Urine Diverting
Dehydration Toilet (UDDT)
Practitioners' Manual

PRACTICAL ACTION
Technology challenging poverty

Published by Practical Action

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Practitioners' Manual

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FOREWORD

The majority of communities worldwide pollute ground water resources and the environment as a result of flush toilets. Another portion of the world's population do not have access to any sanitary facilities due to their adverse environmental conditions in their living environments such as flooding or excessive dryness, rocky earth or limitations of space.

This manual discusses how and why ecological sanitation (eco san) options are necessary under these circumstances, and offers some other sanitation options - options which are favourable to the environment, and yours and others' health.

This construction manual targets people who are concerned about the environment and understand environmental and health concerns linked with sanitation. The manual is essentially aimed at helping the users and builders of eco san toilets. Apart from construction plans, the manual also provides masons with a proper understanding of why they should construct these eco san toilets and a rationale for each part/design of the latrine. The manual provides information and guidance to PHIs (Public Health Inspectors) to ensure that the latrines are kept to proper standards and under good health conditions.

While reading this manual, you the user will first be introduced to the various options of Urine Diverting Dehydration Toilets (UDDTs),

a type of eco san toilet. You can then select the type of UDDT which matches your situation. The different conditions under which a UDDT can be used are listed, and you and your family members can decide the type most suitable for your use. Next, the masons constructing the toilet need to read and understand the manual and follow certain tips provided during the construction of the UDDT. For maximum benefits there needs to be good communication between the masons and the users during construction. The UDDT system must be user friendly and accessible to elderly/disabled people whenever necessary. The manual also includes some troubleshooting tips to help deal with problems which occur largely in domestic toilets.

Practical Action in publishing this book, hopes that it will encourage environmentally friendly sanitation solutions, as Practical Action believes in eco friendly and sustainable approaches to development. Past experience has given us the confidence in promoting the UDDT double chamber option as we have successfully tried it in southern and eastern Sri Lanka, with Christian Aid funding. We would also like to acknowledge the Stockholm Environment Institute(SEI) for initiating the idea of a manual of this nature.

Vishaka Hidellage
Regional Director
Practical Action (Sri Lanka, India, Pakistan Programme)

1. What is a UDDT?

1.1 Ecological Sanitation

The term 'ecological sanitation' is used to describe sanitation systems that recycle excreta in a safer way and to be used as inputs for agriculture, rather than releasing them in to the environment without treatment. Ecological Sanitation is based on three fundamental principals:

- **Preventing pollution** rather than attempting to control it after we pollute

- **Sanitising** the urine and feaces
- **Recycling** the excreta and using the safe products for agricultural purposes

Ecological Sanitation provides 'Better answers to the major global challenges faced by the sanitation sector; many people without sanitation, the health effects of poor sanitation, water shortage and pollution, food insecurity, urban growth and the inadequacy of current sanitation options' (Winblad et al, 2004).

1.2 Urine Diverting Dehydration Toilet (UDDT)

UDDT is one of the popular ecological sanitation systems. Construction and usage of this eco san system is described in this manual.

Benefits of using a UDDT

- Human waste is considered as a resource

- Potential dangerous human waste is diverted, sanitised and recycled in a safer way
- No central water supply or sewage system is needed
- The design of the toilet makes it easily adaptable to different types of communities
- Can be constructed with cheap and locally available materials.

The main functions of the UDDTs are diverting, sanitising and recycling of nutrients.

Human bodies are made in such a way, that the different outflows are stored separately in the intestine and bladder, and leave the human body also separately as urine and faeces. UDDTs make use of this natural condition: they don't mix the urine and faeces. Dry urine diverting toilets separate, collect, store and treat these two flows.

1.3 Why should you select eco san type toilets?

When you think of constructing a toilet or modifying your existing toilet, there are certain conditions/situations which need to be considered. Table 1 maps out the suitability of different types of toilets according to the specific conditions. If you look carefully at Table 1 you can see that eco san toilets are the best option for any given situation.

Table 1

Toilet type \ Condition/ Situation	Urban &/or peri-urban	Water logged areas	Shallow groundwater	Permeable soil with deep ground water	Impermeable soil	Shallow bed rock	Areas with limited space	Water scarcity	Close to natural water sources	Water use for anal cleansing after defecation	Other materials (e.g. paper) use for anal cleansing after defecation
Water seal toilet (direct/ offset pit)				x			x			x	
Ventilated improved pit toilet	x			x	x	x	x				
Septic tank & soak away pit, water seal toilet	x			x			x			x	
Septic tank & drain field, water seal toilet	x			x	x	x				x	
Small bore sewer system with household toilets and common treatment / pit	x					x	x			x	
Direct / offset pit pour-flush water seal built up toilets	x	x	x	x	x	x				x	
Ventilated improved pit, built up toilet		x	x	x	x	x				x	x
Eco san toilet (UDDT is one of them)	x	x	x	x	x	x	x	x	x	x	x

Source: Helvitas, 2005

2.Types of UDDTs in use

All the different models of UDDTs globally available are listed in Table 2 .

