Ecological Sanitation in Southern Africa

Many approaches to a varied need

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The stimulus which helped promote the uptake of ecological sanitation in Southern Africa as a whole, took place in 1997 at a Sida supported workshop held in Balingsholm, Sweden. The workshop was largely based on experiences gained from the Swedish supported Sanres project which had already performed pioneering work in many countries, notably Mexico, Central America and Asia. The earliest work in recent times to promote the concept of ecosan in Africa was undertaken in Ethiopia by the NGO, SUDEA from the early 1990's. South Africa took the lead within the sub-region in 1997 by promoting and evaluating urine diverting toilets, first in Umtata. This included the analysis of dehydrated excreta. This work was largely based on pioneering studies in Mexico, adapted to suit local conditions. Zimbabwe started its own ecosan work in 1997, by testing urine diverting toilets and also adapting existing pit toilet systems already in widespread use, like the VIP. The effects of recycled excreta on food crops was also studied. The uptake of ecosan in countries like Malawi, Mozambique and Zambia followed in 2000 - 2001 period as a result of the interest of WaterAid (UK) staff. Botswana with assistance from GTZ also started its ecosan programme in 2001 in a project linked with the Permaculture Association of Botswana (CBNRM Missing Link Programme). Projects have also begun in Namibia in the towns of Mariental and Gibeon with support from GTZ. Thus the adoption of ecological sanitation in Southern Africa followed in the wake of other pioneering groups around the world and was therefore able to take advantage of existing experience and designs. What made Southern Africa challenging was the huge variation of conditions under which people lived. Did a single approach fit the bill?

The central philosophy of ecological sanitation is based on protecting the environment by using ecologically friendly toilet systems which not only save water and reduce pollution, but also are designed or equipped to processed excreta in such a way that makes it safe and suitable enough to use in agriculture. By doing so, food production can be increased using an inexhaustible resource.
At its best, ecological sanitation is able to link the two huge disciplines of sanitation and agriculture. Closing the loop, as so beautifully described by the late Steve Esrey, should ideally lie at the core of such developments. However one must accept that such attempts to recycle nutrients, at least within a household, may hold a very low priority for many recipients of the new technology. In these cases the processed products may simple be disposed of in the ground and never recycled in such a way that benefits agriculture. In practice many ecological sanitation projects around the world often concentrate first on promoting the toilet itself, usually the urine diverting type, with much less emphasis being placed on recycling the processed excreta to enhance food production. One step at a time can be a wise practice.

What makes ecosan development in the Southern African sub-region particularly interesting is the varied approach which has developed to cater for the huge variation in living conditions seen in the sub-region. In terms of diversity, an extended range of sanitary options is available to accommodate an equally wide range of recipients. Some will be accustomed to flush toilets in the urban areas of big cities, others, perhaps most, will be familiar with the pit toilet in its various forms. Huge numbers of people living in the sub-region may never have used a toilet at all. This real live situation clearly demands a flexibility of approach.

As one would expect, there is also much variation in the willingness of the users of ecological toilets to recycle the processed products themselves. Some, who regularly practice backyard gardening to produce their own maize or vegetables, are naturally far more willing to experiment with recycling human excreta than those who are not familiar with tending to their gardens. Back yard gardening as a means of supporting the family is far more common in countries like Malawi, Mozambique and Zimbabwe for instance, than it is in South Africa or Botswana. Thus the concept of recycling processed excreta may come more naturally to Malawians than for South Africans for instance. Traditional culture and day to day practice can play an important part in deciding.

If the recycling of nutrients derived from processed human excreta cannot for various reasons take place on site or by the family itself, then a more centralised recycling system must be used. Centralised systems of processing excreta are not yet well developed in Southern Africa, as they are in Mexico and China, but small pilot projects have begun – the Sida supported programme in Kimberley being an example.

