

Double pit latrines a solution for sanitation in sandy areas

*Feedback from INTER AIDE and SOAKOJA,
in the Analanjirofo region, Madagascar*



Double pit latrine at Tanambao, Analanjirofo

July 2024

Written with the contribution of Mylène Bobo and Hippolyte Blachez, Technical Support Officers and the Inter Aide and Soakoja teams in Madagascar
Proofreaders: Damien Du Portal, Tristan Salmon

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In order to offer a sustainable sanitation solution to the populations of villages living in sandy areas where the water table is close to the surface of the ground, Inter Aide and Soakoja have tested a system of latrines equipped with double concrete casing pits, adapted to this type of soil and allowing easy "emptying".

This pilot project was deployed in the district of *Fénériver-Est* in the villages of *Tanambao* and *Namahoaka*. It involved the construction of 122 latrines in 2022.

These projects are based on lessons learned from previous experiences¹, and in particular on the expertise and tools of a local micro-entrepreneur mason who had previously been trained as part of the setting up of a "Diotontolo site"² in the neighbouring fokontany of *Mahambo*.

The main technical innovation proposed compared with conventional dry toilet recommendations³ is the construction of a double pit to facilitate emptying operations and the alternative reuse of the pits in a sustainable way.

The advantages of these double pits with concrete casing:

- The concrete casing can be installed above ground or semi-buried (depending on the height of the water table⁴), so they are compatible with sandy soils and areas where the water table is close to ground level,
- These latrines can be used continuously thanks to the two pits (when one pit is full, the Sanplat-type slab is transferred over to the other pit),
- This alternative use of pits avoids handling fresh excreta and the risk of contamination when emptying (the first pit is emptied when the second is almost full, and so on),
- Compost is produced (after fermentation and drying out in the unused pit), which can be used as an organic fertiliser without further pre-treatment.



¹ See in particular: « Retour d'expériences sur l'assainissement "liquide" à Madagascar », pS-Eau :

https://www.pseau.org/outils/ouvrages/cite_pseau_cahier_assainissement_sept2011.pdf ;

J. N. LANOIX, M.L. ROY. 1976. Manuel du technicien sanitaire, OMS : <https://iris.who.int/handle/10665/40504> ;

PRACTICA, UNICEF. 2008. Etude sur les techniques à faible coût d'assainissement et leur approbation à Madagascar :

https://www.pseau.org/outils/ouvrages/practica_rapport_assainissement_faible_cout.pdf .

² <https://gret.org/projet/diotontolo-un-reseau-local-de-vente-de-toilettes-hygieniques-a-madagascar/>

³ <https://memento-assainissement.gret.org/IMG/pdf/memento-assainissement-chap8a.pdf>

⁴ See the Sphere manual (<https://spherestandards.org/fr/manuel-2018/>) : « ... a depth of at least 1.5 metres between the pit and the top of the water table [must be respected] ».

STAGES OF LATRINE INSTALLATION AND CONSTRUCTION

A latrine is made up of two pits, each comprising two superimposed concrete rings and a Sanplat-type slab (with a ventilation hole). A superstructure (shelter) generally covering the 2 pits is built by the beneficiaries using local materials.

The costs, materials and inputs required to build a latrine:

Village contribution for a latrine:

- 10 bags of sand,
- Digging and installing the concrete casing, making the shelter from local materials and the chimney,
- **Financial contribution: Ar 30,000** (i.e. 20%, 6€) towards the purchase of the concrete casing and slab.

Subsidy and materials provided by Soakoja/Inter Aide for a latrine:

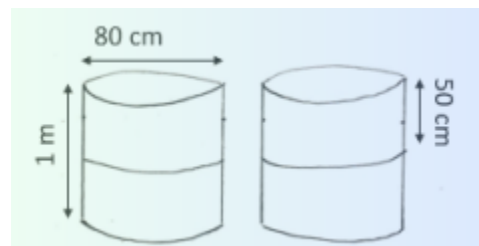
- 1.5 bags of 75kg cement and annealed wire (hardened) for reinforcing the concrete rings and the Sanplat-type slab made by the local micro-entrepreneur,
- **Financial contribution: Ar 120,000** (i.e. 80%, 24€).

Total Cost: Ar 150,000

MANUFACTURE OF CONCRETE RINGS AND SANPLAT SLABS (BY THE MICRO-CONTRACTOR MASON)

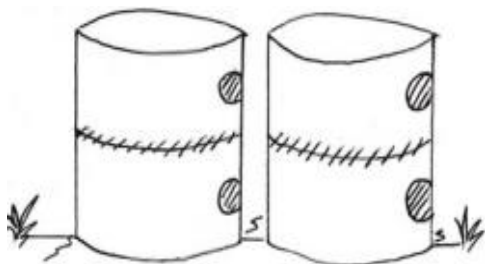


50 cm high and 80 cm in diameter, 2 stacked concrete rings per pit. Volume 0.5 m³ (1 m³ per latrine).



The micro-contractor manufactures the Sanplat slabs and concrete rings on site using his own tools (metal moulds and hoist). The concrete rings are made using only annealed wire (10cm mesh) and cast in formwork moulds. Two openings are made in the sides of the rings to make it easier to transport them to their location using a log. These holes will be filled in when the rings are installed and the 2 of them are sealed together.

The Sanplat slab has a hole in the edge for inserting a chimney.



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Site preparation and concrete rings installation

Digging of the 2 pits to install each concrete casing. The depth of the pit can vary depending on the height of the water table. **Concrete casings can be completely buried, semi-buried or above-ground,** depending on the distance from a water table, to limit microbial contamination.



To reduce smell and trap flies and insects, **the use of a chimney is recommended.** The chimney should be:

- fitted with a mosquito net near the top to trap flies,
- fitted with a black nozzle (paint, clothing, plastic bag, etc.) to encourage the circulation of gases,
- inserted into the concrete casing (10 cm), passing through the dedicated hole in the Sanplat slab.



Building a shelter protects the latrines from rain that could seep into the pits. A drainage channel around the shelter is suggested to prevent the area becoming waterlogged.

Alternative use of pits, draining and cleaning

Each pit is used alternately, the Sanplat slab being moved to the adjacent pit when the pit in use is almost full (30 cm from the top). Once the slab has been moved, the full pit is backfilled.

To fill in a full pit, users place branches and then rice bran to cover the excreta before finishing off with sand.

A period of at least 6 months is needed for the excreta to dry out and finish fermenting, to obtain an inert, odourless material that is easy to clean out of the backfilled pit (its level drops and can be filled in from time to time). The pit must be protected from any water infiltration, which is why it is particularly important to make users aware of the need not to shower over the pit (if it is not covered by an additional slab).

The excreta from the first pit will not be "emptied" until the second pit has been filled, so there is plenty of time for drying and composting. This system avoids the need to handle fresh excreta and the risks of environmental contamination that would exist if the excreta were emptied immediately.

The length of time it takes to fill a pit depends on the number of people using it.

For a household of five people, it takes an average of one year of daily use to fill a pit.



The volume of compost extracted from the pit when it is cleaned is equivalent to a "bag of cement", which is a fairly small quantity. It can be used as an organic amendment for perennial crops (banana, coffee). Although the material obtained is apparently harmless, it is not recommended for use in market gardening.