An ecological approach to low cost sanitation provision in Malawi and Mozambique

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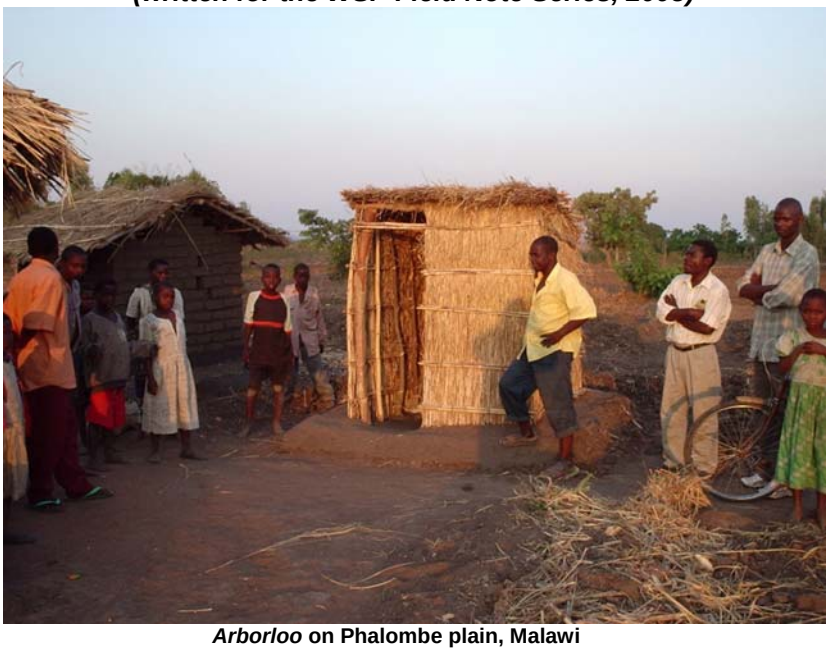


***Arborloo* on Phalombe plain, Malawi**

Summary

Various estimates place the overall coverage of sanitation throughout sub-Saharan Africa as between 50 – 60%. This estimate includes families served even with the most basic pit toilet, which can itself become a health hazard. This still leaves an estimated 300 million people without any form of basic sanitation at all. Despite repeated efforts, the actual percentage coverage may be decreasing due to population increases. In reality the actual number of rural families being served by simple yet safe and effective toilets, may be far less than 50%. Even where successful rural sanitation programmes, using the pit latrine or its variants, have taken place before, pits do eventually fill up and toilets must be rebuilt. Most programmes using the VIP latrine, which are familiar in Southern Africa, and the mainstay of rural sanitation in several Southern African countries, are much dependent on donor or government support. What happens when the pit is full and a second subsidy is not forthcoming? Will the percentage coverage fall further?

This field note describes pioneering work being carried out in Malawi and Mozambique with a new generation of low cost pit toilets. The pits are shallow, rarely more than 1.5 metres deep. The pits fill up, not with raw excreta alone but with a mix of ingredients which includes excreta, soil, wood ash and sometimes leaves. Garbage is not added. With such a mix the pit contents change into valuable compost relatively quickly. This simple transformation in design and use can have far reaching effects. Young trees can be planted in topsoil placed over the pit contents almost immediately, thereby utilising the valuable nutrients which would other wise be lost. Also, using an alternating twin pit technique, the processed pit soil can easily be dug out after only a year of composting for use on gardens. The pit emptying process is simple and inoffensive and makes available an empty pit for the following year's use. This makes the twin pit system almost everlasting. The pit compost is much valued by the owners as it can increase the harvest of food crops, particularly in areas where the soil is poor. The regular addition of soil and wood ash also greatly reduces odour and fly breeding. The concepts being promoted are based on traditional methods already used in both Malawi and Mozambique. These include tree planting on old latrine pits and the addition of wood ash to control flies. Several innovative methods have been used to promote these new concepts in countries like Malawi and Mozambique. This field note describes this pioneering work.

The designer knows he has
reached perfection - not when
there is no longer anything to add,
but when there is no longer anything
to take away.
Anon.

Background

The pit latrine is the most commonly used toilet in Africa. In its simplest form it consists of little more than a pit with some covering of wood or concrete and a structure mounted above for privacy. Such toilets occur in their millions. Well cared for, pit toilets can be safe and pleasant to use. If not, they can be a smelly and fly ridden nuisance, as well as a health hazard. Some rate them worse than open defecation.

Improvements in the pit toilet, like the SanPlat which offers a hygienic slab surface, or the VIP, which uses a screened vent pipe to overcome problems of odours and flies, are well known on the continent. The popularity of the VIP is mainly confined to Southern Africa, where donors have been prepared to offer relatively large subsidies to support programmes. For budget programmes, the SANPLAT system, principally a concrete slab placed over a protected pit, has been used far more widely throughout the continent. The main improvement being the hygienic surface on which people can squat. And compared to traditional latrines this is a big step forwards.

VIP latrines can also be low cost too! It works perfectly

Another major problem with all pit toilets is that they **fill up.** For single pit VIPs the period of filling may be in the order of ten years for a medium sized family. When the pit is full the unit can no longer be used. If constructed in brick and mortar most are abandoned since they are not easy to excavate. Also the mass of raw excreta held in the pit, usually mixed with garbage, takes many years to compost to the point where it can be removed.

Another factor of consideration is that human excreta contains valuable nutrients which can benefit agriculture. By far the greatest proportion of filled latrine pits are covered over and abandoned once they are full. A huge potential tonnage of valuable nutrients is therefore lost to agriculture.

In heavily subsidised programmes like the ones in Zimbabwe and South Africa, evidence shows that very few families are able or willing to build a second unit of the same type without material assistance from a donor. Commonly, villagers revert back to the simple pit toilet or use the bush. A generation may have benefited with huge donor support, but true development requires more than this.

The advent of eco-sanitation in Malawi and Mozambique

More recent programmes in several African countries are beginning to show that a new generation of "shallow pit composting toilets" may offer an answer to several of the dilemmas mentioned earlier. Such toilets can be built at ultra low cost if needs be, and to a large extent can control the twin banes of fly breeding and odours, without the use of a vent pipe. Such toilets can easily be made, largely from locally available materials. Also they can be used in an **almost** identical way to the standard pit toilet. The design and use of these new eco-toilets also permits the emptying of the pit contents.

The new generation of low cost eco-toilets operate very much like the familiar pit toilet but with three fundamental differences.

*Soil and wood ash are added regularly to the pit as well as excreta to assist composting. Leaves help too.

*The additions of garbage, plastic and other refuse are cut down to a minimum.

* Pits are dug shallow, usually less than 1.5m deep.