UDDT	Single Chamber	All of them can be • squatting or sitting type (there is a wide selection of squatting pans and commodes in different designs and materials available) • inside, attached or outside toilets • modified for washers or wipers • with urine collection or urine diversion to plantation bed, mixed with wash water or without (there are different options for urine collection/storage) • designed as solar models
	Double Chamber	

Out of all the categories the following 4 types of UDDTs are common in South Asia

1. Single Chamber, Squatting, Outside/attached, Washers, With Urine collection
2. Single Chamber, Sitting, Attached, Washers, With Urine collection
3. Double Chamber, Squatting, Outside, Washers, Without Urine collection
4. Double Chamber, Squatting, Outside, Washers, Without Urine collection, solar Model

Single chamber, sitting, attached wipers with urine collection.
(Reference: Ecological Sanitation- Revised and Enlarged Edition, Stockholm Environment Institute2004)

Double chamber, squatting, outside, washes without urine collection.

3. Selecting a UDDT to suit your requirements

Table 2 Diagram 1 shows the different options and models of UDDTs from which you can select the one most suitable for you and your family based on your preference and situation/where you live. You and your family can discuss and select a model based on your preferences and the ground situation.

DIAGRAM 1: Different UDDT models/options

1. Squatting type

2. Sitting type type

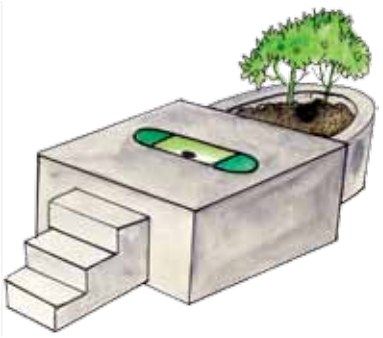
3. Attached

4. Outside

5. Wipers*

6. Washers

7. With urine collection*



8. Without urine collection/ divert to plant bed

9. Solar models*

** Reference: Ecological Sanitation-Revised and Enlarged Edition, Stockholm Environment Institute 2004*

Single or double chambers? - How to chose the right type

When deciding whether to have a single chamber or double chamber UDDT you need to consider certain factors.

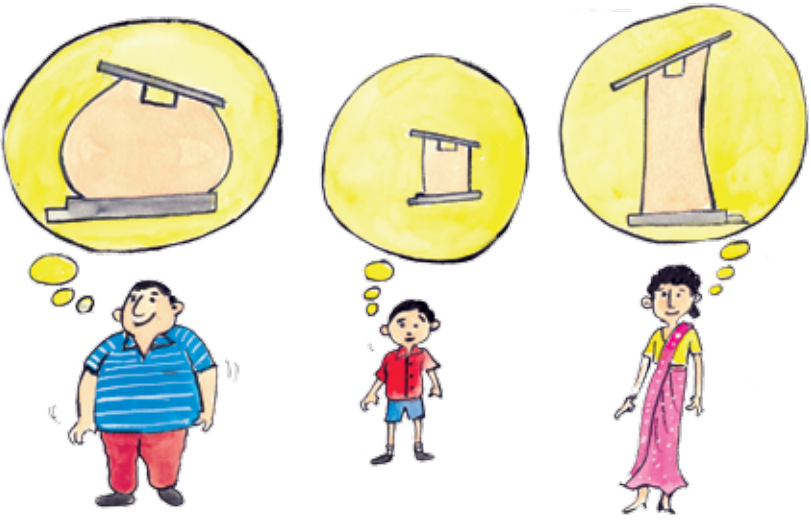
Table 3: Single Chamber UDDT vs. Double Chamber UDDT

	Double chamber	Single chamber
1	Requires more space	Less space
2	Comparatively high cost	Low cost
3	Comparatively maintenance is difficult	Less maintenance
4	Permanent	Permanent or temporary
5	Frequency of compost removal is less	Frequency of compost removal is comparatively high

4. Design and Construction

4.1 Factors to consider when designing and constructing a UDDT

Technical, environmental, economical and social factors should be considered at the design and construction stages of a UDDT.



