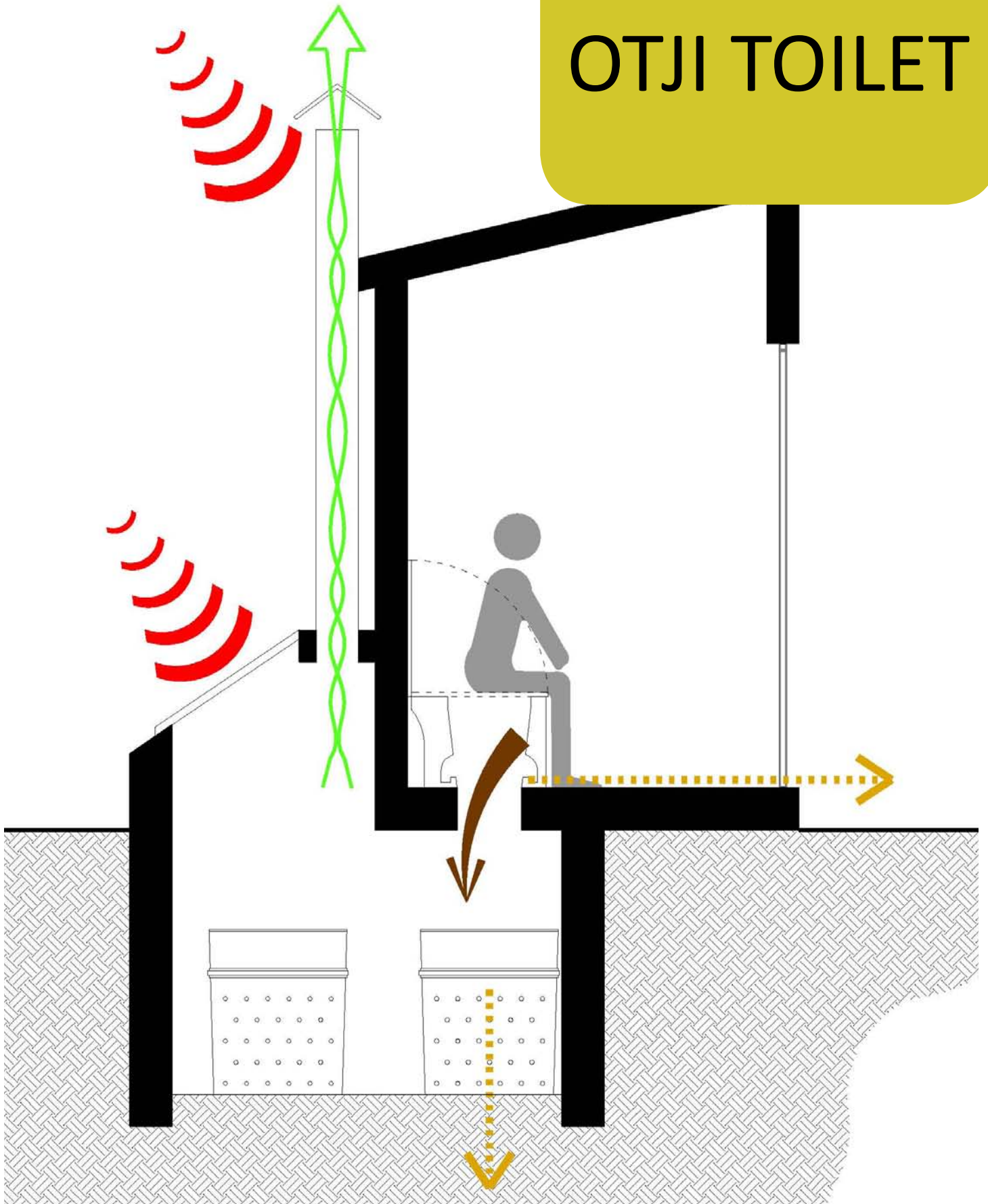


OTJI TOILET



OVERVIEW

A "Otji" toilet is a dry toilet system which collects humanure in a large perforated bucket in a chamber beneath the toilet. A specially designed urine diversion toilet is used to divert 80% of the urine directly into a soak pit in the ground. This type of urine diversion toilet does not need special instruction for use. The remaining urine and solids are collected in the 90L bucket below. The remaining urine percolates through the solids and seeps into the soil.

The bucket for a single family use usually fills up within 6 months. It is removed to the rear part of the chamber below the ventilation chimney to dry out the remaining solids and replaced with an empty bucket. When the second bucket fills the dry solids are removed and return to a hole in the soil, unless further composted.