These elementary differences in the way the pit toilet is built and used greatly increase the efficiency of composting within the pit, making subsequent excavation of compost or tree planting possible. Increased composting and pit shallowness also help reduce the potential for underground water contamination. The regular addition of ash and soil also greatly reduce fly breeding and odour. Shallow pits are also easier and safer to dig that deeper traditional pits and a better gender balance is achieved because women can undertake this work. The conversion of "deep pit latrine" to "shallow pit eco-toilet" is simple, yet has far reaching consequences.

In several countries within the sub-region these "shallow pit composting toilets" are becoming more popular. Two methods are being promoted in countries like Malawi and Mozambique. In the ***Arborloo*** a tree is planted in topsoil placed over the pit contents once the pit is full. The toilet site is then moved on. An orchard or woodlot may be the end result. This method, based on a widely used African traditional practice of planting fruit trees, notably banana, on abandoned toilet pits can produce both prolific growth and tasty fruit. It is sure proof that there is value in composted human excreta. The *Arborloo* can be a good entry point for introducing eco-toilets to many parts of Africa.

Most trees will grow well in abandoned toilet pits if cared for and watered. Here a fine paw paw tree grows in an old *Arborloo* pit in Zimbabwe.

Shallow pit composting technology is also used in the ***Fossa alterna*** concept, where two permanently sited shallow pits, each about 1.5 metres deep are used alternately. Once again soil, ash and if possible leaves are added to accelerate the rate of composting within the pit. Pits become easily excavated after a year of composting, making an annual pit change possible. The simple motto is more soil – less garbage! Compost suitable for the garden is thus produced every year. This is highly valuable, especially when mixed in equal proportions with very poor soil almost devoid of nutrients – a common condition over much of Africa.

Whilst these "shallow pit eco-toilets" were researched and developed in Zimbabwe, by far the most successful programmes of promotion have taken place in Malawi and Mozambique. This field note records the work undertaken by WaterAid in both Mozambique and Malawi. WaterAid is very active In Mozambique, and supports the local NGO ESTAMOS in Niassa Province together with the Provincial Department of Water and Sanitation (DAS), District Directorates and District Administrations in Mandimba, Lichinga, Maúa and Nipepe. WaterAid also works in Zambézia Province and Maputo. WaterAid Malawi offers financial support to its partner CCAP in Northern Malawi. COMWASH is a project in Southern Malawi being funded by CIDA and managed by Cowater International in collaboration with the two District Assemblies and Ministry of Water Development.

MOZAMBIQUE

ESTAMOS, a Mozambican NGO, with support from WaterAid, together with the Niassa Provincial and Nipepe District Directorates of Public Works and Housing, have initiated a successful and widespread programme of promoting low cost water supplies and sanitation in Niassa Province, Northern Mozambique. The programme has been most active in the areas, around Lichinga, the provincial capital and also in Mandimba, a town south of Lichinga and in the district of Nipepe. WaterAid and ESTAMOS assist the Provincial Department of Water and Sanitation (DAS) and the District Directorate of Public Works and Housing (DDOPH) in these districts. (see bibliography). A second WaterAid programme operates in Zambézia Province.

Sanitation in Mozambique

The traditional deep pit latrine is the most commonly used latrine facility in Mozambique. A large number of these have been upgraded by fitting a concrete slab known as a SanPlat above the pit. The SanPlat offers a hygienic surface which is more easily kept clean than the more traditional wooden slab. In Mozambique this is known as the "*Latrina Melhorada*".

The sanitation programme undertaken by ESTAMOS with WaterAid support in Niassa (and also in Zambézia province) offers people a choice of technologies. This includes the "Improved Latrine" ("*Latrina Melhorada*") which generally consisted of a SanPlat latrine slab placed over existing traditional latrines, or over a new 3-metre deep pit. The VIP latrine is also offered as well as the *Arborloo* and *Fossa alterna*. The urine diverting concept, much used internationally in ecosan projects is also included. Overall a mix of "*Latrina Melhorada"* and *Fossa alterna* are built in almost equal numbers.

Concepts of eco-san explained

EcoSan is based on three main principles:

- It offers a safe sanitation solution that prevents disease and promotes health by successfully and hygienically removing pathogen-rich excreta from the immediate environment
- It is environmentally sound as it doesn't contaminate groundwater or use scarce water resources
- It creates a valuable resource that can be productively recycled back into the environment. Over time, through proper management and storage, excreta is transformed from a harmful product into a productive asset

Programme Start up in Lichinga

ESTAMOS held a series of meetings with community leaders and active residents in various Lichinga bairros. Sanitation issues were discussed and it emerged that participants had problems with their current latrines. Flies, smells and pit collapse seemed common. ESTAMOS then introduced EcoSan, as described above, as a possible alternative to consider.

Explaining the merits of toilet compost to villagers

The response was positive. ESTAMOS constructed the first 35 *Fossa Alternas* in 2000/2001, after which interest increased significantly. Interest in EcoSan was further enhanced through a series of radio interviews with a woman who had received a *Fossa Alterna,* and who spoke eloquently about the numerous advantages of the system over her previous "Improved Latrine". A PHAST process began that allowed participants to explore a range of local water and sanitation-related health problems in their bairros. Participants told stories about their lives in the bairros through "Unserialised Poster" exercises. Local educational campaigns, along with dance and drama, continue to reinforce the process. Health problems emerged as a key concern among local residents.

Further promotion in the rural areas

In terms of rural ecological sanitation in Niassa, EcoSan was first introduced into Maiaca, a rural village in Maúa. Maiaca participated in the DDOPH/DAS/WaterAid water supply programme in 2000, and the Chefe de Posto Administrativo was interested in exploring why diarrhoea was such a problem in the area (Breslin 2001).

Training session in Lichinga, WaterAid, Mozambique

The Chefe felt that sanitation was a particular problem in the area, so some demonstration models were built. The Chefe and the Chief (Regulo Vatiwa) of the area had been introduced to a range of concepts in sanitation at an earlier workshop. Both had immediately expressed interest in improved latrines (the Chefe had a traditional latrine that was now almost full and the Regulo has no sanitation system at his house). A sanitation ladder was shown to them, and after some discussion on the concepts behind each latrine they both decided to test the *Fossa alterna.*

Demonstration *Fossa alternas* were then built at the house of the Chefe and Regulo. The designs of the system are slightly different from the *Fossa alterna* used in Zimbabwe. The two pits are contained within one large superstructure made of local materials. As a result, families do not have to move the superstructure but only the slab as pits fill. Attached to the latrine is a washing area as well. This is done because people in Niassa consider a "proper" latrine to have areas for defecation and for bathing.

A group of 18 heads of households were then involved in a series of PHAST exercises designed to explore local diseases more carefully. A series of exercises were used, including family dynamics, and a sanitation ladder followed by a visit to the demonstration latrines. Participants explored a range of local diseases – ranging from water- and sanitation-related diseases, to diseases associated with stress, physical ailments and sexually transmitted diseases. It was found that the diseases/illnesses that are of greatest concern to the participants at this session were diarrhoea, malaria, hernias, and STD's.