Range of sanitary options

For most of Southern Africa as well as the rest of the world, ecological sanitation is most strongly linked to the promotion of urine diverting toilets which separate urine from faeces at the source. Using this method the urine can be tapped separately, and since it contains most of the nutrients, particularly nitrogen, it has the potential to be used either diluted or undiluted with water to enhance growth of vegetables, maize and trees etc. The increases in food production can be impressive. The solid faecal matter collects in vaults, which may be single or double (alternating). Most fill the vault direct with faeces which dehydrate. In a smaller proportion the faeces/ash/soil combination collects in containers held in a single vault. The pioneering Umtata project, used single vault toilets. Generally wood ash and in some cases soil and ash, are added to the faeces to assist in the dehydration or composting process. Here again there is variation within the sub-region. Double vault dehydration systems, as well known in countries like Mexico and elsewhere have been used extensively in the eThekwini project, Durban. Elsewhere in South Africa, a single vault UD toilet has been promoted more widely. The contents of vaults or containers are removed and placed in secondary composting system nearby or into shallow pits. In Botswana, a mix of UD systems has been used, some using pits and others vaults. Single vault systems where the vault is used to process the excreta (no container used) have been promoted in Zimbabwe by Mvuramanzi Trust. But once again there is a mix of technologies used. In an Austrian funded project in Sofala, Mozambique, squat plate urine diverting toilets have been used.

A considerable range of urine diverting pedestals are made in South Africa and these range from a concrete modification of the Mexican pedestal to a high tech Separett urine diverting pedestal designed in Sweden. Urine diversion toilets are used almost exclusively in South Africa, Namibia, Botswana, Swaziland, with a mix of methods used in Zimbabwe.

In several countries within the sub-region, notably in Malawi, Mozambique and parts of Zambia and Zimbabwe, the urine diverting option is less well known than simpler “shallow pit composting toilets” which are modifications of the pit toilet. This makes them easier to maintain and they can be built at low cost. Using more traditional materials, they are not as permanent as the more solidly built urine diverting systems, although there is some variation in construction. They operate very much like the familiar pit toilet but with three fundamental differences. Soil and ash are added regularly to the pit as well as excreta. The additions of garbage, plastic and other refuse are cut down to a minimum. Also 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 can also reduce fly breeding and odour (without the need of a vent pipe). The conversion of pit toilet to eco-pit toilet is simple, yet can have far reaching consequences.

Two shallow pit composting toilet methods are currently in use. In the *Arborloo,* a tree is planted in topsoil placed over the pit contents once the pit is full. The toilet structure and slab are then moved to a news site. Over the years an orchard or woodlot can 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 ecosan to many parts of Africa. 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.

Promotional methods
Promotion of these new forms of sanitation usually begins with introductory workshops introducing the concept, often demonstrations being set up, or visits made to areas where ecosan is already being practiced. This is usually followed by an NGO (often with support from a government department) setting up strategically placed demonstrations of the technology built in potential implementation areas. This holds true for most projects sites in Southern Africa. Potential users may also be offered significant financial support to build an eco-toilet. This holds true for South Africa where large subsidies are provided for those forms of sanitation promoted by government (VIPs and UD toilets). But various other promotional techniques are used. In the lower cost programmes a concrete slab is often provided with promotional support. In Mozambique, PHAST educational techniques, M&E (monitoring and evaluation techniques), workshops and radio are used with influential members of the community being given units to use and promote. In Malawi, Heath and Sanitation clubs are commonly used to promote ecosan. Also trained masons and entrepreneurs cast concrete slabs with NGO subsidised cement and sell to prospective customers – a good promotional tool. In Zimbabwe UD toilets are provided with material subsidies like cement, pedestal and piping to encourage uptake with the owner buying bricks and paying for labour. At the low cost end of the scale “compost toilet kits” are provided to promote *Arborloo* constructions. These include enough cement to build a small concrete slab together with instructions and often a young tree may be provided in the kit. In Botswana the owner may provide up to 50% of the costs of the new unit, being responsible for providing the structure, with the NGO providing education and other parts of the toilet, like the UD pedestal and substructure. These donor contributions help to promote a new concept, but if the donor input cost is high, the project itself may not be sustainable in the longer term.

