
- Improving health and quality of life.

Most users chose EcoSan technology because it is hygienic (if used properly); does not require water for its operation; is conveniently situated in, or near, the house and cheap to run. However, the latter reason may have been influenced by the degree of subsidy provided. When asked to indicate their best-preferred sanitation facility, those who chose EcoSan cited permanence, potential for agricultural productivity and hygiene as the appealing factors. Respondents did not think ecological sanitation facilities were easy to manage.

Costs for a Skyloo ranged from US\$60 for a toilet with earth walls to US\$400 for a brick-built one; most of these costs were subsidized. Attracted by the offer of subsidies, households' initial response was positive but some later failed to complete the toilet facilities.

There is some evidence of spontaneous copying of EcoSan technology. In December 2003 the SWTWSP

newsletter reported 52 privately-financed EcoSan toilets in three districts, plus two nursery schools, developed 'on individual initiative'. In one shoreline fishing settlement, a local petrol station owner copied a not-very-well-received communal EcoSan toilet, and erected two others for his customers.

The majority of households with EcoSan toilets indicated that they built them primarily as a sanitation facility

and not for supporting agriculture. *"In all the 7 districts of our project, only four households are re-using the human excreta"* (SWTWSP Official August, 2003). Most families were unfamiliar with excreta re-use and those engaged in farming had strong negative sentiments and cultural resistance to application of manure from fecal matter.

In Kisoro District, where more than 250 EcoSan toilets have been constructed,

there were no reports of using fecal manure or urine in agriculture. Seventy five percent of households disposed of dried feces by emptying the filled receptacles into pits.

## Tanzania

A field visit to the Wanging'ombe Division in southern Tanzania found encouraging evidence of ongoing excreta use in agriculture. A project in the 1980s saw the construction of over 17,000 VIDPs (Ventilated Improved Double Pit latrines) of which over 10,000 are still in use. It was a large project in which toilets were subsidized by approximately 50 percent. No unsubsidized toilets were built after the project ended.

The VIDP is designed to allow the contents of one pit to decompose for about two years while the second pit is filling up. One of the original project advisers reported that villagers originally rejected the VIDP because of a taboo against the handling of excreta. But, after a villager accidentally dug into a disused pit latrine, and realized that the decomposed contents had become innocuous, there was widespread support for the scheme.

The recent social survey concluded that all households with VIDPs use composted faeces in agriculture and have been doing so for up to twenty years.

One recent project in Majumbasita, a settlement in peri-urban Dar Es Salaam, illustrates that much remains to be done. With eighty five percent



EcoSan demonstration toilet in Kabale, Uganda.



of the 23,000 residents drawing water from shallow wells, EEPCO (the Environmental Engineering and Pollution Control Organization), promoted double-vault urine-diversion EcoSan toilets to meet sanitation needs and protect threatened groundwater. Some 95 household units and one school facility were constructed between 2000-02. Substructures were built with concrete blocks and superstructures with a variety of local materials according to choice. Costs ranged from US\$80 to US\$250 depending on materials with a typical subsidy of US\$113.

A year after construction a survey found that 75 percent of residents in households with new toilets had stopped using their old toilets and the number of users was increasing over time.

All except one of 28 toilets inspected were being properly used and 46 percent of those households were using urine to fertilize plants. After direct construction subsidies stopped in 2002, trained local artisans continued promoting EcoSan and have built an additional 200 toilets directly contracted by households. It was too soon to observe the re-use of excreta since this

only happens once the second vault is full. But there is some recent evidence of local artisans offering emptying services to households for a small fee.

Prospects for embracing EcoSan urban agriculture are about the same as in South Western Uganda where users were reportedly more interested in a quality permanent toilet than opportunities for EcoSan agriculture. A pre-project PHAST community facilitation exercise indicated that most people welcomed EcoSan because it was promoted as permanent, simple, durable, affordable, environmentally



Urine-diversion toilets in Majumbasita near Dar-es-Salaam, Tanzania. Note the different construction materials used.

friendly and hygienically safe relative to the traditional pit latrine; however some respondents saw the reuse of nutrients as a good feature.

## EcoSan Experience in Southern Africa

### Malawi

Water Aid has been working in Embangweni, a rural area where there has been unprecedented interest in EcoSan technology. Three toilet types were offered: Arborloo, Fossa Alternata and Skyloo. The Skyloo is too expensive for most, but the others have proved popular.

The subsidy offered, as a reduction on the price of the cement slab, is less than US\$2, but farmers have built over 250 toilets in an 18-month period. A more recent report says this figure has risen to 1800.