When the sanitation ladder was initiated, there was some interest in SanPlats, acknowledgement about traditional latrines and curiosity about the *Fossa Alterna*. People said they knew of and had used the SanPlat (Latrinas Melhoradas), which generally includes a 3 metre-deep pit with a SanPlat slab. All were also aware of traditional latrines, and a few of the participants had such latrines. Most use the "cat system" where people defecate and then cover the faeces, but quite a few said that the covering of the stools was not really done that much in practice. Many mentioned that they often step in human faeces when walking to their fields.

The *Fossa alterna* at the Chefe's house was then visited. The concepts were explained to all the participants, and the idea that the contents of the pits would, over time, be transformed into compost was well received. Participants saw the logic of this, and felt that such an innovation would be of great benefit to the local community**.**

Training material. ESTAMOS-WaterAid, Mozambique

As a result, all the participants decided they would like to try the *Fossa alterna*. A series of follow-up meetings were held with each family who has a *Fossa alterna*, emphasising the use of ash and soil after each use and the hygienic maintenance of the system as a whole. Recent M&E visits to the area have confirmed that the people are using the toilets as suggested. And most importantly, demand has grown for *Fossa alterna* in the area. Residents without such systems want them as well, and news is spreading about these new systems with little assistance from WaterAid.

A similar process took place in peri-urban Lichinga, Maúa Sede and Mandimba district. In Maúa Sede, demonstration toilets including *Fossa Alterna*, *Arborloo*, 3 metre deep latrines with SanPlats and the smearing of a thin layer of cement over the squatting sections of tradition latrines were undertaken. One issue that has emerged is that 3 metre pits are proving to be impossible to dig during the wet season in these areas.

Sanitation ladders explored options that people could consider. Families with traditional latrines argued that SanPlat slabs would improve the hygiene of their latrines, but would not necessarily eliminate the problems of flies and smell. "Improved Latrines" with deep pits might also contaminate groundwater in congested areas where wells were used for domestic water. People made informed choices about their latrine of choice.

Applications for support

Communities interested in sanitation send representatives to demonstration facilities, and are given the opportunity to talk to owners about their new systems. In fact the latrines "sell" themselves in many ways, and have led to considerable demand for Ecological Latrines in both Lichinga and Mandimba. Formal applications are made by families for support to build a toilet.

Family contributions and costs

In Maúa and Nipepe the contribution per family by WaterAid through DDOPHis as follows –

- 1 Plastic Sheet to line the roof of the superstructure
- 1 latrine slab
- 1 small contribution of cement for bricks to line 30 cms of the pit(s)

Family Contribution:

- Excavate pit(s)
- Buy Bricks for lining pit(s)
- Bamboo
- Straw
- Traditional Cord
- Wooden Poles
- Rocks
- Sand
- Water
- Labour for construction
- Cover for second pit

Note: For "Improved Traditional Latrines", WaterAid is contributing cement only.

Total Cost of a ***Fossa Alterna*** - ~US$18 – 27 (depending on locale)
Total Cost of "Improved Latrine" - ~US$13-20
Total Cost of "Improved Traditional Latrine" - ~US$4

Once the family has been awarded a subsidy, the family hires a locally trained builder to construct the latrine.

Numbers built

The total number of latrines built in Niassa supported programmes over the last 4 years is 1,261, of which 10 are public latrines, 3 are *Arborloo's,* 6 are improved traditional latrines, 540 are SanPlats and the rest (702) are *Fossa alterna*. WaterAid also supports sanitation work in Zambézia province using similar methods. Here direct or indirect support has led to the construction of a further 375 *Fossa alterna*, 24 traditional latrines and 395 Sanplat/Melhorada latrines. 15 urine diverting toilets have also been built in Maputo under this programme at a cost of US$200 each, which is deemed unreasonable to sustain, so alternatives are being considered.

Grass structure being built in Lichinga, Mozambique

Monitoring and evaluation programme

During the active implementation phase a parallel M&E programme was undertaken to assess whether systems were being used and managed properly. M&E surveys have been conducted every 3-4 months to see how the systems are being used. More recently this has changed to yearly surveys. Problem areas are identified at household level and across households.

Adding ash to a Fossa alterna in Lichinga, Mozambique. WaterAid UK.

Potential problems discovered

When the M&E programme was started, a number of problem areas were identified. First, a considerable number of households had odour problems because they were afraid to fill their pits too quickly and therefore were not including enough soil/ash after each use. They would put a small handful of ash/soil down the pit, which never covered the excrement. This behaviour has since been modified, and smells have been reduced or eliminated altogether.

***Fossa alterna*, Niassa province, Mozambique**

We have also worked to allay fears that the latrines will fill too rapidly and thus do not allow enough time to pass for the latrine contents to transform into compost. Consequently the alternating pits were deepened from 1.3 metres to 1.5 metres. This has proven to be important because the first sets of *Fossa alternas* that we built were filling too quickly. One family filled their first pit in less than 6 months. The reason for this is that neighbours were using these latrines as well. So, three families were using a latrine designed for a family of seven. 12 Months of composting is desirable, as this rids the pit compost of most viable worm eggs (see Malawi report later).

The M&E programme also learned that men do not use the *Fossa alterna* when they need to urinate only. Instead, they urinate in the bathing area adjacent to the latrine, and this can cause offensive smells. Thus urinals placed were placed in the washing area as well to reduce smell and to divert urine away from the system as a whole.

The M&E programme also discovered that EcoSan required greater management and care during the rainy season, when Lichinga in particular becomes quite damp. Families have a difficult time identifying dry soil to include in the ash mixture, and it was found that ash alone did not kill smell as effectively as ash/soil mixtures. It should be remembered that the smell associated with conventional toilets increases as well during the rains, and that a well managed EcoSan system is certainly less odorous than its alternatives.

That said, the M&E system is showing that people like their systems, generally show them off to neighbours, and are keeping them extremely clean (free of urine and faeces). Ash/soil mixtures are present within the toilet and the systems are being used correctly. The second pit is covered allaying fears that children will hurt themselves inside the latrine. Some pits have filled quickly while others – which are not being used by neighbours – should take about one year to fill. We know that groundwater did not enter ***Fossa Alternas*** during the last rainy season.

Digging out the compost from Fossa alterna, Mozambique.

Inspecting toilet compost. Niassa Province, Mozambique.

Pumpkin growing on Arborloo pit. WaterAid UK.

Reponses and lessons learned

Uptake and interest in ecological sanitation has grown considerably in Lichinga. There appear to be a number of reasons for this, which are described below.

First, families do not have a great deal of space in their yards for toilets, yet EcoSan provides people with a legitimate alternative that addresses this problem. People think of the *Fossa alterna* as a permanent solution, in sharp contrast to pit latrines that eventually fill and need to be relocated. New latrine sites inside small yards will not have to be found with a *Fossa alterna*.