Recycling methods
Whilst the planting of trees on compost pits is the simplest and safest method of recycling human excreta (the material is never touched) - it will not be applicable in higher density settlements. But in rural and peri-urban settlements where there is space, the method can provide trees for food and shade. Planting citrus trees is popular amongst owners of the *Arborloo (*eg Malawi*)*, although banana, mango, mulberry and paw paw may be more successfully grown – gum trees also grow well. Most trees also benefit from the subsequent addition of diluted urine. The requirement of regularly moving the toilet facility once or twice a year may not always be practical or popular. Experience in both Malawi and Mozambique shows that whilst the *Arborloo* may be an excellent entry point to the recycling concept, people invariably move towards the twin pit composting system of the *Fossa alterna*, as it is seen as more permanent and an easy source of garden compost, which is prized particularly in areas where the soil is poor and where cattle are scarce. Pit compost can significantly enhance the growth of vegetables when mixed with an equal volume of very poor topsoil. The reuse of pit compost is common in projects using the *Fossa alterna*, since this must be removed annually to provide a new empty pit, and thus keep the toilet system operational. The excavation process takes less than one hour. The compost is usually added and mixed with topsoil in gardens or vegetable beds. Composting times before excavation vary between 6 and 12 months. After 6 months most pathogenic bacteria have died out and after 12 months most worms eggs are non-viable. Thus taking Mozambique and Malawi as examples, between one and two thousand households will be practicing this method of recycling.

Dehydrated faeces taken from urine diverting toilets also has value as a soil conditioner and may also add improved texture to a poor soil as well as valuable phosphorus, and particularly where ash has been added, valuable potash. However in many projects using UD toilets dehydrated faeces are thrown into shallow pits nearby where they may play no part in agriculture. In the Botswana missing link programme, where toilet compost forms part of a more holistic approach to recycling, dehydrated faeces are placed in shallow pits near the toilet along with other compostable materials from kitchen and garden. Sometimes trees are planted on these pits. In the large eThekweni (Durban) project, recommendations are made for families to dig in the dehydrated faeces into the topsoil or place in shallow pits. Recommendations are also made to plant trees or other hardy plants on these pits – which means useful nutrients will be recycled. In the Hull Street project in Kimberley partially dehydrated faeces are collected on a fortnightly basis in containers held within the vault and transferred to a central composting site some 400m away where it is mixed with straw and animal manure. This has been performed on a commercial basis by an entrepreneur for the last 3 years who charges R5.00 for each collection. A R100 fine can be imposed if the collection is messy, but such a charge has so far not been levied. So far the resulting compost has not been used in agriculture. However this collection method appears to be working well and may offer an example for other projects.

The greatest benefits to both maize and green vegetable growth are attained by the application of urine, either diluted for use on vegetables or applied neat as in the case of maize. Urine is most commonly collected in urine diverting toilets, but can also be collected in bottles and in various other ways. Whilst urine has a very pronounced effect on increasing plant growth, particularly on green vegetables and maize, the uptake of urine application within the sub-region appears to have been slow. In Durban, as well as most ecosan projects, the urine is allowed to seep away in the ground. However the volume of urine produced by a family is considerable and urine overflow can cause problems. Considering the relatively high cost of commercial fertiliser, its slow uptake is surprising. Urine has been recycled in gardens in the Missing link project in Botswana and 150 families have been recycling both urine and faeces in projects run by Mvuramanzi Trust in Zimbabwe. Clearly the full benefits of urine application, particularly on maize, vegetables and trees have not yet been realised in the sub-region, although convincing experimental work has been undertaken (Morgan P. 2004, Jönsson, H. et all 2004).

Numbers built

If numbers are anything to go by, South Africa has been by far the most successful at promoting ecosan or at least urine diverting toilets. At least 20,000 urine diverting toilets have been installed in eThekweni (Durban) with at least 13 000 units being installed elsewhere at various sites (in Eastern, Western and Northern Cape, North West and Gauteng. Thus the number of households using ecological toilets in South African supported programmes will be in the order of 40 000 units. A Sida/SEI supported programme in Kimberley located in the Hull Street Integrated Housing Project has supported over 78 UD toilets, and a smaller number in the Moshoseshoe eco-village. Another Sida/SEI supported project with Buffalo City Municipality where about 5 UD demo units have been built and studied in detail. This information will need updating.