A black painted panel and large chimney vent help to remove smells from the toilet. Orientating the ventilation stack towards the sun is important for efficiency. On occasion this system has been installed with a small solar operated fan for night ventilation.

The toilet fixture is painted concrete moulded in a workshop in Delmas 31, Haiti operated by Grupos Sofonias. Country Director: Byron Lopez - byronlopez@ecosur.org

SOCIAL ACCEPTABILITY

There would be a medium level social acceptability with this system. The interface, designed by Peter Arndt, looks like a modern toilet which people would find appealing and the black basket means it would be difficult to see the collected humanure below.

However, there is a need for the user to make intermittent contact with the feces which most would find discouraging. It may also be difficult to manoeuvre the buckets from the tank as they are quite large. This work is all the responsibility of the home owner.

The ventilation system ensures the bathroom remains odour free most of the time. However the chamber emits strong offensive smells at the time of cleaning.



ENVIRONMENTAL SUSTAINABILITY

This is a cyclical process with a fairly low environmental impact. No water is required for the system. The end product of the composting process can be put directly back into the ground.

Effective microorganism or MicroBen Technology was initially being used in the Haitian sanitation systems but it was proving too expensive as people were using too much of the substance. Once finished users proceeded to replace the MicroBen substance with old engine oil causing a veritable ecological disaster. Some sources also questions the effectiveness of this technology to substantially reduce the volume of the waste generated.

MAINTENANCE

The maintenance of this system relies heavily on household participation. The buckets will have to be moved to the back of the chamber when almost full about every 6 months. There is a hook provided to aid this process. Once the contents of the bucket have dried, it becomes lighter and is easier to remove from the chamber.

Grupos Sofonias recommend putting ashes into the bucket to help with the drying process and to reduce odours. They are currently proposing to operate the system in Haiti without the ash component but perhaps it is a maintenance aspect that should be considered for more successful operation.

The householder will have to dispose of the contents on site by burying it in the ground or using it as compost. Again there is an educational aspect needed to ensure safe composting.

The household is required to keep the toilet area clean and not to throw any foreign objects into the toilets that could fill the bucket faster and impede the collection.

EDUCATION

In larger applications every householder in a neighbourhood needs to be educated on how to use the toilet and how to manage the contents when it is full. People will have to be taught how to remove the solids carefully and hygienically. The dispersion of solids on site needs to be taken into consideration.

An educational plan is currently being prepared with posters being issued to end users. However Grupos Sofonias, the company implementing the system in Haiti are not currently in a position to give recommendations on composting. They recognize that social coordination is the key to success and are open to arranging periodic supervision. They currently don't have this framework set up.

In other applications such as Namibia the municipality serviced the toilets. This is not an option in the current Haitian context.

HEALTH AND RISK

There is the possibility of urine and fecal cross contamination in this toilet thus potentially causing pathogens to disperse into the ground. The soil can handle a certain amount of the pathogen removal but this system would need to be implemented in areas where there is a high water table. It would have to be cleaned very regularly to reduce this possibility.

Urine infiltration can cause high nitrate levels in drinking water. This can affect infants up to the age of 6 months causing methaemoglobinaemia or blue baby syndrome. Urine soak pits need to be placed 30m from wells and a minimum of 1m from the water table.

There are large numbers of people coming in direct contact with the humanure increasing the risk of contamination by pathogens if not handled correctly and suitably cleaned afterwards.

There is a risk that the end product is not fully broken down into compost increasing the risk of pathogens being dispersed into the soil.



IMPLEMENTATION

Grupo Sofonias is part of the EcoSur Network working all over Latin America. They have recently been engaged to put 125 individual toilets in a housing project in Santo. Previous to that almost 60 dry toilets had been handed over to the most needed people affected by the earthquake in Liancourt, Jacmel and Petit Goave. They have been present in Haiti since July 2010 and have trained staff in country. There will also be training new staff as part of their current project.

Products are manufactured locally in Delmas 31 with their toilet fixtures being made out of concrete.

They plan to have a presence in Haiti for the foreseeable future and definitely have the capacity to complete projects of varying scale and size.

ECONOMIC FACTORS

CAPITAL COSTS (EXCLUDING SUPERSTRUCTURE)

Description	Total Cost
Otji Toilet Installation (\$700/each)	\$700

The 90L baskets at \$100 per pair are what substantially raises the costs in Haiti. Perhaps there is an opportunity to source a cheaper alternative.

RUNNING COSTS

If the householder takes care of all the maintenance in this system the running costs involved are low.

However it would be advisable to employ a team of trained managers to ensure the longevity of the system. Grupos Sofonias believe a toilet could be serviced for about \$1 and a person with a small cart can attend ten toilets per day and bury the material onsite.