Second, EcoSan offers people the potential for added economic value, and this too is proving to be a considerable incentive for people who depend on farming for at least some of their economic well being, and who are generally quite poor. Compost from an ecological latrine can be used for small vegetable plots within a family's yard, and some are now considering the *Arborloo* in their main fields outside of town.

As one user comments, "I now have a latrine (*Arborloo*) in my machamba (field). During the agricultural season my family can use this latrine which is an improvement on our situation in the past. But what is most important is that we can plant a young tree there at the end of each harvest. In the future we will have many fruit trees because we will make a new pit each year and plant a new tree when we are finished for the year".

Third, the concepts behind ecological sanitation make sense to people, as these concepts are simple and easy to understand, especially with demonstration models in place. People living in Lichinga generally have some experience with pit latrines (usually traditional latrines). Including ash/soil mixtures in the process is proving less difficult to do, especially with regular follow-up support as discussed above. Improved management practices are evident over time as people see the value of introducing ash/soil mixtures, as their systems do not smell, do not attract flies, and lack the humidity to entice mosquitoes as is the case with other pit latrines in the area. It is hoped that families will also see the value of soil/ash at a later stage when they have transformed the faeces and urine into useable compost. Moreover, few have said they think the use of excreta is culturally unacceptable – instead many families insist that it is "logical".

Fourth, and as discussed above, there is a growing sense that the shallower pit depths of EcoSan systems will ensure that groundwater is not contaminated. This is an important issue among Lichinga residents, especially as more people link poor health with poor drinking water quality from their household wells.

Concluding remarks for Mozambique programme

WaterAid (Moçambique) has strongly supported the development of EcoSan in Niassa and elsewhere in Mozambique, but does not believe that EcoSan is the "only" correct sanitation option.

Pit latrines have saved millions of lives worldwide, and are a safe alternative for many. The "*Latrina Melhorada*" programme has had a considerable impact in Moçambique, and this technology is promoted alongside the more recently adopted eco-latrines. Groundwater contamination may be of concern in densely settled bairros, where the water table is high and wells are common, but this is not always the case. The threat to groundwater contamination can be easily overstated, where population densities are lower and water tables deeper. Residents in bairros such as Lulimile may well choose SanPlat slabs on their traditional latrines over EcoSan because groundwater contamination is not a threat (Breslin 2001).

What has been observed in the Niassa programme is that people can make informed choices, and the end result is what we all seek – a reduction in the number of people worldwide without adequate sanitation. EcoSan can stand on its own merits without the need to condemn other technologies. Families in Lichinga and elsewhere in Niassa are choosing EcoSan over others. Yet, EcoSan is threatened when proponents claim that there are no valid alternatives, and undermine household choice in the process, which occurred when Moçambique claimed that the only alternative for families was an "Improved Latrine". Our approach is to let people decide, and to marvel at the fact that so many in Lichinga are choosing EcoSan over better known alternatives. The ultimate aim of all sanitation programmes in the sub-region should be to increase coverage with the most appropriate system.

MALAWI

WaterAid (UK) started promoting ecological sanitation in Malawi in 2001 and initiated a project in Salima. Training programmes were also held in Lilongwe and the concept of ecosan was promoted nationally. WaterAid also financially supported an ecosan programme undertaken by the Development Department of the CCAP (Church of Central Africa Presbyterian), Synod of Livingstonia, in Embangweni. The CCAP has also extended its operations to Ekwendeni operating in the outskirts of Mzuzu City in Northern Malawi WaterAid support has also been provided for a project in Dwangwa.

Training in making brick ring beams. WaterAid. Lilongwe

The Canadian funded COMWASH Project, operating in Southern Malawi, initiated an ecosan project in mid 2003 in the districts of Phalombe and Thyolo.

In combination these NGO's have so far supported the construction of nearly 9000 low cost eco-toilets. Three quarters of these being *Arborloos,* with most of the remainder being *Fossa alterna*. Urine diverting technology is also promoted but because of increased cost its uptake has been far slower. Improved traditional latrines are also promoted.

Ecological sanitation activities of the CCAP

These projects are initiated with a series of workshops held with community leaders and the setting up of demonstrations within project areas. The earliest demonstration site in the north is based at the CCAP mission in Embangweni. However a larger site in which all the technology is exhibited has been built at Dunduzu in the Ekwendeni catchment area.

Promotional methods

Several promotional methods are used to extend the knowledge of ecological sanitation in Malawi. The demonstration sites mentioned above are numerous and promote the concepts well. In the CCAP project, the project coordinator identifies local masons with an entrepreneurship background. Masons are trained in latrine slab making, ecological sanitation and marketing techniques.

Domed slab made by mason in Embangweni

The masons are called promoters in the programme. They operate within a particular demarcated area and are responsible for managing sanitation activities. The programme currently has twenty-six promoters for both Embangweni and Ekwendeni. The promoters train other masons within their areas of operation and these are called agents. Agents assist promoters to carry out sanitation activities effectively. An agent of a promoter usually gets a token of appreciation in the form of cash or in kind from the promoter for assisting in selling slabs and promoting sanitation. An agreement between a promoter and an agent is reached so that after the sale of each slab the latter gets a quarter of the payment. This is common at Embangweni and it is gradually being adopted at Ekwendeni too. The agents and promoters teach local builders or families how to contruct the latrines. The technology is so simple that construction can normally be achieved by family itself.

The concept of the sanitation clubs also originated in the CCAP programme in Embangweni. The CCAP Synod of Livingstonia at Embangweni and Ekwendeni have acted as learning centres for many NGO's in Malawi. Many of the organisations, visiting projects sites bring chiefs, farmers and extension workers to CCAP before they start implementing their own programmes. Organizations that have learned from CCAP include COMWASH in Thyolo and Phalombe, Inter Aid, a French NGO based in Lilongwe, WESM based in Dwangwa in Nkhotatakota, CCAP Nkhoma Synod in the Central region of Malawi, Total Land Care in Kasungu and Dowa districts and of late Canadian Physician and Relief Organisation from Nkhatabay.


Drama used to promote eco-toilets and tree planting. Embangweni

Empowerment of Women

Women are a winning group for ecosan activities. Women are now entering a man's world in that they are active masons and promoters. They find it easy to dig shallow pits (pit digging was traditionally left to men) and also they are able to build structures from traditional materials. Thus there is no part of the construction that they cannot perform. This means that there has been a change of roles within the programme which has empowered local women. Also women use and maintain the latrine far more than men. These are strong motivating factors which support the uptake of simple low cost ecosan technologies.

Costs

At first subsidised cement was provided by the project, but more recently the promoters receive cash from the programme to buy cement. Cement costs MK1350 (US$11) per 50kg bag. The project subsidises cement by paying promoters K900.00 (US$7.5) for each 50 kg bag, with the promoter contributing MK400.00 (US$3.3). Each slab is purchased by the villagers for MK 500 US$4.1). The agent gets MK150.00 (US$1.25) for each slab he makes while the promoter who manages the agents and is involved in all logistics of transporting and accessing cement gets MK350.00 (US$2.9) for each slab made. The promoters have

taken on “agents” to sell and build slabs and latrines in areas the promoters themselves cannot cover. Promoters also have many customers. It is possible for a successful agent to move up the system to become a promoter and develop agents of their own.