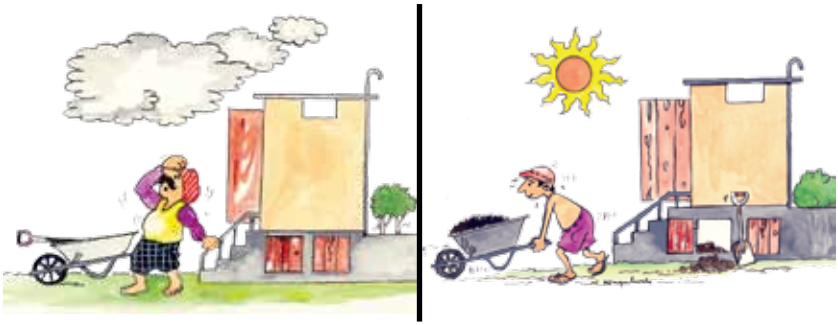
Technical factors

The rate of accumulation in the feacal matter chamber depends on the following factors:

- Number of people using the eco san toilet / family size
- Amount of feaces each user excretes
- Type and amount of material used as the additive material after defecation
- Temperature and humidity of the area

A chamber of 8 ft^3 can be used by a family with 4 members for about 1½ years. The duration varies with the above factors.

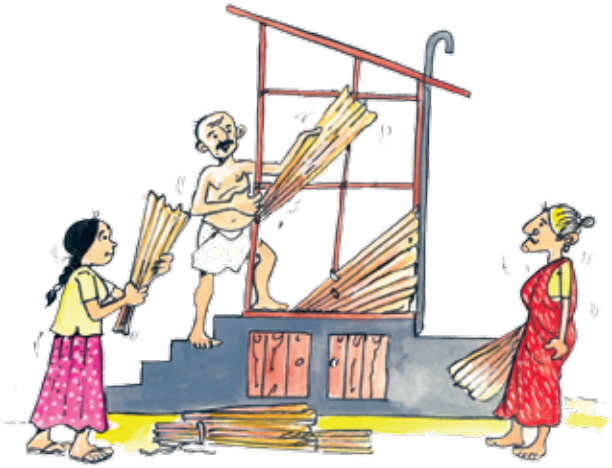
Environmental factors



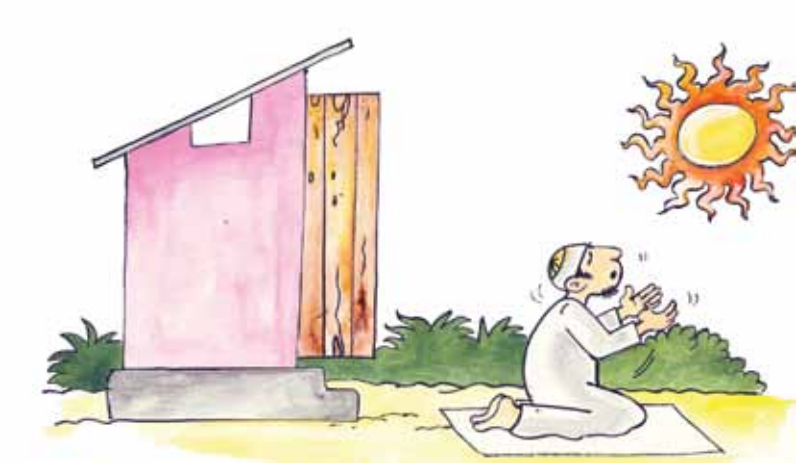
- Climate – If the temperature is lower than the average it will take more time for feacal material to decompose. If the temperature is high the time taken for composting is low, and operation and maintenance is easier (e.g. average temperature and rainfall affect the composting period).
- Soil types – UDDTs are suitable for any type of soil types generally not recommended for more conventional toilets (e.g. sandy, muddy, rocky/impermeable soil and mangrove areas)

Economical factors

- Locally available construction materials (e.g. bamboo, cane, clay) can be used, especially for the superstructure.



Social factors



- Social/cultural and religious beliefs (e.g. Muslims avoid building of toilets facing Mecca direction)
- Anal cleansing habits (wipe/wash)
- Special needs of users (e.g. special arrangements for the elderly and people with disabilities, such as an access ramp to the UDDT)

All the above factors should be considered when choosing the appropriate type of UDDT

4.2 Designing and constructing the different UDDT models

A) Steps in designing and constructing a Double Chamber, Squatting, Outside, Washers, Without Urine collection UDDT

Preparatory Work

- Set out the building accurately using a plan and setting out drawings
- Remove the top layer of soil if the soil is loose/light and make sure to remove tree branches providing shade (to facilitate sunlight and airflow around the toilet) remove any other barriers and mark the measurements