A 2003 report indicated that after 18 months any resistance or doubt has disappeared. Communities have experience of emptying the toilet pits, and know that the contents are neither obnoxious nor unpleasant to handle. Farmers have become enthusiastic advocates for eco-sanitation, which is now self-promoting within the area. Demand is such that there is insufficient capacity to meet it. The ever-decreasing fertility of the soil (reduced by 40 percent in the last decade) is reported to be a significant factor in the popularity of eco-sanitation. The cost of fertilizer has also rocketed to around US\$14 for a 50 kg bag.



Fossa Alternata latrine in Zimbabwe.

In a country where 60 percent of the population live on less than a dollar a day, this is a huge proportion of the household budget. A system that is free and within the household's control is understandably regarded as valuable.

Another factor driving demand could be the desire to grow fruit trees and derive a small income; owning a fruit tree may also be a kind of status symbol.

### Mozambique

Water Aid has also had some remarkable success in Niassa Province, Mozambique. EcoSan was introduced

an alternative to the more conventional system of dome slabs, which had run out of government subsidy. Some 330 Fossa Alternata toilets had been constructed by 2002, and an additional 100 by the end of 2003.

A 2003 report describes some early experience with test plantings of crops. In 2002-03, rains in Lichinga and Mandimba were well above average, and many communities lost their entire crop through rotting. Despite this, maize crop grown with EcoSan compost thrived while the rest of the crop was stunted and inedible. As a result, demand for EcoSan has exploded, with over 2,500 requests for Fossa Alternatas.

According to Water Aid, the trials have made an impact in improving understanding by farmers of the concept of 'closing the loop'. The challenge now is to meet demand for improved sanitation linked to agricultural production. The successful field trials imply there are no more fears of eating crops grown on EcoSan compost.

This project also uses a low subsidy approach, with intensive PHAST community interaction and social marketing using the local radio; but the best marketing comes from satisfied users. Potential clients are given a choice of the three EcoSan technologies used elsewhere, in addition to the conventional dome slab. Most choose the Fossa Alterna using a single large superstructure made of wood and thatch. Both pits are within the one superstructure and there is room for bathing. The bathing area, with water and soap available, encourages hand washing, and so does the use of bare hands to sprinkle soil and ash after use.

In Sofala Province over 600 Skyloos were built using donor funds for families resettled after floods. This has stimulated a demand in neighbouring towns and a further 12 have been constructed. Six farmers are using urine in horticulture.

## Zimbabwe

Between 1996 - 2001 the Mvurumanzi Trust has facilitated the construction of over 12,800 toilets, of which 1,847 are EcoSan types. The numerical breakdown is: 38 Arborloos, 27 Blair composting toilets, 295 Skyloos and

1487 Fossa Alterna. These large numbers are in part the result of a uniform, mass adoption program in peri-urban areas.

A subsequent KAP survey carried out in 2002 concluded that while respondents had some knowledge on the different uses of excreta, there was limited evidence of any use in Dzivarasekwa Extension. Some people said they would not eat their own vegetables grown on re-used excreta, preferring to buy vegetables from other farmers

## South Africa

The Mvula Trust has been assisting the Department of Water Affairs and Forestry and the Provincial Government of the Northern Cape with the

conversion or replacement of 25,000-bucket toilets in the poor and remote small towns of the most arid province in South Africa. The program was initially subsidised on a partial basis but it now attracts full funding under the free basic services policy.

Communities were given information, including capital and running costs, on a range of options including full waterborne, urine-diversion EcoSan toilets and VIP latrines. Estimates suggest that 80 percent of households have opted for in-house urine-diversion toilets and that up to 15,000 conversions have been done.

A 2003 report on the acceptance of the EcoSan technologies, and development



An EcoSan toilet in South Africa.

of an appropriate marketing strategy, suggests that the large-scale success of the dry urine-diversion toilet has been achieved by marketing it around social factors rather than the benefits of excreta reuse. Wide scale acceptance is attributed to the choice householders had between different technologies and because ecological sanitation best satisfied social requirements, given the water, geological and cost constraints.

Some success with re-use of excreta is also reported. "Two methods of dealing with the pit contents have emerged: burning or composting/burying. Burning has been successful because of the very dry climate and the use of hard instead of soft toilet paper. Composting is relatively new, as the first pits have only recently required emptying. People have realized how innocuous the contents are and have had no problem in emptying the pits and burying the contents.

"Subsequently, pumpkins, potatoes and onions have been planted, but this development is due to the strong encouragement of one of the fieldworkers. Of the 981 households who have accepted the dry urine diversion technology in the Kammissberg Municipality, Namaqualand, 50 are now practicing ecological sanitation."