The project distributes receipt books to all promoters. The promoter sells latrine slab recording names of those that have bought latrine slabs in the receipt book. The receipt is issued to the buyer so that the promoter is left with a duplicate. The latrine slab has a receipt number written down on it.

Each 50kg bag of cement produces an average of four 80cm diameter domed latrine slabs. Every month the programme conducts promoters meetings at Embangweni and Ekwendeni. Each promoter brings a receipt book. The number of bags of cement must equal to the number of latrine slabs indicated in the receipt book. This is done before the promoter gets more cement or money for cement.

In the Salima project, WaterAid supplies the cement for its project. The superstructure, bricks, sand and stone and labour for digging the pit or pits are provided by the owner. WaterAid provides some support for building the substructure of the *Fossa alterna* and casting slabs. 400 bricks are required for the two pits of the *Fossa alterna*. The total cost for a *Fossa alterna* is around MK1160 (US$9.6 for 2003) of which WaterAid pays MK700 (US$5.8) and the household MK460 (US$3.8). The household contribution for the *Fossa alterna* is MK 60 (US$0.5) for stone and MK 400 (US$ 0.33) for bricks. The WaterAid contribution is MK 300 (US$2.5) for cement, MK 200 for slab casting and MK 200 (US$1.6) for labour for lining. The household builds the structure of its choice and also collects river sand and digs the twin pits.

Numbers built

Since its advent in 2001, over 1500 low cost eco-toilets have been built in Embangweni with a further 300 units in Ekwendeni using this promotional method. Approximately three quarters of these are A*rborloos*. In the Salima project and surrounding areas some 500 units have been built – a mix of *Arborloos* and *Fossa alterna*. Very few urine diverting systems have been built, although the technology is on display in demo areas.

Urine diverting toilet in CCAP project Malawi

Evolution of *Arborloo* to *Fossa alterna*

The demand for *Arborloos* is greatest at first, since it is the simplest and cheapest system to build. But invariably the choice moves to the *Fossa alterna*, which is considered permanent and offers a regular supply of much valued compost for the garden. The requirement for more permanent facilities which do not require moving is one factor. In some areas there is a lack of tree seedlings to plant. Families with a large number of people fill up the *Arborloo* (which has a small pit) quickly. If there is delay in planting a tree, the *Arborloo* contents are often excavated and used in the same way as contents of *Fossa alterna* are used. This has increased the number of those using “excreta manure.”

Reasons for popularity

Eco san latrines are relatively free from odours and flies, while traditional pit latrines can smell badly. It is also easier to build an eco latrine because the pit is shallow. The household can do everything itself from pit digging to superstructure construction. These are thought of as big advantages. Also the households benefit from manure on top of controlling diseases. Eco san latrines are also able to address latrine collapse in sandy soils without being costly. They also assist people who live in high water table areas and rocky areas.

Recycling activities

1. *Arborloo* and fruit trees

An *Arborloo* is the simplest of all eco san latrines designed because it requires the least amount of behaviour change. Many families tend to build this type of latrine first, when they are convinced of eco sanitation. This creates a demand of fruit seedlings among households. For most the *Arborloo* is the entry point for ecological sanitation.

Growing fruit trees, Embangweni

The introduction of little known fruits like granadillas to the households at Embangweni has been a complete success. The performance of granadillas in full pits is superb. As of now granadillas seem to be the fastest to reach a stage that could be consumed. A group of water and sanitation experts from Inter Aid visited the project in the last quarter. They described the fast

growth of fruits like granadillas in full pits as incredible. Households who planted granadillas in full pits started eating the ripe ones within ten months of planting. Households have sold produce from their full pits like granadillas that were not known before in the area (report of Twitty Munkhondia, sanitation coordinator CCAP).

Kabuthu, which is a variety of banana is the second among the fruits planted that grow very quickly. One family was able to harvest and eat a bunch of bananas within a year of growing. The fact that households have started eating these fruits grown in full *Arborloo* pits, assists in eliminating fears that made some health professionals and others doubt if households would eat such fruits. Paw-paws come third on the list of fruits that grow fast in full pits. Within four months of planting paw-paws start flowering. The biggest disappointment is guavas, which many households thought would grow the fastest. These have failed to impress by not growing to the expectation of the families after planting them in full pits (report of Twitty Munkhondia). In fact many tree species grow well. Even citrus, which is a popular choice can be made to grow well in these pits.

Use of urine on trees

One of the households at Ephangweni, which, is within Embangweni area, has been using both urine and contents of an *Arborloo* to increase the growth of both banana and granadilla. This method is now being encouraged among households so that they can get quick results after planting a tree (report of Twitty Munkhondia). In Zimbabwe the application of diluted urine (2 litres urine + 10 litres water per week) produced a significant increase in growth on mulberry, banana and mango.

Inspecting paw paw tree growing on Arborloo pit. Embangweni

Tomatoes grown on *Arborloo* pits

Twitt Tomatoes are very difficult to grow during rainy season because of pests and diseases that are prevalent during this season. With little chemicals applied one is able to get big and good tomatoes from full pits planted simultaneously with a fruit tree. One household was able to harvest good quality tomatoes planted simultaneously with a fruit tree on a full pit. Tomatoes are able to grow well when planted on the same pit with fruit seedlings or any other seedling. *Arborloo* nutrients in the early stages are capable of supporting more than two plants without competition for food. The enormity of the nutrients is the reason for this.

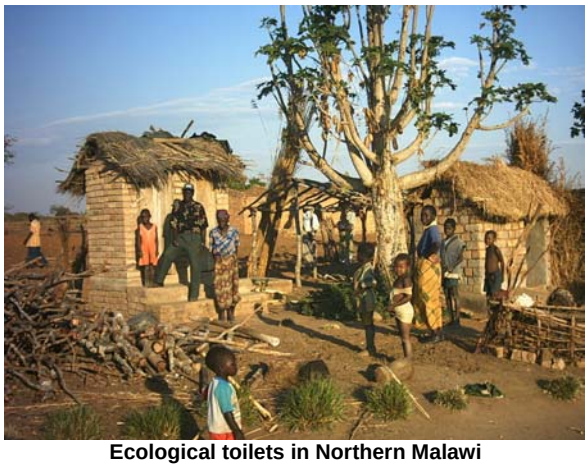
Use of *Fossa alterna* pit compost in Embangweni

During recent growing seasons, households have been able to grow maize, cabbages, tomatoes and other cash crops like to tobacco with the help of toilet manure. The poor local soils cannot produce a good yield no matter how hard a farmer works. Many farmers that have used the manure indicated that there is a good response to the application of the manure to their crops (report of Twitty Munkhondia).