Foundation

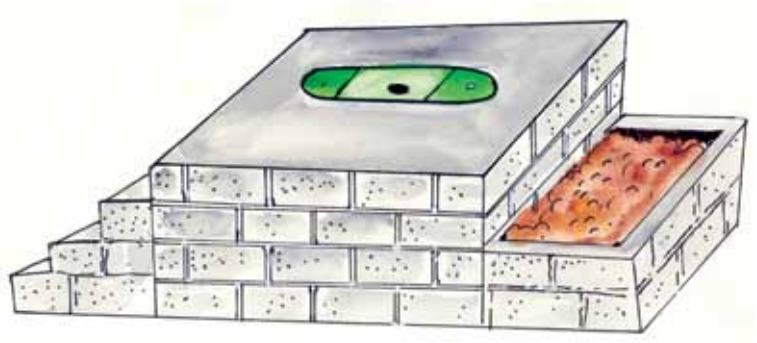
- Excavate foundations for all walls as per drawings and specifications
- Ensure that the base of the foundation trenches is level
- Foundations can be made out of brick pieces, stone or concrete depending on the ground condition
- the top of the stone foundation walls should be 9" above ground level
- Fill dry earth within the walls of the foundation of the toilet, use water to firmly compact it and level the filled soil

- If the ground water level is close to the surface or a regularly flooded area lay a damp proof membrane (DPM) of 1,000 gauge polythene on the surface of the compacted earth.

Chambers

Double Chamber

Slab with squatting pan above chambers



- The compost chambers must be constructed above ground on a solid floor and free from moisture penetration.
- The size of a chamber may be 0.90m x 0.70m x 0.40m (depth) for a 4 member family
- For removal of dry compost provide an opening size of at least 0.25 x 0.25m (10" x 10") in each chamber

- The openings should be filled with masonry blocks bonded with a mortar mix of clay and sand to facilitate easy access to the compost in the chambers when compost has to be removed. After complete removal of compost from a chamber, the opening must be filled as before with masonry blocks and clay/sand mortar mix
- Build support walls for the toilet floor and a divider wall using 6" cement blocks of good quality in 1:6 cement/sand mortar as per drawings.

Concrete slab

- Provide needed props and shuttering to construct a 3" Reinforced Cement Concrete (RCC) slab 1:2:4 (3/4") with 10mm Y bars both ways at 6" centres
- Pour concrete and allow for curing for a minimum of 3 days (5 days would be better) before removing shuttering (formwork), and replace props under the slab immediately after removing formwork
- Ensure that provision is made for placement of the fibreglass eco san pan as per drawings
- Note that the pan is placed off-centre to allow for the water/urine waste pipe to be fitted under the floor slab
- If any other type of pan is used, place the pan accordingly

Stairs

- Ensure that sizes of treads and risers and landing for the stairs are in strict compliance with dimensions given in drawings
- It is important to ensure that the earth fill under the stairs and landing is well compacted, Steps (not less than 10" wide), risers (not more than 7" high) and landing to be constructed using kiln fired bricks laid flat with mortar joints and cement rendering on top
- Ensure that the cement rendered (5/8" thick, 1:3 cement/sand mix) surface of the steps and landing is of a rough finish and not smooth, to prevent people from slipping when the surface is wet
- Build balustrade walls for stairs with 4" cement blocks 1:6 cement/sand mortar as per drawings

Vent pipe

- Place PVC vent pipe with “T” socket (internally) and elbow bend (externally) centrally between the two compartments under the floor slab as per drawings and connect a PVC waste pipe to the water/urine outlet of the eco san pan as per drawings
- Extend the PVC vent pipe upwards as shown in the drawings
- One vent pipe must be fitted from the compost chambers and extending up at least 50 cm above the roof of the toilet
- Ensure that the vent pipe is firmly secured to the toilet wall with brackets
- Vent pipe extends upward beyond the top of the roof and ends with a bend that is cut at an angle at the mouth (as shown in drawings) to prevent entry of rain water into the vent, firmly fix a protective insect net at the mouth of the vent pipe

PVC wash water/urine pipe

- Extend the PVC wastewater/urine pipe downwards and under the soil as described in drawings
- PVC pipe is firmly secured to the toilet wall with brackets
- The portion of the pipe within the plant trough is perforated and set in gravel packing as specified
- Soil for planting must be placed over the gravel bed

- The minimum internal diameter of distribution pipes taking the washing water and urine should be 0.05m
- Perforations in pipes should be between 5 -120 mm diameters.

Superstructure wall

- Different types of material can be used for the superstructure according to availability
- When using cement blocks build superstructure walls of 4" cement blocks in 1:6 cement/sand mortar as per drawings. Allow openings for door and ventilation openings as per drawings
- Allow walls to cure before constructing RCC roof slab

RCC Roof slab

Different types of material can be used for the roof according to availability - If the roof is a concrete slab,

- Set up props and shuttering for the RCC slab to construct a 3" slab 1:2:4 (3/4") with 12 mm Y bars at 6" both ways
- Pour concrete and allow for curing for a minimum 3 days (if possible 5 days would be better) before removing shuttering (formwork)
- Replace props under the slab immediately after removing formwork

Door

- Different types of material can be used for a door according to availability
- Install (timber) door as per drawings.
- Ensure that the door opens outwards to facilitate entry by people with different abilities

Walls

- Cement render outer surfaces of toilet wall from ground level to top of floor slab level with 1:3 cement/sand mix ¾" thick
- Apply 5/8" thick cement plaster (rough) 1:1:4 cement/sand/lime on outer surface of toilet walls (from floor level of toilet to roof) and stair balustrade
- Apply 5/8" thick cement plaster (smooth) 1:1:4 cement/sand/lime on internal surface of toilet walls
- Apply suitable waterproof rendering on top surface of RCC roof slab as per manufacturer's specifications

Ramp

For people with different abilities, a ramp and landing should be provided for access.

