The Zimbabwe Rural Sanitation Program.

What is sustainable sanitation in the context of Zimbabwe?

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The provision of improved sanitation both to the rural and peri-urban poor poses a huge task for implementers and recipients alike and will require every method at Zimbabwe’s disposal to satisfy the need. The range of environments which needs to be served is wide indeed, from remote rural areas to relatively high density peri-urban settlements. This must be matched by an equally adaptable range of technical options to serve it. The ambitious goals set by the Millenium Development Goals are not easy to achieve. The aim is to provide a high coverage of toilets and matching hygiene improvement which will benefit the recipient populations for many generations to come. This means the programs should be based on cost effective, sustainable methods which are replicable and flexible.

But sustainable solutions mean that costs are reduced to suit family’s pockets and that donor support should be minimised. If programs rely solely on donor support they are, by definition, not sustainable. Zimbabwe’s successful programme of sanitation provision which was most active between 1983 and 2000, was a great success in that it served about 3 million people with half a million Blair VIP toilets. But two thirds of the rural population were not served, and continued to use pit toilets or no toilets at all. When donor funding almost dried up, the program almost stopped. The national standard Blair VIP toilet, chosen as the national technical option, was too expensive for most people to build themselves. Few self-financed units were ever built. These are not the features of a sustainable program.

What can we learn from previous experience of sanitation provision in Zimbabwe?

Zimbabwe has an impressive history of researching as well as implementing rural sanitation programs. Zimbabweans are proud that they not only designed but also managed very successful rural sanitation projects in the past. The Blair toilet, born within the Ministry of Health’s Blair Institute in the 1970’s, became the mainstay of rural sanitation technology throughout Zimbabwe after 1980. The Blair Toilet became known as the VIP (Ventilated Improved Pit) Toilet internationally and is used world wide. Before the big expansion of the rural sanitation program in the early 1980’s, the Ministry of Health’s Blair Institute had also been tasked with designing a range of Blair toilets to suit the new and expanding program. These included lower cost as well as higher cost units.

Early low cost Blair VIP toilets?

In the early 1980’s the Blair Institute (now known as the National Institute of Health Research) designed a wide range of Blair VIP toilets. Many were low cost, using up to a single bag of cement. Such models were examined by research staff over a course of years. The single bag of cement was used to make a slab and was often laid over a circle of bricks formed around the pit head. Toilet houses were made of traditional materials like grass. But the pipe was always a problem with these so called low cost models. It could no longer be made with bricks (as in the standardised brick Blair VIP unit). Low cost home made vent
Pipes made at that time were not durable. Also the traditionally built superstructures required constant maintenance, unlike the more sturdy brick models. It was for these various reasons that the low cost range of Blair toilets never became popular, and were never recommended by the Ministry of Health. This did not mean that individual families were not allowed to build what ever they liked in their own back yards. Individual families can build what they like. But the policy remained that if they wished to take advantage of donor support, they had to build the standard Blair VIP toilet. So at that time, cheaper models were out of fashion.

However and the more substantial (and costly) brick built version became the standard. However much experience was gained at this time and also later in the construction of low cost VIP’s.

Acceptance of a new standard for the Blair VIP by the MoH in the early 1980’s

The Blair Institute’s range of Blair VIP’s also included solidly built brick VIP units, and some of these originals are still to be seen at the Henderson Research Station, where this early research took place. In the early 1980’s the Ministry chose a brick built spiral door-less design which used up to 5 bags of cement and wire etc. The vent pipes were also made of bricks. In negotiations with the donor community, it was agreed that each family Blair VIP would be financed by the donors up to this 5 bag level. This was a generous material subsidy on the part of the donors – but it was maintained throughout the active phase of the program. In the later 1980’s and early 1990’s calls came to reduce the material support level and the design was modified so that fewer bags of cement were required to build this unit. Mvuramanzi Trust, for instance, ran a program where only 3 bags of cement were provided with the recipient family providing a bag of its own and using a higher proportion of traditional mortars in the construction. This modification also involved a reduction in the diameter of the pit from an original 1.5 metres down to 1.2m and then to 1.1 metres. This refinement reduced the life of the pit and was an unwise development. It meant that pits would last only 10 – 12 years rather than 15 or more. Some wider pits built in the 1970’s are still operational 30 years later. This history is well described in various papers written on the subject.