Finally, there are reports of a massive program with a target of providing 155,000 double vault urine diversion toilets in the rural areas of the Greater Durban metropolitan area (now called eThekweni) as part of the South African Government's free basic sanitation campaign. An estimated 20,000 have



An EcoSan toilet designed to be accessible from the house at a South African suburb.

been built so far at a rate of 1,000 per month and a unit cost of US\$400. Preliminary reports indicate that it struggles with the same issues as those of other top-down heavily subsidized sanitation projects (e.g., not properly used, or not used at all).

One expert's visit to the project areas produced the following recommendation that spells out the level of effort required to achieve proper use of the prescribed EcoSan toilets: "During the first year, people must be supported far more with user education. The chambers must be opened far more regularly, with the householder, and mistakes pointed out [eg too much liquid, non-degradable material, etc]. In particular

the householder needs to understand the importance of using dry soil to aid the desiccation process. They also need to be supported with the composting process as this is virtually unknown in South Africa and they need to be shown how the natural processes render the faeces harmless."

## Summary of Findings

The findings recorded above do not claim to be a fully comprehensive report of every instance of EcoSan in the countries reviewed, but they do give a fairly good picture of the order of magnitude of activities and achievements, and problems

**Table 1. Summary of findings on EcoSan activities**

<b>EcoSan Type</b>	<b>Country</b>	<b>Subsidized Numbers Reported</b>	<b>Non-Subsidy Numbers</b>	<b>Was it well-received?</b>	<b>Comment</b>
Arborloo	Kenya (Makueni)	3	54	Yes	Semi-arid area
	Malawi (Embangweni)	Portion of 250		Yes	Poor soil; desire for fruit trees
	Mozambique (Niassa)	38		Yes	
	Zimbabwe (Mvurumanzi)	38			
Fossa Alterna/ Ventilated Improved Double Pit	Kenya (Kusa, Nyando District)	45	3 schools	Little replication at household level; more positive response from schools	Most subsidized toilets were built for schools
	Ethiopia	8			
	Tanzania (Wanging'ombe)	10,000 VIPs		Extensive use of contents	Chosen when reuse potential was recognized
	Malawi (Embangweni)	Portion of 250		Yes	Poor soil & expensive fertilizer
	Mocambique (Niassa)	430		Yes - 2500 requests	Convincing demonstration as fertilizer
	Zimbabwe (Mvurumanzi)	1487 & 27 Blair composting toilets			
Skyloo/ Urine diversion	Kenya (Kisumu)	15	Some	Some abandoned	Attractive in high water table
	Ethiopia (Addis)	300+		Some abandoned, limited use of contents	Suits some farmers but few urban dwellers
	Uganda (Southwest Uganda)	506	52	Accepted as a toilet; limited use of contents; some asking for emptying service	Chosen to protect ground-water; also where high water table & rock
	Mocambique (Sofala)	630		Chosen over electricity	High groundwater made traditional pits difficult
	Tanzania (Majumbasita)	95	200		Chosen to protect ground-water; where high water table
	Zimbabwe (Mvurumanzi)	295			
	South Africa (N Cape & eThekweni)	15,000 single pit UD in N. Cape; + 20,000 double pit UD in Durban		Accepted as a toilet; limited use of contents	Fully subsidized program; some in-house use

encountered. Table 1 attempts to provide a brief summary of the main achievements identified in this review. It is acknowledged that this does not include every EcoSan project in every country in East and Southern Africa, but it probably includes the most significant ones identified for which information was available at the time the research was carried out.

Another set of findings emerging from this review is the recognition that there is a range of sanitation types, which can be categorized loosely in terms of the degree of 'user involvement' in the management of each technology. Table 2 briefly summarizes the main features of each type, together with the main reasons for its acceptance or 'success'

in the project areas reviewed and some comments as to their most likely application and potential drawbacks.

## Program Issues

The numerical challenge of the MDG target is daunting, and if current rates of progress do not dramatically accelerate then the target may be unachievable in Africa. Every country needs to rapidly scale up from pilot projects, which test and demonstrate new approaches, to national programs, which benefit from lessons learned. It is therefore important to evaluate findings that provide guidance for the design of more ambitious programs. A number of pointers are discussed below.

## Promotion

It is clear that the 'one size fits all' approach is not appropriate. Different cultural, geographic and demographic situations produce different reactions to EcoSan technologies. Many communities were attracted to a permanent structure linked with the house, but showed little interest in content re-use; some projects reported an emerging demand for a removal service of some sort.

In other situations poor soil fertility may persuade farmers to abandon strongly held prejudices in the light of convincing demonstrations of improved crops. Some communities may only be ready to try a simple Arborloo approach first.