Adding toilet compost to garden. Embangweni

Health and disease

Records for intestinal worm (*Ascaris*) cases analysed in Embangweni hospital were higher in 2002 than in 2003.The reduction in the number of cases could be due to several different reasons. One of the major reasons is the intervention by various programmes operating within Embangweni mission hospital catchment area that includes the sanitation programme, Child survival and shallow well programmes. Though some quarters have shown reservations to the use of *Fossa alterna* contents after six months, cases of worm infection or diarrhoeal disease out break have not been reported from families using the material.



Ecological toilets in Northern Malawi

Ecological sanitation activities supported by COMWASH in Phalombe and Thyolo

This operation was initiated in May 2003 with the first toilet constructions starting in September 2003. The project has made excellent progress since that time with 6740 eco-toilets being recorded by June 2005. The technology and concept of recycling and hygiene promotion are promoted through focussed group discussion by **sanitation clubs** in the village setting by Health Surveillance Assistants (MOH), who convene meetings with the villagers and headmen and in some cases the village Chiefs. Members of the club committees are elected. There is a link between the Sanitation Clubs and the Village Health Committees. The Sanitation clubs offer an avenue for the application for subsidised latrine slabs. The clubs in practice take a lead role, together with the masons, in the promotion of eco-toilets. Links are formed between the projects and the households. The clubs are also encouraged to apply for funds from the District Development Fund (ie outside COMWASH support) to encourage longer term sustainability of support. There are 301 sanitation clubs operating in Phalombe, and 104 in Thyolo. Normally a Health Surveillance Assistant looks after 3 villages.

Installing small slab on bring ring beam for *Arborloo*

Another feature of Sanitation Clubs is that they are gender friendly. Normally a man is responsible for pit digging, although this is may not be high on their priority list. Since ecosan pits are shallower, it is less of a physical constraint for a woman to dig one. Further a Sanitation Club must select one male and one female to be trained as a latrine mason; this is a boost for women given that they have fewer opportunities for income generation, but equally important a woman mason may show greater affinity in supporting women fulfil their sanitation requirements (Gary Holm pers.comm.).

14 demonstration sites have been erected in Phalombe and 8 in Thyolo, where the various technologies are put on permanent display. The *Arborloo*, *Fossa alterna* and urine diverting technology are on display, as well as the improved traditional latrine. In Phalombe the technology of choice is the *Arborloo,* in Thyolo, the *Fossa alterna*. Hand washing facilities are also strongly promoted. Most of these are made by drilling holes in a plastic cup or tin and filling a reservoir nearby with water which is decanted into the dispenser.

Slab mounted over pit with ring beam (Phalombe)
Early stage for *Arborloo*

Completed *Arborloo* in Phalombe

Promotional methodologies

COMWASH use a range of participatory methods and social marketing techniques with communities involved in water and sanitation activities, Communities are taken through a participatory hygiene and sanitation transformation(PHAST) process that helps the communities decide what key hygiene practices and sanitation problems they would like to address. Sanitation ladders covering health and hygiene issues are also used. Families are given a range of technical choices to consider and advantages and disadvantages of each system are explored with residents listing which are best and worst. Posters and leaflets are also provided to households. A latrine Constructional Manual has also been produced by COMWASH (May 2004).

The sanitation clubs and latrine building masons are part of the institution through which COMWASH is providing support towards construction of latrines and through these institutions the hygiene discussions are conducted to enhance behavioural change. Some latrine masons now operate on their own to buy cement for slab casting and pit lining (in the case of the *Fossa alterna*). Therefore some households buy slabs directly from these masons.

Twin pits in a *Fossa alterna*. Thyolo.

Demonstration centres

COMWASH has made great use of demonstration latrines centres in promoting different sanitation technologies. So far 22 demonstration centres have been set up. 4 different latrine models have been constructed and are displayed for the communities to see and learn how they function and constructed. The sanitation clubs around these centres encourages their communities to come during sanitation shows and open days, during these festival days community representatives are given opportunity to talk and ask questions to extension workers, COMWASH resource persons, sanitation club members and latrine masons about the new system. This has led to considerable demand for ecological latrines and improved traditional latrine technologies.

Schools project

COMWASH in collaboration with DFID has embarked on sanitation and hygiene promotion activities in selected 12 schools on a pilot basis. VIP latrines and improved traditional latrines with hand-washing facilities are being built. Pupils are being encouraged to discuss and pass sanitation and hygiene messages to fellow pupils within school premises. School sanitation clubs have been initiated and it is through these clubs that most of the hygiene practices will be promoted, linking them with village sanitation clubs.

Tree Nurseries

Also tree nurseries linked to the project are being established in Phalombe. These were initiated by the villagers themselves. A variety of trees are grown and sold and advice being given by an experienced nurseryman to villagers. Citrus are the most popular fruits with orange and tangerine being top of the list. Various other trees are sold including guava, paw paw and mango. Grafted trees cost MK50 each and ungrafted trees MK10 each. Most trees grow well in these organic pits and failure is usually caused by lack of watering and tree protection. In some cases the compost is dig out of tree pits for use on vegetables.

Tree Nursery in Phalombe

Monitoring and evaluation

COMWASH sanitation and hygiene activities have included an ongoing monitoring and evaluation program as a central part of the initiative. This is providing critical information that is strengthening the understanding of various sanitation technologies and hygiene in the project.

The monitoring of the activities are done once every month by COMWASH Sanitation team and every week by the Facilitation Assistants and Sanitation clubs mainly focusing on whether sanitation and hygiene activities/system are being used and managed properly. Problems are identified at household level and across household, which then forms future plans and thinking about sanitation technology modification and hygiene education.

At the beginning, a number of problems and issues were identified. First, a considerable number of households who adopted ecosan had odour problems because they were afraid of filling their pits too quickly and therefore were not including enough soil/ash after each use. Instead they would only put a small handful of ash/soil down the pit which did not cover the excreta. This has since been changed in Thyolo and Phalombe where smells have been reduced and in some cases eliminated altogether.

For most people the *Arborloo* is considered the entry or starting point for ecosan, and prefer that their pits fill up quickly, so they have more places for planting trees. After 6 or more trees have been planted, they may change to the *Fossa alterna* concept for a more permanent toilet which makes compost. Field investigations have shown that *Fossa alterna* pit soil is well composted by 6 month and is used on the gardens at that age. The greater the volume of soil, leaves and ash added, the faster the composting takes place. Few people have opted for urine diversion at this stage of the programme. In Phalombe villagers call the *Arborloo* a “one day latrine” meaning that it only takes a day for one to build it and remove it (Elias Chimulambe pers.comm.).