Promotion and training campaign

The Ministry of Health with its Environmental Health Department, promoted and taught the technology and the importance of personal hygiene. This education was also linked to the importance of improved water supplies and an impressive shallow well protection and upgrading program also took place. This educational program within the Ministry dated back
for many years. The Environmental Health Department had staff which operated at all levels of rural society within Zimbabwe, from Provincial and District Environmental Officers to Environmental Health Technicians operating within the villages. The skills required to build Blair VIP toilets were widely taught and practiced. The technology entered the school curriculum and most school children became familiar with the Blair Toilet and how it works. During the active phase of the program, half a million units were built in homesteads and large numbers of double or multi-compartment units were built at schools and other institutions.

![Early Blair VIP toilet and the later standard family model](image)

**Multi-purpose use**

An interesting feature of the Blair VIP was that it was also used as a wash room. It also served as a garbage disposal point which also included the disposal of sanitary pads and other materials. It was thus a multi-purpose unit and this had wide appeal. Such features were well received by the rural folk. It was felt in earlier years that if a fully functional Blair VIP could provide such a good service with a minimum of maintenance for 10 – 15 years, then the family would consider financing the construction of a new unit after this period. This possibility has rarely taken place.

**Previous program history**

By the late 1990's the program was starting to slow down. Yearly output was being reduced. The after 2000 many donors withdrew their support. Relatively few Blair VIP toilets have been built since that time. It became clear that the program as it was planned was not sustainable.

Whilst figures vary, the maximum percentage of rural families built during the programme reached about 33%. The remaining 66% (approx) was served by standard pit toilets or used no toilets at all. Thus despite the success of the program, most rural Zimbabweans had no access to improved sanitation. Improved sanitation was regarded as the Blair VIP – with standard pit toilets not entering this category at that time. However more recent inventory’s do include
unventilated pit toilets. Since the Blair VIP is a pit toilet and pit toilets fill up, the percentage coverage in the rural areas has been falling, rather than rising, with few new Blair VIP’s being built and old one’s filling up or collapsing. The present coverage may be less than 20% and falling. It is clear, that while the former programme was a great success serving an estimated 3 million people, it is not replicable in modern Zimbabwe and other methods of tackling this huge problem must be sought.

**What did we learn from this program?**

Many lessons can be learned from this early program. The biggest lesson learned was that the program was not sustainable. It was entirely dependent on donor support. Had it been sustainable, then the number of Blair VIP’s in use would have been rising, not falling. Very few self financed units have been built and a donor dependency syndrome developed. For most rural folk, the Blair VIP as recommended by the Ministry of Health was simply too expensive to build using their own funds. A family’s scarce resources were being used for survival. Sustainable programs and ideas tend to replicate themselves. Had the costing been more affordable, the technology might have been copied and replicated. But there is little evidence for this. The standardised Blair VIP did not meet these requirements, as good a technology as it was.

Also the brick built Blair VIP tended to serve the better off. The deal struck between the Ministry and the users, was that the users would provide all the bricks required, dig the pit and also pay a trained artisan. The Ministry, with donor support, would provide the cement and in some cases wire for reinforcing. This meant that poorer members of the community could not afford the expense and were left out of the program. In effect those with the greatest need missed out on the support being provided by donors.

**The challenges of the new program**

Zimbabwe is faced with a monumental challenge in every sector of development including the revival of a new rural sanitation programme. And it does not end there. People living in peri-urban settlements are also in need, especially as water supplies serving these communities continue to fail. Water born sanitation, the mainstay of all urban and many peri-urban communities simply cannot work with inadequate supplies of water. Sewers become blocked and then burst, leading to catastrophic potential for disease transmission. An essential requirement for water born sanitation is an adequate and reliable supply of water. The system fails without water. There has been a considerable migration from the rural areas into the towns and cities in Zimbabwe and this is a world wide trend. The greatest demand for improved sanitation exists in the towns and peri-urban areas surrounding the cities. This is a very demanding situation, especially where people live in dense settlements. It is a problem being faced universally throughout the world. Where there is space, as in the rural environment, a greater range of technical options become workable. In such areas the methods developed for the rural program may find a place in the future.

**Looking at the rural program first.**

The new Zimbabwe rural sanitation program should take heed of the lessons learned from the earlier program and not follow the same course. This does not mean the Blair VIP must be abandoned. Not at all! Since the 1980’s and even during the years within the new millennium a huge amount of research and development work has been undertaken. The knowledge now
available for lower cost and sustainable sanitation is now considerably more than it was even 10 years ago. One can draw not only on the experiences of the earlier program but also take advantage of the new knowledge gained in the past decade of research. This research work is an ongoing process.