In Botswana around 40+ UD toilets have been built under the missing link project funded by GTZ . These are mainly single vault, put there is much variation in design, some using pits. In Namibia a number of UD toilets have been built in Mariental with GTZ support, the exact number is unknown at the time of writing. In Mozambique 1000+ ecological toilets (mostly *Fossa alterna*) have been built in a project funded by WaterAid in Niassa province. These are fitted with bathrooms and made from traditional materials. *Arborloos* have been less popular in Mozambique. Elsewhere in Mozambique, over 200 squat plate urine diverting toilets have been built by PAARSS (Programme for Rural Water supply and sanitation) in Sofala province with Austrian aid. WaterAid (Malawi) operating in Salima and Lilongwe have constructing around 500 units (a mix of *Arborloo* and *Fossa alterna)*. WaterAid (Malawi) have also supported ecosan work by the CCAP (Presbyterian Church of Central Africa) in Embangweni and Ekwendeni who have built 1000+ shallow pit composting toilets since 2001(a mix of *Arborloo* and *Fossa alterna*), and also WESM in Dwangwa. The NGO COMWASH (based in Thyolo, Malawi) has supported the construction of over 3700 eco-toilets, mainly *Arborloos* in the last 3 years (Elias Chimulambe, pers.comm.). Thus in Malawi some 5000 + low cost shallow pit ecological toilets have been built. Much experience can be gained from this work for use in other African countries, especially on the various methods of promotion used. In Zimbabwe, the Mvuramanzi Trust have since 1997 supported the construction of several hundred completed *Fossa alterna* and 300 *Arborloo's* - some having been in use for several years and moved at least 3 times with regular tree planting In more recent years the construction of 1200+ urine diverting toilets has been supported by Mvuramanzi, most being built in brick and mortar, the design being a modification of the national standard Blair VIP latrine, with single vault structure and concrete urine diverting pedestal (E. Guzha pers.comm). The Eco-Ed Trust and Kufunda Village in Zimbabwe have also built over 100 *Arborloo's.* Kufunda promote the concept with a "compost toilet kit."

Costs

Project and toilet costs vary enormously. Rural and peri-urban programmes in Malawi and Mozambique accept a completed toilet with a single concrete slab usually provided by the project and structure made of grass or mud bricks provided by the owners. These simple structures, using local materials are easily maintained and can offer good service and privacy in a suitable setting. Locally available mud brick as well as grass can be used with the *Fossa alterna* in most rural and many peri-urban areas, where both pits are housed within in a single structure. Such structures offer privacy and where low cost is important they have their place. Project costs for these units are generally less than US$20 per unit with the family proving labour and the superstructure. In the CCAP project, Malawi, entrepreneurs and promoters are given MK900 (US$8.00) to assist them buy a 50kg bag of cement (costing MK1300). From this 4 households can be served with 4 slabs. Other building materials are provided by the family. In the COMWASH project eco-toilet slabs are sold to customers for a subsidised MK180 (around US$2.00). In most low cost projects the cement slab is valued at around US$2.00. in Zimbabwe Kufunda Village, offer a toilet compost kit with enough cement (8 litres valued at US$2.00) for a slab, instructions and young tree. Total project costs including transport and support costs are US$15 per unit.

In other more sophisticated programmes structures are built along more permanent lines with bricks, concrete blocks and mortar. Commercially available urine diverting pedestals are used in SA, Botswana, Namibia and Zimbabwe and to a lesser extent in other countries. Home made urine diverting methods have been used in Malawi and Zimbabwe. Very high standards of construction can be achieved, comparable with flush systems. With the urine diverting technology, structures are designed to be permanent, with the compost and urine being withdrawn or excavated regularly. There is much variation in the design – some are built into existing housing in the cities and replace conventional waterborne systems (Richard Holden (pers.comm.).

The more permanent double vault urine diverting toilets used in countries like South Africa, may cost anything from R600 (US$98) where the unit is fitted into an existing house, through R2400(US$390) for a single vault (similar to VIP) up to R4000+(US$650) (eThekweni). A grant covering the full cost is normally provided in South Africa. In Botswana urine diverting systems may cost in the region of between 950P (US$210) to 1430P (US$314). Fifty percent of the cost is provided by the owner. In Zimbabwe brick built single vault UD toilets cost Z$1 500 000 (US$ 150 – 250). Families provide 1500 bricks, and sand and pay a builder about Z$400 000. Donor support (Mvuramanzi) provides 5 bags of cement, urine diverting pedestal and piping etc amounting to around Z$525 000 and also supervision (E. Guzha pers.comm.). In the Mozambican PAARSS programme in Sofala costs amount to about US$400 per family for the UD toilet. Programme and professional support will add considerably more to these costs. Total project costs may rise to around US$1000 per unit in some projects in Africa (e.g. Kampala). Apart from South Africa, most funding comes from the donor agencies and NGO's supporting ecosan projects, notably GTZ, Sida, Austrian Aid, WaterAid etc in the sub-region.