DINEPA REQUIREMENTS

Providing individual toilets and wash stations to a house surpasses DINEPA's Minimum Standards.

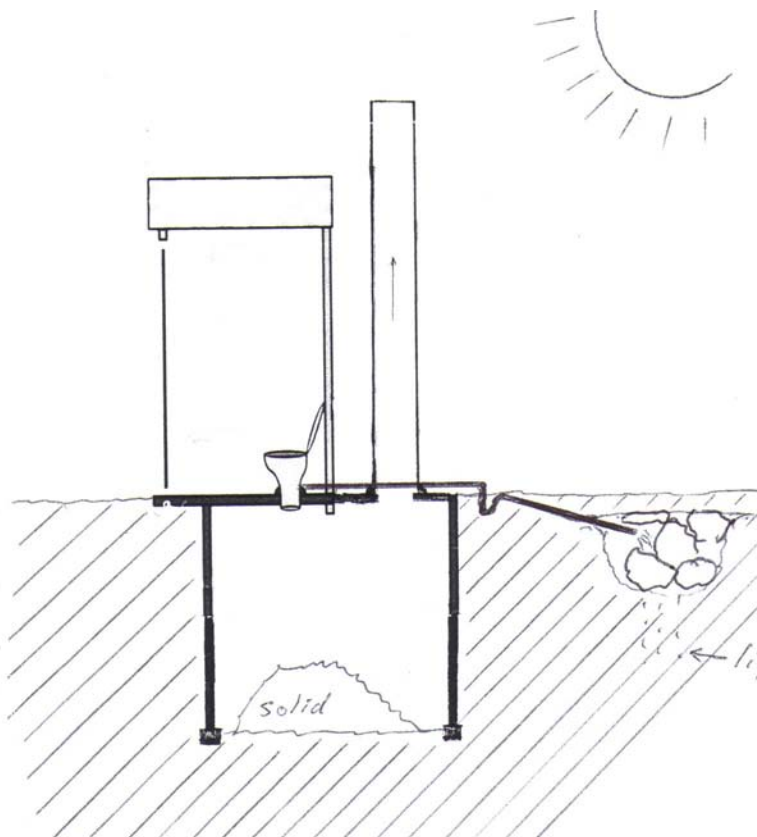
DINEPA DRAFT MINIMUM ECOSAN REQUIREMENTS ARE AS FOLLOWS:

1. projects be planned and designed in collaboration with the community and presented to the local authorities with a timeline for planned activities
2. projects be designed to respond to informed choices on the part of the community and be demand driven – no construction should occur prior to approval of the community
3. projects exceeding 500 beneficiaries must present their education and M&E framework and their toilet plans and compost hardware to DINEPA for review prior to construction starting
4. all Ecosan projects must take into account worker protection through the provision of safety equipment and hygiene education. The health, safety and environment risk assessment should be presented for review to DINEPA

5. projects must have a strategy for access to a good cover material for the toilets, and a carbon source for the compost site
6. projects must include a strategy for the sanitization of excreta, whether it is in the toilet, on-site or offsite, and there should be a clear strategy for the reuse of the final product
7. all composting areas must be planned to ensure restricted access and must have the capacity to treat wastes from all of the project toilets
8. where thermophilic composting is used, the standard rule for pathogen destruction is “temperatures throughout the pile must attain 50 degrees Celsius for at least one week

A new Ecosan working group is being set up in DINEPA in January 2012. It is hoped all organizations working in country will have an opportunity to attend to discuss the draft minimum requirements outlined and the future of ecosan in Haiti.

DEGRADATION ALTERNATIVE



The degradation toilet is a version of the Otji toilet system recommended for very remote areas and where maintenance causes problems.

The degradation toilet is recommended for use by one family and is installed with the customized urine diversion toilet bowl. The degradation toilet can be used for at least 10 years without any maintenance as the solids reduce so much in size. It is similar to a ventilated pit latrine with the addition of urine diversion.

RESOURCES

Otji Toilet Information Website: www.otjitoilet.org

Ecosur Website: www.ecosur.org

DINEPA Website: www.dinepa.gouv.ht

Effective Microorganisms (EM) and Wastewater Systems: *Nathan Szymanski and Robert A Patterson, Lanfax Laboratories* - October 2003

Technology review of urine diversion dehydration toilets (UDDTs) : *GIZ Sustainable Sanitation Ecosan* - DRAFT May 2011

Otji-Toilets for peri-urban informal households Omaruru, Namibia: *Sustainable Sanitation Alliance* - July 2011