What can make the new Rural Sanitation Program sustainable?

Drawing on existing evidence it is clear a new approach to sanitation provision is essential in any new national programme. The concept of standardisation on a single technology, such as the present standard brick built Blair VIP alone should be replaced by a more flexible policy more suited to the attainment of Millenium Development Goals. A revised approach to policy should endorse a range of specified technical options to suit varying needs. These options should be specified so that each is linked to the other in a series which makes upgrading possible, from simpler very low technologies to cost effective and durable Blair VIP toilets. The aim of achieving VIP status must remain technically possible within this range of options, as this is a technology of great national pride and its inclusion provides the program with the National Incentive, which predominated in previous times. This range of toilets should be designed so that all technical options of are ecologically sound, and that the various parts are recyclable.

The series forms a sanitation ladder of increasing cost and complexity for the toilet technology. The recipient steps on the first rung of the ladder by constructing the simplest and lowest cost unit. But the method is designed so that the central component of the technology, can be used as a building component in a series of technical upgrades. The central component, is a 1.1m diameter concrete slab equipped with holes for a squat (or pedestal) hole and a ventilation pipe hole. This slab can be incorporated into a range of toilets, from the simplest, called an “Arborloo” or tree toilet, to a full brick version of the Blair VIP.

Bottom of the range - Arborloo

The Arborloo is a slab mounted on a ring of concrete (“ring beam”) mounted around the head of a shallow pit. The pit is dug within the ring beam. A simple superstructure is built around the slab for privacy. Soil and ash are added to the pit to reduce flies and odours and also to promote composting in the pit. When the pit is full, the various components of the toilet are moved to another location. The pit is filled with soil and a tree is planted. Thus the toilet moves about within the homestead.

In essence donor support is still valuable to add an incentive to the family. In its most basic form the Arborloo utilises half a bag of cement to make a concrete slab and “ring beam” to protect the pit head. Pits are built shallow (1m) and an upgradeable concrete slab (1.1m diameter) is mounted over the ring beam. Structures are built with traditional materials. No pipe is fitted at first. The control of flies and odours is carried out by the regular addition of soil and wood ash to the pit contents. In this first model of the series, the family takes on the possession of the durable concrete slab and ring beam which can later be upgraded to a VIP which can be built in various forms.

The technology at this stage of the series can be used like an Arborloo. That is a simple shallow pit toilet, where the additional soil and ash added to the pit turn into compost. The pit fills up and a new toilet site nearby is located.
Simple Arborloo toilets

Such a toilet can serve a family well. But it is not yet a Blair VIP. It is the simplest “ecological toilet.” In this simplest model, the concrete slab and slab, if made correctly are very durable and should last for decades being used on a long series of toilets placed in various locations within the homestead. It tree planting is less desired, a second or third ring beam can be built and the slab can alternate or rotate between the pits and the valuable compost can be extracted at yearly intervals. This toilets system is known as the “Fossa alterna” – the alternating shallow compost pit.

Alternating shallow pit compost toilets (Fossa alterna in Epworth and Hopley Farm near Harare. Both these units on trial are built on concrete ring beams.

Both the Arborloo and the Fossa alterna can be upgraded to VIP status by the addition of an effective screened vent pipe and the construction of a superstructure which guarantees semi dark conditions within the “house.” Such simple toilets can be very effective – VIPs do not need to be expensive to work well. But the basic elements of the design must be followed.

Rising up the technical ladder to a Blair VIP

Where bricks are available the same 1.1m slab can be placed over a larger pit of much greater capacity. A brick construction technique known as corbelling is used to line a wide diameter pit with a narrower top in which the same original slab can be used to build a new toilet. Such pits can be 1m, 2m or 3m deep. 2m is a good standard for this model but a 3m pit will last for longer. School children are also being trained in this technique. Cement mortar used to bond the bricks. This forms a strong lattice work for the farm bricks which may be low grade. A 2m deep pit lined with mortared brick work fitted with a durable concrete slab uses a single bag of cement.
Upper end of lined pit using corbelling technique. Once a lined pit is fitted with a concrete slab made with squat and vent hole a wide range of structures can be built including brick built VIPs.