Problem areas

Ecosan technology is relatively new in the sub-region and is still evolving and on trial. It is true to say that no method comes without its problems, and it is unwise for those serious about development to ignore this aspect of development. It is only by admitting to existing problems and failures and trying to correct and overcome them that real progress can be made.

With all shallow pit composting toilets the accelerated rate of composting, which makes possible the yearly excavation of pit soil or the planting of trees, can only be accomplished by the regular addition of extra soil and ash, etc. Garbage, like rags, plastic and bottles should not be added, as these make subsequent excavation difficult. This requires a revised way of using these toilets, and at first this may not be understood and practiced. To add extra soil in quantity to a pit does not, at first, seem logical, with the benefits only becoming obvious later. If these simple requirements are not undertaken, the toilets operate like normal pit toilets – smell and fly breeding will continue in the absence of a screened vent pipe. And more importantly, the composting process will be slow considerably. In normal deeper toilet pits between 5 and 10 years being required for complete conversion depending of pit depth and lining material. Composting takes place more slowly in lined pits (brick and concrete) compared to pits which are mostly unlined (ie with ring beam). If the units are overloaded (e.g. *Fossa alterna*) the filling rate will exceed the composting rate. Then the system will not operate properly. A balance must be struck. Also the alternate use of twin pits must be maintained with an avoidance of using both pits simultaneously. The provision of a single toilet slab which itself alternates is important as this ensures that only one pit can be used at any one time.

Handling of compost which is not fully processed can be dangerous. Normally 12 months of composting is required. In cases where the compost is valued, it may be extracted early. However so far the extraction of 6 month composted excreta in Malawi and Mozambique has not met with problems. Local analysis of the compost shows an absence of helminths (Field data of both CCAP and COMWASH – Malawi). Climate also plays an important part. Composting rates are accelerated considerably in warmer/hotter places.

With urine diverting technology, the dehydrating/composting vault should remain dry or almost dry for the process to be effective. Experience in the sub-region and elsewhere shows that a fair degree of user discipline is required to achieve this. Men may urinate in the dry compartment whilst standing unless a urinal is fitted and young children may squat over the urine side of the pedestal and the urine outlet and piping may become fouled. Where alternative pit sanitation is still available, this may still be used, particularly by men for urination (eg Botswana). Children may also continue to use an existing and well known system if it is on site. Special UD children's seats may not always be available, Urinals are normally not fitted to most UD systems in the sub-region.

With vaults containing a mix of raw faeces and ash (and soil) flooding must be avoided at all costs as any resulting overflow of mobile excreta can be offensive and disastrous. Such systems may be particularly vulnerable during the rainy season. This means that even rain or washing water should not be able to penetrate the vault easily. Thus cleaning down of the pedestal with water after fouling, unless undertaken carefully can lead to a problem. Those systems which use removable containers to hold the faeces/ash/soil mix have an advantage here. Where containers are used to hold faeces, they must be removed regularly and their contents placed in secondary compost sites or shallow pits. Alternatively the piles of semi raw material must be moved around inside the vault to ensure completed composting. If these basic routines are not carried out, the systems operate inefficiently. This means that the users of eco-toilets must be aware of how the toilet operates and how to keep the system operational. This requires rather more than just squatting and dropping or just flushing away. Compared to the flush and pit toilet, all ecological toilets used under ecosan do require more attention and care in both use and maintenance to be successful. Handling semi processed human excreta is foreign and offensive to most people, but must become part of the routine unless a commercialised collection system is established.