Pit filling times

Most *Arborloo* pits are 80cm in diameter and 1.0m deep (0.5 cu.m.). This pit lasts a family of 5 for a period of 7-8months. The *Fossa alterna* pit size is 80cm diameter, 1.5m deep (0.75 cu.m.) and lasts the family of 5 -7 for a period of 9 -13 months. The *Skyloo* (urinje diversion) vault has a volume of 1cu.m. and lasts a family of 5-7members for period of 12-15 months. (Elias Chimulambe pers.comm.). Figures derived from the CCAP programme are similar to these.

Costs

Project material contribution is mainly cement for the 80cm dome slabs, which each cost MK395 (US$3.3 @ July 2005 rate) to make. The Project provides 54% of the cost (MK215—US$ 1.8) and a household pays the remaining MK180 (US$1.5). Of the MK180 paid by the householder, MK150 (US$1.25) goes to the mason for casting the slab and MK30 (US$0.25) goes to a sanitation fund that would be used to assist more disadvantaged householders (very poor or with illness) to purchase a slab.

In the case of an *Arborloo*, the total cost with slab varies between MK279 (US$2.3) and MK307 (US$2.5) that excludes the cost of superstructure that is made of local materials (woven bamboo strips). In this case the subsidy is about 45% of the cost. In the case of *Fossa alterna* the total cost to a household with slab ranges from MK558 (US$4.65) to MK858 (US$7.15) depending on type of structure built. The urine diversion double vault toilet with home made urine diverting squat plate costs between MK1418 (US$11.8) and MK 1868 (US$15.5). Costs vary depending on whether a mason needs to be hired or not.

Each Sanitation Club can receive a “starter pack” of 5 50kg bags of cement from COMWASH which can build up to 40 slabs. Up to eight 80cm diameter concrete slabs can be case from a single bag of cement. With stepped in brickwork in the ring beam this can fit over a 80cm diameter pit. A Club may seek further funding from a NGO in their area or apply through their Village Development Committee for a contribution from the DDF. The attempt is to make the contribution very specific (cement) and accountable, while the Sanitation Club would then support other households to build the slabs (Gary Holm (pers.comm.).

Making concrete slab for eco-toilets. Malawi

Numbers Built

By June 2005, a total of 6023 eco-toilets had been built in Phalombe and Thyolo. The breakdown is as follows

District	type	Number
Phalombe	*Arborloo*	2578
	Fossa alterna	546
	Traditional pit	1085
	Skyloo	45
Thyolo	*Arborloo*	365
	Fossa alterna	897
	Traditional pit	498
	Skyloo	9
Grand Total		**6023**

Urine diverting toilets (Skyloo) were built in smaller numbers mostly by business people with more money to spend. The urine diverting system is normally built in permanent brick and mortar which makes it more attractive and prestigious, but also costs more than most villagers can afford. The *Arborloo* was the most popular followed by the *Fossa alterna*. A total of 788 hand washing facilities had also been built, greatly increasing the hygienic aspect of the programme. Throughout the two districts a total of 22 demonstration centres had been built (Elias Chimulambe pers.comm). This is an impressive piece of work by any standards.

Urine diverting toilet in Phalombe

Random Surveys (performed in August 2004)

During a random survey of 100 eco-toilets the following statistics were revealed:
Evidence of latrine usage - 100%
Evidence of hand washing facilities – 10%
Households adding ash and soil – 47%
Households keeping latrines clean – 47%
Number of pits filled up and households utilizing the compost – 12 out of 100 latrines

Analysis of pit compost

No viable *Ascaris* eggs were found in 13 samples of pit compost analysed after 12 months of composting, although they were detected in 2 samples which had composted for 6 months (Gary Holm pers. comm.). Escherichia. coli, faecal streptococci and Clostridium perfringens were also absent from *Fossa alterna* compost taken from Thyolo. Bacteria die out much more quickly than worm eggs.

The issue of sustainability

A central issue to all sanitation programmes concerns sustainability – what will happen once the donor funding is reduced or comes to an end?

As several projects have revealed, the provision of concrete slabs alone does not motivate people to build toilets. Many sanitation projects in Africa fade away as soon as material subsidies are cut off as donors move on. It is therefore interesting to discuss what aspects of the programmes described above are likely to lead to a continuation of the provision of low cost sanitation in the event of donor money being reduced or cut off entirely. Good examples can be taken from the work of CCAP and COMWASH.

Technical issues

Low cost, ease of construction, links to agriculture and the potential to increase food production, make the simple eco-toilets popular with the users. When these advantages are understood and borne out by reality, the technology has a better chance of being absorbed into traditional practice, whether the donors are present or not. This was the case in Zimbabwe for the construction of family owned wells – long before donor support became available. In the present case the method of planting fruit trees on latrine pits was already established in traditional practice, and digging out manure from old pits did occur but on a much smaller scale. The introduction of the same basic concepts, a little more refined and legitimised, clearly has the potential for carrying local wisdom much further.

Strengthening local capacity.

In order to sustain improved sanitation after 2006 when the project comes to an end, COMWASH is strengthening the capacity of communities and field extension workers to encourage households to adopt improved sanitation technology and hygiene strategie. This primary objective has been addressed by supporting a wide network of sanitation clubs in each target area. Examples of this approach have been successful in other parts of Malawi. Sanitation clubs have the potential to become viable long-term institutions at village level provided the benefits are clear, the application is practical and the price range is reasonable. It is anticipated that 10,000 household toilets will have been constructed at completion of COMWASH project

Community based organisations

Sanitation Clubs are CBOs (community based organisations) that have the various pros and cons that are characteristic of so many voluntary organisations:

- They are relatively democratic and easy to form.
- They can easily fall dormant once those most interested in sanitation and major supporters of the Club, receive the benefit of a slab subsid.
- CBOs are usually focused on one issue or service to a community (in this case sanitation and to a lesser extent hygiene). Sustaining this service needs either a stimulus from a project or agent, and/or a strong sense of need (outbreaks of water born diseases) or campaign by government
- Overall their survival is dependent on good local volunteers who have time and energy to sustain the club or a particularly motivated extension worker.

It may well be that CBOs are well suited during the developmental stages of a sanitation programme when community-wide promotion is a priority, and when introducing new sanitation technology, improved hygiene and managing subsidised materials. However after this initial development, the demand in a community for eco-latrines are likely to decrease, and therefore the need and sustainability of a Sanitation Club becomes more difficult. Possibly a more sustainable strategy is the kind of promoter/agents that CCAP are using, who get paid for their efforts and must cover several Sanitation Club service areas, since the number of improved latrines should have wider coverage.

So the challenge may be to find individuals resident in a community who would promote the use of the improved family wells with little or no support from outside. The other challenge is to determine what kind of remuneration can be sustained. There are several possibilities for promotion agents that include latrine masons, Health Surveillance Assistants, Facilitation Assistants and repair team workers.