The fully lined pit can be fitted with a low cost traditional or wooden superstructure at first

This lined pit can be fitted with any structure at first, ventilated or unventilated. The lined pit and slab form the basis of all the main toilets in the range. The next stage in the upgrading process involves building a more permanent brick superstructure. This can be made in the form of a circular brick structure fitted with a door or a brick structure made in a spiral form without a door. The roof is an essential component and the vent pipe. Several methods are available for making low cost vent pipes. This latter unit is very much like the original Blair VIP. The various technical options from simple Arborloo to Blair VIP all use the same basic slab unit. The family chooses the level it wishes to reach in the series. The amount of cement used in the door less spiral structure varies depending whether cement is used for mortaring or plaster work and pipe making. The total amount of cement used in this method will not be greater than 2 bags of cement.
What level of material subsidy to what people?

One dilemma faced here is at what level to introduce what level of material support. Within the technical range of options, material support can be offered at the level of 25kg, 50kg, 75kg and up to 100kg (2 bags) of cement. That is, if material assistance is accepted in the form of cement, what amount should be offered to whom. This aspect still needs debate within the Technical Task Force and the NAC. For those families who are unable to provide bricks, the simple Arborloo principle may serve them well for years if they have sufficient materials to build a sturdy but portable structure. Half a bag of cement can be used to construct a durable ring beam and slab. A single bag of cement (preferably PC15 – Portland cement) can be used to make a durable slab and line a pit with bricks. A large range of suitable superstructures can be built around this substructure and slab. With 100kg (2 bags) of cement it is possible to make a vent, make a thin cement roof, make mortar for the structure brickwork and even make a low cost pedestal. The issue remains at what level is the material assistance given. Who gets what? Will the under privileged still be compromised by receiving a level of assistance which is less than those who can provide bricks. This is an issue which required serious debate at national level.

Demonstration structures or well illustrated manuals can be provided to pass on practical information about upgrading the basic unit to a full Blair VIP. These issues require debate between NGOs and Government institutions and the NAC/NCU.

What makes this approach more sustainable

This approach to providing assistance to the rural community may have several advantages which make it more sustainable than the previous program. These can be listed as follows:

1. The more flexible approach to donor support can reach more destinations, including very poor families. If officially endorsed, donors can provide smaller but meaningful material support to a much larger numbers of the rural folk than was possible in the earlier program.
2. The lower cost methods are more easily copied and are replicable
3. The goal of the Blair VIP is still attainable within this range and at much lower cost that the existing Blair VIP
4. The advantages go beyond the provision of a toilet alone. All the technologies are ecological and provide either toilet compost for the garden or extra nutrients for trees. Thus the combined value of having a toilet facility and source of fertilizer may make the cost of reconstruction, second time around, more acceptable to the family
5. At very little additional cost, the new Blair VIP may be used not only as a toilet and bathroom and garbage disposal unit, but also as a source of nutrients for growing valuable fruit on trees.
6. Thus this approach may tip the balance of advantages versus costs. The costs are lower and the advantages more.
7. The possibilities of approaching MDG’s are increased

Ongoing research

Most of the options described are already being field tested, but this testing needs to extended nation wide and the feedback received back into the Technical Task Force and the NAC/NCU. Thus the described options require field testing on a wider scale and also the refinement of special methods to be used in special environments like high density settlements
and areas where rock or water lie close to ground level. There will always be a need for diversity of method, since there are so many different situations where improved sanitation is required.

Conclusions

It is clear that in order to attain wider coverage and attempts to meet Millenium Development Goals (MDGs) a rather different approach will be required in the future. The unit cost of each toilet must be considerably reduced, and matched by a reduction in material assistance provided by donors. However the concept of providing some material support, especially cement, should be maintained. Such donor assistance can catalyse development in this sector and offer a meaningful incentive to the poor. Words alone are not enough. If that cement is used wisely, the benefits it provides can achieve wide ranging benefits which far outweigh the value of the cement.

In Zimbabwe the aim of achieving VIP status must be technically possible as this method brings with it national pride which is an important driving factor. The concept of being able to start simple and upgrade is an approach which can provide an answer to this challenge. A range of methods must be made available and accepted within a revised government policy to suit varying needs and make the upgrading process possible. Added value can be given to a toilet system if it has a usefulness beyond that of disposing of excreta alone. Ecological toilets will undoubtedly play a larger part in the future programme. Zimbabwe has the potential to achieve such objectives given a suitable climate which permits and encourages meaningful development.

Finally, it is very possible that a more flexible approach can provide a far wider coverage to the rural poor, than was ever possible before. Also in being more flexible and with the aim of sustainability being an ultimate goal, it provides the government with a tool and method which may bring it even greater international accolade than the former program. The experience of the past together with the new and exciting developments of the present can be combined to form a sanitation experience which can be an example to the rest of Africa.

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