- The ramp should be constructed at a gradient of 1:12 and have a clear width of 3ft not including the side balustrade.
- The landing should be about 1" to 1½" below the level of the toilet floor. This is to prevent rainwater from readily entering the toilet floor.
- A sloped surface between the toilet floor and landing will facilitate entry and exit of wheelchairs used by disabled persons.
- The toilet door must open outwards for easier wheelchair access.

Percolation bed

- Construct a percolation bed about one foot or more away from the rear of the toilet as per drawings
- The area of the percolation bed can be increased above the specified size, but not reduced

- The effective area of the seepage bed shall be 2.5 sq. m (27 sq. ft.), and should not be at a greater depth than 0.5 m (1'.6") and not less than 0.15 m (6") from the surface of the ground. The effective area can be increased according to available space and user needs.
- Locate the plant trough a few feet away from the toilet
- The bed should be located in an open area to get the maximum amount of sunlight and airflow, and it should preferably be facing east or west
- Gravel, stone chips or any other suitable inert material which is insoluble in water and resistant to corrosion can be used as an aggregate in plant beds
- The soil may be vegetated with shallow rooted plants.

B) Steps in designing and constructing Single Chamber, Squatting, Outside/attached, Washers, With Urine collection

The main difference of this model is the chamber. Instead of changing the chambers a container or rotating drum is used to change compartment is not divided into 2 and is only one chamber. The ventilation pipe and urine pipe arrangement is simple and directly taken out from the chamber. The model of the pan is a different design which allows the single chamber to function as the urine diversion.

C) Steps in designing and constructing Single Chamber, Sitting, Attached, Washers, With Urine collection

This system is attached to the house and constructed so that at least 2 sides are exposed to the outside. Urine collection devices need to be kept away from the toilet and precautions need to be taken to lower the smell as much as possible. Sitting type commode and another washing devise/commode used for anal cleansing are included in this type of UDDT. Urine is collected using a tube connected to the commode and urine is not mixed with the wash water. A separate line for the wash water goes to the plant bed.

D) Steps in designing and constructing Double Chamber, Squatting, Outside, Washers, Without Urine collection, Solar UDDT

This type is similar with UDDT type A, the only difference being the compost chambers are designed to trap more sunlight and accelerate the composting process. The chambers must be placed in east or west directions to catch more sunlight during daytime.

5. Operation and Maintenance

5.1 How do you make certain that your UDDT is functioning well?

Well constructed and well maintained UDDTs don't develop bad odours or attract flies. After sanitising the urine and faeces, these nutrient rich products are reused for agricultural purposes or in the garden.

To ensure the good performance of a UDDT 4 things must be kept in mind. This will assure that there will be no smell and the products can be adequate sanitised:

- The design of the toilet-slap assures that the urine is directly diverted from the faeces; the urine does not touch the faeces.
- The faeces are led into a faeces chamber or container and covered with drying material - prepared soil, ash, lime and/or wood-flints.
- The chambers must be kept completely dry and covered with sufficient soil, ashes, lime and/or wood-flints.
- Urine and faeces are always stored and treated separately.

Before going on to the next section there needs to be information on how long to use each chamber (single vs double chamber), containment period, etc.

Proper use of the UDDT

During use, care should be taken not to add water into the faecal chamber. The chamber should be closed with a lid after each use.

Non-biodegradable material, including tampons and sanitary pads, should not be disposed in the faecal chamber at any point in time. Separate collection bins should be provided in the toilet for this purpose.

Inside the latrine shelter there needs to be the following things:

- a brush-for sweeping the squatting slab
- a box/bucket with ashes, paddy husks, saw dust, dry earth/a mixture of such material placed in a corner of the latrine shelter
- an empty tin/a coconut shell inside the box/bucket to help in sprinkling of the dry material
- a bucket of water within reach for anal cleaning

After defecation, a handful of dry cooking ash, lime, sand, soil or wood chips should be sprinkled into the faeces opening which is then closed using a simple cover. Dry garden waste can also be used in combination with input material.

Special arrangements should be made considering the women's needs during the menstrual periods and pregnancy and needs of differently abled people.

6. Handling and use of the compost

Fresh faeces contain high amounts of pathogens (illness making bacteria or viruses). Therefore, faeces must always be treated before they are applied on a field or a garden.