**Table 2. Summary of successful EcoSan types**

Successful EcoSan Type	Features	Reasons for success	Comment
Arborloo	Simple portable superstructure; use of soil & ash encouraged; one year capacity recommended; move and plant a (fruit) tree	Least expensive hardware; valued in areas of poor soil fertility; fruit trees grow better than in ordinary soil	"Entry level" EcoSan; introduces the re-use idea and lessens effects of taboos; good in poor soils
Fosse Alterna	Two pits with movable drop hole; typically with a concrete slab; any superstructure; soil & ash needed; change pits after 1 year; empty contents after 1 year rest	Limited involvement with contents - sprinkle soil & ash, empty with shovel; permanent location; contents look harmless & do not smell; contents valued in areas with low soil fertility	"Intermediate" EcoSan; robust and likely to survive ignorant use; needs education & demonstration to overcome taboo on digging out and re-use; good in poor soils and where fertilizer is expensive
Skyloo/Urine Diversion Dehydrating	Urine diversion pan or drophole; needs regular addition of wood ash or lime; single pit/chamber needs emptying for further composting; double pit/chamber avoids this	Permanent; can be used in-house; can be built above ground and overcomes high water table or rock	"Full Involvement" EcoSan; valued in difficult ground conditions and harsh climates; so far more success as a toilet in subsidy-driven programmes than as an asset to agriculture; needs considerable user education; users may choose to pay someone to empty and dispose of contents

Sanitation programs clearly need expertise in market research and the design of social marketing. The promotion of EcoSan may be better done as an option in a range of technologies rather than through a doctrinaire position that 'this is the only way'.

## Appropriateness

Some of the problems described above such as abandoned new toilets or poor operations and maintenance are the result of poor program design and inappropriate technology. These difficulties are hardly unique to EcoSan; for example, there is a well-documented record of the failure of numbers of communal toilets, often installed as demonstration units in public places or schools, where inadequate attention to operations and maintenance has actually put people off the idea of toilets.

Market research needs to be used with an open mind, and not accompanied with a 'hard sell' of the supporting agency's favorite technology. The best indication of demand is to offer a range of toilet types in the context of limited, or at least similar, subsidies and to see what people choose. Potential users need to be aware of the degree of user involvement required; otherwise there may be complaints and later problems, such as subsequent requests for a removal service.

Culture plays a large part. Throughout Africa there are taboos against the handling of feces and its possible re-use. These do not break down easily, whatever people might say when a



User-education on EcoSan technology in Uganda.

heavily subsidized toilet is being offered. In some areas both Christians and Moslems have successfully managed EcoSan toilets; in others Moslem use of water for personal ablutions has caused problems. Gender and age are also big issues; women need privacy and space, and ways of dealing with waste items related to menstruation, which could have a big impact on potential re-use. The very young and the very old also need special provision.

## User education

Every sanitation technology needs some user education and EcoSan needs even more. The simplest is about the use of soil and ash after use. Alternating pits should be rested for at least a year before digging out for compost. The contents of a Skyloo need to be kept dry, preferably in an alkaline medium (by adding ash or lime) and carefully

composted, if they are to be safely used after only three months, as claimed by some EcoSan promoters.

Public health practitioners are well aware of the simple challenge of instilling the practice of hand-washing with soap and water. EcoSan introduces another level of complexity and public health risk. Sufficient resources are needed to make users fully aware of their responsibilities, and provide for follow-up visits until operational requirements have become common knowledge.

## Technology

Approaches to technology must be more flexible in terms of choice of toilet type and use of materials. Over-designed, expensive or imported components make replication difficult without subsidies. Problems such as

blocked urine diversion pipes, stolen jerry cans, children unable to use urine diversion units, can quickly create failure.

## Role of subsidies

Most of the projects described in this field note have used some form of subsidy to promote or support widespread use of new technologies. Most of the subsidies have been so large as to be unsustainable for a regional or national program. In some cases the subsidy has even persuaded people to consider a technology that they are not even sure they like.

All sanitation technologies, but especially EcoSan with its greater demands on the users, require some form of 'buy-in' from the users. Subsidy approaches must avoid distorting decision-making to the extent that wrong choices are made. Hardware

subsidies should be governed by a clear subsidy policy with explicit objectives and political commitment to the total amount of funds that would be necessary if programs were scaled up.

## Conclusions

This review of EcoSan technologies and approaches in East and Southern Africa reveals slow progress towards solving the sanitation and environmental challenges of the region. Over the last two decades, despite many projects financed by NGOs and international agencies, with one or two remarkable exceptions, relatively few households have been persuaded to re-use excreta in agriculture.