Latrine Masons are trained by COMWASH to construct the latrine slabs and assist households construct latrines. In some cases they are already doing promotion work on their own, buying cement and building slabs, but charging a higher amount for slabs to cover the cost of cement than when through Sanitation Clubs. The problem may be that their margin per slab plus price of cement may price their units outside the financial capacity of the average rural household, especially those most disadvantaged (sick and very poor).

Health Surveillance Assistants (HSAs) work for the MoHP (Health & Population), are trained in sanitation and supported. However they are approached by many NGOs and projects to assist in preventative health work which is in addition to their normal duties, so their time may get oversubscribed. A further constraint may be that sanitation policy and planning is under the mandate of the MoWD and not the MoHP,

therefore the specific role of HSAs in light of MoWD's mandate may need further clarification.

Facilitation Assistants (FA's) are selected by the community then trained by COMWASH to assist in facilitation work during the development of a water scheme. They have some formal education (often secondary school leavers) and receive a bicycle and small allowance during facilitation. Usually there are 1 or 2 per branch and are gender balanced. Quite often they are also asked to take part in sanitation activities such as Sanitation Club orientation or short surveys. They tend to be well motivated but will need some form of monetary reward either from the community or water scheme.

Repair team members are trained by COMWASH to make basic repairs on a water scheme and who receive a small salary from the scheme committees. They have some basic technical knowledge but tend to be mainly males. Their work performance has been somewhat mixed, in part due to the varied quality of management from the scheme committees. However since they already work with the water scheme committees they may be developed into a community-based water & sanitation worker unit.
The remuneration for an agent promotes the use of improved latrines, could come from a mark-up on the sale of a latrine slab; there is still a problem of who will set the amount for this margin. To depend solely on market forces is likely to limit the accessibility of the latrines to the majority of households. As good sanitation may be defined as an essential 'public good' especially for poor households, it is therefore necessary to consider managing the margins for any agents or provide some sort of input subsidy as in the case of COMWASH or CCAP
.
Government Health and Sanitation Assistants are also involved in promotional and training exercises and the more motivated members have potential for encouraging communities once donor support comes to an end. Government agencies have normally been referred to when the management of essential public goods, but unfortunately their resource base both in terms of operational support and human resources are too limited to work effectively in this field. Water scheme committees might take up some of this role, but they are mostly volunteers who are willing to spend only a limited amount of time on such matters. Ideally this management role of setting the mark up for the agents and/or checking on the subsidised materials could be done by an NGO, but would require funding from local government or international donors (Gary Holm, pers. comm.).

Entrepreneurship

The CCAP has encouraged local entrepreneurship as a means of promoting sanitation and establishing longer term involvement by community members. An important factor is the motivation and empowerment of women within the village, who are able to undertake all practical stages of toilet construction and recycling of the products themselves within each household. The practical knowledge and benefits are passed on from one household to the next. A good example is revealed by the continuation of low cost sanitation projects undertaken by CCAP in Embangweni after the sanitation co-ordinator moved to Ekwendeni, only making monthly visits to Embangweni.

Established demonstration sites

The establishment of permanent demonstration sites has played an important part in bringing a knowledge of the new concepts of ecosan to the community. These are well build and in themselves will play an important role in ensuring the sustainability of the concept in and around the project areas. People from all walks of life are visiting the sites and learning about eco san consequently buying slabs and hand washing facilities to improve their latrines or practice eco sanitation. This is a step forward towards achieving a sustainable sanitation industry in all the current project areas. The CCAP pioneered this concept. Capacity building for local management team is being done so that the industry becomes completely independent. The programme invested start -up costs only and it is not pumping in more moneys.

Value of the pit compost

Several programmes in Malawi and Mozambique and also Zimbabwe have shown that the compost removed from pits is highly valued by the users of compost generating toilets. This provides a valuable commodity for those interesting in food production. At first the conversion of human excreta into compost, in such a relatively short space of time, is thought to be impossible, and people may at first opt for more conventional deeper pit sanitation. However once the conversion into compost has been witnessed there is a strong trend in communities to move towards the ecological method. This has been well demonstrated in Malawi (in a forthcoming M.Sc. thesis written by Bianca D'Souza at the London School of Hygiene and Tropical Medicine) and also in Mozambique, both in Niassa Province (refs Ned Breslin) and also in Zambézia Province.

Erik Harvey (WaterAid, Mozambique, based in Quelimane, Zambézia Province) writes "..our programme revolves around choice, so it may happen that ecosan is not chosen as an option and even if it is, individual families may not choose it. We always, though try to encourage at least one person to try ecosan as an option. We often end up with a situation that we have three activists and one option is built in each of their houses. Generally the ecosan guy soon learns the benefits of his technology and ends up championing it. We have seen this happen in a number of villages, where the initial emphasis of choice is on the more traditional technologies, but once some experience is gained with the ecosan (option) the choices veer in this direction fairly rapidly. The big turning point is when we get to empty out the first compost (ours is the double-pit alternating pit design).

New technologies which provide meaningful and valuable assistance to daily village life are very often absorbed into the traditional technical culture (the

windlass is an example on family wells in Zimbabwe). It is possible that the conversion of human waste into valuable pit compost in those eco-toilets being used in the Malawi and Mozambican programmes, may provide the stimulus which ensures that this ecological method endures beyond the era of external donor support. Only time will tell.

Overall conclusions

The programmes described in this Field Note offer extra scope to low cost sanitation programmes being carried out in the sub-region, and perhaps Africa as a whole. The aim is not to replace earlier systems, but to add a wider range of technical options which can then best suit local conditions and individual requirements. The possibility of providing low cost, easily made, fly and odour controlling toilets (under the banner of ecological sanitation) may be of value in contributing to the huge targets set for millennium goals for Africa. Also the possibility of linking these programmes to tree growing and back yard agriculture also adds a new and exciting dimension to any sanitation programme. It is now obvious that pit compost is greatly valued. The tree planting programme alone, when linked to this sanitation programme, could yield immense rewards.

The low cost is of particular interest. A cement slab which may last for a lifetime, may cost as little as US$2 for imported materials (cement), with all other ingredients being sources locally. What is required then is the knowledge and the will to make the toilet and maintain it, and then to usefully use the compost generated in tree planting or agriculture.
The various promotional methods used in these programmes is also of great interest. The combined use of sanitation clubs, village committee's, entrepreneurs and masons together with various educational and promotional techniques including PHAST, drama, radio, demonstration, personalised accounts etc has appeared in every case to increase interest and uptake of the new innovations. No two programmes appear to be identical, but they do share common themes. In all cases communities play a central and active part. Village level operations are of central importance. And the work of an inspired sanitation co-ordinator, often linked to an NGO, works wonders, as the success of these programmes show.

Every tool that can be made available should be harnessed to increase the coverage, not only of improved toilets, but also of facilities which help improve personal hygiene. Thus the presence of a hand washing facility which forms part of every toilet is a great asset.

The programmes described here are still young and evolving. They offer a source of inspiration to those whose aim it is to extend the coverage of simple yet effective sanitation in Africa.

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