Human excreta contain nitrogen, potassium, phosphorus and magnesium, which are essential to grow plants. Due to rather low nutrient and high humus concentration, sanitised faeces or compost is best used as a soil conditioner. Well treated (composted) faeces are safe to use, improve soil structure and soil health and can be applied in rather high amounts.

Application of compost

- 1 to 2 litre compost per square meter soil (/m^2)
- 2 to 3 litre / m^2 for plants with rather high nutrient consumption like potatoes or onions
- 3 to 4 litre / m^2 for plants with high nutrient consumption like maize, tomatoes or pumpkins
- 1 part compost mixed with 1 part soil for balcony or bucket plants

Handling of compost

- Most of pathogenic bacteria are destroyed and reduced during the containment period (6-12 months).
- A period of one month should be observed between fertilising and harvesting to allow any further pathogens to die.
- Compost should be kept so that it has no contact with the ground to prevent nutrients from draining-off. The compost should not be exposed to rain or water and should be kept in polysak bags to minimise exposure to humans and animals.
- Compost should be kept dry before use and away from animal and children's access.
- The user should use protective equipment such as gloves, and wash hands with soap.
- Food crops that are consumed raw should be washed thoroughly before consuming.

7. Handling and use of the urine

Urine contains several nutrients like nitrogen, potassium and phosphorus, which are essential to plant growth. The daily urine from one person contains enough nutrients to help produce food for one person.

Storage

- Urine is collected separately from faeces. A variety of containers and urinals are used for urine collection depending on the scale.
- Direct use of urine should be practiced on a household level and there is no storing required at the household level.
- The temperature is 25-35ºC storage time is 2-4 weeks. If the urine is contaminated, longer storage time and higher temperature are required.
- It is preferable to stir urine during storage (at an ambient temperature) to avoid crystallisation and precipitation. As these salts trap nutrients significantly.

Application Methods

Applying urine without dilution

1. Before sowing or planting applied onto the soil
2. Direct application to trees
3. Moisten dry compost heaps

Applying with dilution

Once crops have started to grow, the urine should be diluted with water in a ratio of 1 to 7 (one part urine and seven parts water) for all plants.

Field Practices

- Fertilisation with urine is better at early mornings or late in the afternoon to avoid evaporation by sunlight.
- After application it is recommended that the earth be covered with soil or leaves, to avoid evaporation.
- To avoid wasting this fertiliser, apply urine only during the vegetation period.
- In case of high nitrogen demand more urine can be given in several applications. The nitrogen characteristics of urine are comparable with that of artificial fertiliser and therefore care must be taken not to apply too much or high concentrates of urine to plants.
- To be safe, urine should not be applied on vegetables which are supposed to be eaten raw and should be applied no later than a month before harvesting.

8. Troubleshooting

Problems 01

Children, differently abled people, pregnant and elderly people will face difficulty in entering the toilet

Solutions

- Follow standards for step construction
- Provide hand rails on both sides of the steps
- Provide a ramp as per standard specifications
- Use the natural landscape to minimise the height

Problems 02

Accidentally excessive water enters into the chamber and household members get diarrhea episodes

Solutions

Apply additional amounts of additive materials ash/ lime…etc.

Problems 03

Worms found inside the compost chamber

Solutions

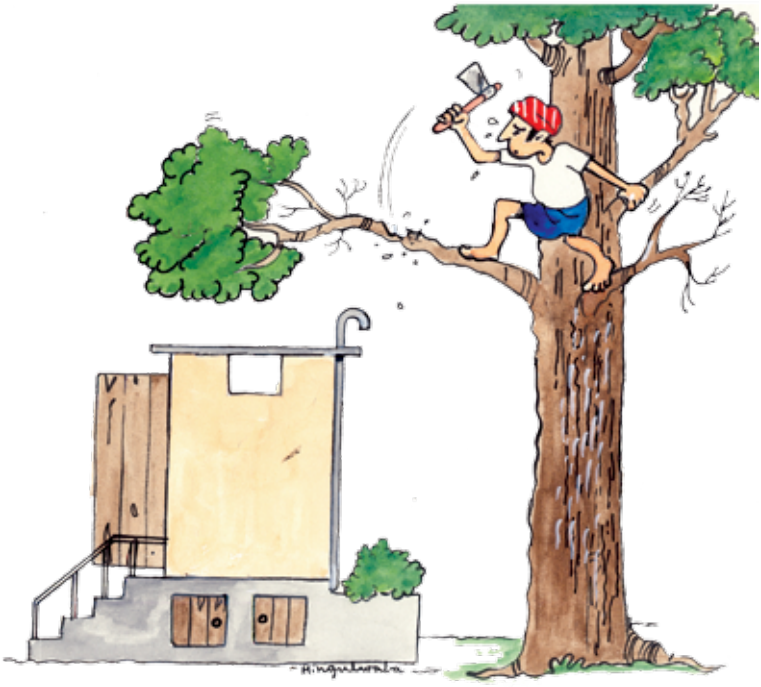
- Avoid kitchen waste contamination
- Apply additional amounts of additive materials ash/ lime…etc.