Since the development of more rigorous approaches in the last decade, the number of EcoSan toilets built has only recently risen into thousands,

largely as a result of heavily subsidized South African programs. Apart from thousands of toilets in Tanzania, the number of households practicing EcoSan agriculture may still remain in the hundreds.

Current approaches must be more sensitive to what local economies and customs can embrace. EcoSan may simply be inappropriate for widespread use in some localities where soil fertility is still good. In others, sensitive introduction of EcoSan in response to local conditions, as an option alongside other technologies, could provide much needed economic and health benefits.

The use of extensive but unsustainable subsidies may have achieved some short term gains but appear to militate against long term affordable solutions of the type that will be necessary to achieve meaningful progress towards sanitation coverage for half the world's population by 2015.

A better alternative is to design pilot projects from the beginning with approaches that can be sustained in the long term and to use marketing to encourage the spontaneous copying of technologies beyond the constraints of project resources.

The limited but encouraging experiences reported from Malawi and Mozambique suggest that a sensitive response to local conditions may produce sustainable and replicable results, but the principles and methods of such approaches need to be tested in other environments before their widespread application can be guaranteed.



A locally-fabricated EcoSan component. Expensive or imported materials can make replication difficult.

## About the Sanitation and Hygiene Series

WSP Field Notes describe and analyze projects and activities in water and sanitation that provide lessons for sector leaders, administrators, and individuals tackling the water and sanitation challenges in urban and rural areas. The criteria for selection of stories included in this series are large-scale impact, demonstrable sustainability, good cost recovery, replicable conditions, and leadership.

## References and further reading

- Joint Monitoring programme for water supply and sanitation, WHO, [www.wssinfo.org](http://www.wssinfo.org)
- Dr. Boro Gathuo, BG & Associates, Learning from the past and present for the future: sustaining sanitation and hygiene in Kenya, May 2003.
- Barry Jackson, WSP-AF Field Note: Sanitation and Hygiene in Kenya: Lessons on What Drives Demand for Improved Sanitation, March 2004.
- UNICEF 1997, WaterAid 2003, Ethiopia.
- Pankhurst A., and Tesfaye S., Social Assessment of SUDEA's ECOSAN Pilot Project in Ethiopia (1992 – 2002)
- Dr. Maimuna Nalubega, WSP-AF Field Note: Lessons from a field study on what drives demand for sanitation improvement in Uganda (forthcoming).
- Augustus Nuwagaba, Makerere Institute of Social research, Assessment of Factors that Influence Household's Choice of Sanitation Technologies and Excreta Re-use (EcoSan), December 2003, Uganda.
- South Western Towns Water and Sanitation Project, Ministry of Water, Lands and Environment, The Weekly Message, December 2003, Uganda.
- O. Aron, S. Bibby, M. Kibona, E. Kimbe, Report on field visit to Wanging'ombe, September 2004, Tanzania.
- Dr. Albert Wright, personal communication, November 2001.
- Alfred J. Shayo, EEPSCO, Acceptance of EcoSan concepts in Tanzania – a case study of "piloting ecological sanitation in Majumbasita Dar Es Salaam", April 2003.
- Andreas Knapp, notes on recent visit to Dar Es Salaam, July 2004.
- Steven Sugden, WaterAid, Malawi, One step closer to sustainable sanitation: the experiences of an eco-sanitation project in Malawi, August 2003.
- Steven Sugden, WaterAid, personal communication, November 2004.
- Edward D. Breslin & Feliciano Dos Santos, Introducing ecological sanitation in Northern Moçambique, WaterAid Fieldwork Report.
- Edward D. Breslin, WaterAid, Moçambique, Progress Report 2, mid 2003.
- Edward D. Breslin, WaterAid, Moçambique, Introducing ecological sanitation in rural and peri-urban areas of Northern Moçambique, November 2001.
- Madeleine Fogde, PAARSS, personal communication, November 2004.
- Amanda Hammar, Review of Swedish support to water and sanitation development in Zimbabwe, January 2002.
- Edward Guzha, Mvurumanzi Trust, Ecological sanitation practice and technology development in Southern Africa and Zimbabwean case study, 2002.
- Richard Holden, Mvula Trust, Riana Terreblanche & Mary Muller, Nawasan, Factors which have Influenced the Acceptance of EcoSan in South Africa & Development of a Marketing Strategy, 2003.
- John Harrison, eThekweni Water Services, personal communication, August 2004.
- Richard Holden, Mvula Trust, Report on visit to Ethekeeni Sanitation Programme, 8 April 2004.



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