

CHAPTER 7

RECOMMENDATIONS FOR FURTHER RESEARCH RELATED TO THIS THESIS

It is deemed important that the field trials described in chapter 5 are repeated in other climatic areas, e.g. a hot and dry area, or a cold area, as it is likely that different results regarding minimum storage periods will be obtained. This should be supplemented by trials involving co-composting of the faeces mix with other organic material, in order to compare the efficacy of this method with the dehydration process. Further, vault lids made of PVC should be tested for enhancing heat gain in the vaults. Finally, long-term measurements of heap pH should be made in order to ascertain whether high pH amendments (wood ash, lime, etc) do in fact maintain their initial pH level over time. The fact that this was not done in this particular research has been identified as a weakness in the project.

Additional field trials, similar to those described in chapter 4, should be undertaken with a view to making recommendations regarding maximum application rates of faecal material. Consideration should also be given to the maximum agronomic rates. These trials should consist of food crops where the edible portions are either in or near to the soil such as beetroot, onion, potatoes, tomatoes, etc. Trials including urine should also be considered, in order to determine the most advantageous application rates for the various crops.

Another important topic is recommended for further research on the subject of UD toilets. This has arisen due to the writer's ongoing work on the subject of ecological sanitation in general and has also been the subject of discussion in various forums, including communities, around the country. It concerns the feasibility of a collection/disposal service for faecal material.

At present, virtually all the UD toilets built in the country have been for communities on the lower end of the income scale and who previously had no formal sanitation facility at all or, at best, an unimproved pit toilet. Research carried out by CSIR in a number of communities has revealed people's resistance to handling their faecal material, while in others it has not been a problem. There is often a general viewpoint in a village that "the municipality must take the faeces away."

However, a willingness has also been expressed in some villages to pay for a faeces removal service. For instance, this has borne fruit in an area of Kimberley with UD toilets where householders pay a local resident to remove the faecal material on a regular basis. This is done by means of a wheelbarrow, and the material is stockpiled at a nearby approved facility from where it is destined for co-composting with other municipal waste.

This has not yet been attempted on a large scale in an area with hundreds, or even thousands, of UD toilets. The writer recently carried out a theoretical desktop study with the purpose of determining the feasibility of establishing such an entrepreneurial venture in a large settlement or village. Two scenarios were considered, namely:

- The use of an independent agent (entrepreneur) to collect faeces from UD toilets and transport them to a collection station or approved disposal area within 10km of the target community; and

- The use of an independent agent to collect faeces from UD toilets, transport them to a designated site (eco-station) within 10km of the target community for the manufacture of compost and to sell this compost to the local authority for use by its parks department.

The basic assumption in the models developed was that the collection service would be done by means of a small trailer and 47kW tractor or, in the case of animal-drawn carts, a horse or donkey. It was also assumed that the equipment and animals were to be purchased by means of a bank loan at prevailing interest rates, that mechanical equipment would be properly maintained and that animals would be well cared for in terms of food, veterinary and farrier services, etc. The above two scenarios were modelled for each type of collection service, i.e. tractor/trailer, horse/cart, and donkey/cart. Collection fees were assumed to be R80 per toilet per year.

The most critical factor determining the viability of the service was found to be the number of UD toilets available for servicing. The model simulations determined the following:

- For the first scenario, collection and disposal, the following number of toilets are required to enable a viable business to be conducted:

- tractor/trailer collection	3 587
- horse-drawn cart collection	1 379
- donkey-drawn cart collection	1 188
- For the second scenario, collection and composting, the viability improves substantially, as follows:

- tractor/trailer collection	997
- horse-drawn cart collection	395
- donkey-drawn cart collection	374

These are significant numbers of toilets that need to be available within an area of restricted size. Local authority cooperation will also be important with regard to the disposal/transfer site or eco-station, as well as for the co-composting operation. Based on the results of this theoretical study, it seems as if a faeces collection business based on the assumed parameters will not be viable and that some form of subsidy will be required.

It is suggested that an actual enterprise be set up in a suitable village or group of villages, in cooperation with the local authority, with the aim of testing the theory and looking for ways to make the operation more attractive where less toilets are available for servicing. It is entirely possible that substantial savings could be made in terms of equipment by using horses, donkeys and carts that are already available (i.e. that do not have to be purchased).

If successful faeces collection/disposal services could be established in areas with UD toilets it would greatly enhance the social acceptability, and therefore the viability, of this sanitation technology.