Problems 04

Unpleasant smell from the compost chamber

Solutions

- Apply additional amounts of additive materials ash/ lime...etc.
- Remove anything providing shade on the toilet/ improve sunlight and airflow around the toilet
- If possible use a ventilation fan inside the chamber



Problems 05

Obnoxious smell from urinal or urine container

Solutions

- Add hot water with little vinegar periodically to clear the urine sediments
- Tightly close the lid of the container and avoid any leakages

Problems 06

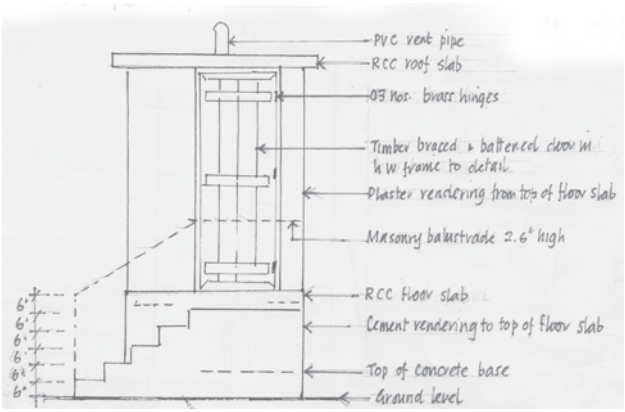
Presence of cockroaches

Solutions

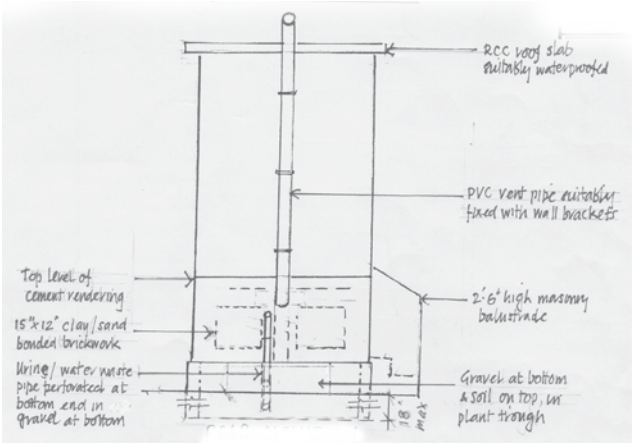
- Close all the holes in the chambers
- Cover the vent pipe hole with a net