Also the construction of ecological toilets must follow established design guidelines. Urine pipes should not allow for air locks (coiling). Access doors to vaults should fit well. Vent pipes should allow for a free passage or air. The vault should be well sealed to avoid the ingress of rain and other water. In South Africa and elsewhere there has been a tendency amongst engineers to reinvent the basic design of the UD toilet – a practice that does not always lead to successful results (Richard Holden pers.comm.). This is also true of the VIP toilet. Such toilets work if they are built following simple fundamental principles. But if these are not followed even high cost structures can fail badly. Also adequate provision should be made for urine storage or disposal. Large volumes of urine can be produced. If not used on vegetable beds, urine should be piped to areas where it can be absorbed by suitable trees or shrubs. Regularly disposed urine on the grounds surface can lead to bad smells.

Popularity
What has struck people using ecosan toilets of all types is that the addition of ash and soil in some quantity to the excreta does help to promote composting and at the same time overcome problems of smell and fly nuisance. Considering the simplicity of adding these products, if they available (e.g. ash in a wood burning culture) - these are huge advantages. The low cost and ease of construction of the simpler models makes these concepts popular at grass roots level. They are little more than shallow pits toilets where the method of use needs to change little (more soil and ash – no rags and rubbish). The possibility of gaining valuable compost is also seen as an asset by those who grow their own food, particularly where the soil is poor and cattle manure is not available. The possibility of shallow pit composting under ecosan offers much scope for low cost sanitation provision in the sub-region.

As an alternative to the flush toilet, great costs savings can be made in water use (as is also the case with the VIP toilet). Compared to the complex plumbing of septic tanks and sewers, a urine diverting system or even *Fossa alterna,* in the urban or peri-urban homestead seems like a much simpler solution, provided that attention can be paid to routine care and maintenance. A fully functional urine diverting system can be made to provide a permanent asset for any family. The writer has used a urine diverting system almost daily for 7 years in his garden. Overall it has given fewer problems than the alternative waterborne/septic tank system and used infinitely less water. In addition it has provided huge quantities of urine, mostly used to enhance the growth of fruit trees like banana, mulberry and mango. The compost formed has been used to grow many generations of tomatoes which grow spontaneously from the compost. Carefully used, the urine diverting system offers an excellent sanitary system which can be used in a wide variety of situations.

But one aspect must remain clear. No matter what the popularity, these new ecosan systems will never wholly replace existing systems of excreta disposal, like pit or flush toilets. The advent of the flush toilet made modern civilisation possible in the cities of the world. The pit toilet is used by more people than any other system, world wide, suggesting it must have considerable merit. The new range of eco-sanitary options add a new and valuable range which will certainly grow in size and extent.

Conclusions in brief

The new "sanitary adventure" being undertaken in Southern Africa should be seen in its true context – an attempt to add a new dimension to help solve the existing overwhelming problem of providing affordable and sustainable sanitation to millions of people who need it. Those methods described above are under trial - to be scrutinised and compared to existing systems. Their success and future inclusion into ongoing programmes can only be achieved on true merit, and by popular consensus. The true nature of ecosan programme, warts and all, should be revealed, so that sound progress can be made and encountered problems are corrected and overcome. Such an evolution may take time. It is thus important to pool existing experiences and recycle important information. By doing so, earlier mistakes can be avoided, and progress can be advanced and wasted time avoided. The sharing and dissemination of experience is thus important – something that this Durban workshop can help achieve.

The sub-region has risen to the huge challenge of providing a wide range of potential options not only of sanitary hardware but also recycling methods which may offer a solution to the equally wide range of living conditions under which people live. This flexibility of approach is vital in a continent which is itself is filled with people who live in such a diverse range of circumstances.

For many, the principles of ecosan which embraces a more holistic approach to sanitation and offers workable links to agriculture and food production may have come just in time to resolve many existing problems with conventional sanitation. It may, for instance offer effective solutions at the low cost end of the range, and greatly improve the potential for ease of pit excavation. Certainly all methods used reduce the consumption of water, and the potential of existing systems to pollute both surface and ground water. It may also provide facilities which are permanent and where long term on-site management is possible, compared to the standard pit or VIP toilet. Thus it may offer an alternative approach which may work where earlier methods have failed. In the view of the writer the huge combined experience of ecosan development in the sub-region, whether it be positive or negative, should be carefully monitored and documented so as to offer practical feed back into the sub-regional network. By doing so one can expect progress – and that is what the sub-region, as well as Africa as a whole, so desperately needs.

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