9. List of Figures

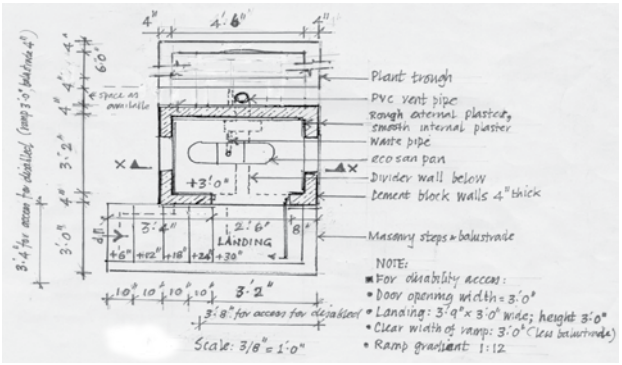
Front View



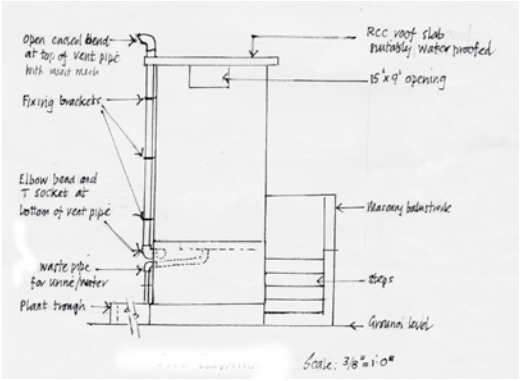
Rear View



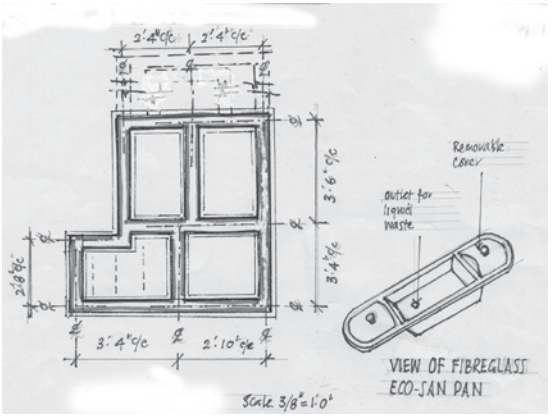
Plan



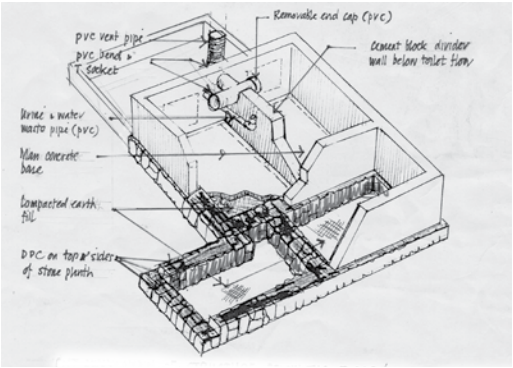
Side Elevation



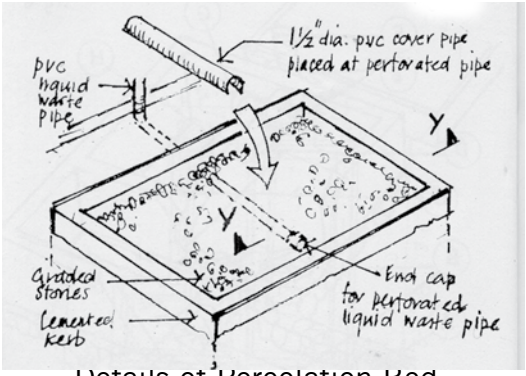
Setting out Plan



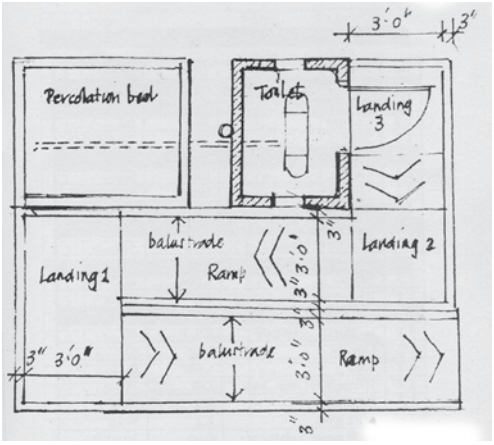
View of Structure below floor



Details of Percolation Bed



Details of Percolation Bed



10. Annexes

i. Foundation to DPC including mass concrete base

No.	Item	Unit	Qty
1	Foundation to DPC incl. mass conc. base		
1.1	Stone (rubble)	Cube	0.15
1.2	Cement	Bag	01
1.3	Sand	Item	10 thatchi*
2	Damp Proof Course and D P Membrane		
2.1	Tar	Litre	02
2.2	Sand	Item	10 thatchi*
2.3	1000 gauge polythene	Item	30 sq/ft
3	6" ct. block walls to toilet floor and stair landing		
3.1	6" cement block	Nos.	175
3.2	Cement	Bag	01
3.3	Sand	Cube	0.15
3.4	Red cement (rendering)	Kg	02 kg
4	RCC toilet floor slab for eco pan		
4.1	¾" metal aggregate	Cu. ft.	10
4.2	Cement	Bag	01
4.3	Sand	Cube	0.15
4.4	10mm Steel rfmt. bars.	L/ft	70
4.5	Binding wire	Kg	½ kg
4.6	Wire nails	Kg	¼ kg
4.7	1000 gauge polythene	Item	30 sq/ft
5	4" cement block walls from Toilet floor to roof		
5.1	4" ct. blocks	Nos.	350
5.2	Cement	Bag	3.0
5.3	Sand	Cube	0.20
6	External plaster for walls		
6.1	Cement	Bag	01
6.2	Sand	Cube	0.20

No.	Item	Unit	Qty
7	Internal plaster on walls and RCC roof soffit		
7.1	Cement	Bag	01
7.2	Sand	Cube	0.20
8	Cement rendering on toilet floor, landing and steps		
8.1	Cement	Bag	01
8.2	Sand	Cube	0.20
9	RCC roof slab		
9.1	¾" metal aggregate	Cu. ft.	15
9.2	Cement	Bag	1.5
9.3	Sand	Cube	1.20
9.4	12mm steel rfcmt. bars	Lin. Ft.	140
9.5	Binding wire	Kg	½ kg
9.6	Wire nails	Kg	¼ kg
9.7	1000 gauge polythene	Sq/ft	45
9.8	Waterproof rendering	Litres	02
10	Shuttering & props for floor slab & RCC roof		
10.1	1" timber plank	Sq/ft	42
10.2	2" x 1" h w battens	L/ft	30
10.3	2" x 4" timber	L/ft	30
11	Supply and fix eco pan		
11.1	Supply & fix eco pan	Item	01
12	Fabricate & fix timber door and frame		
12.1	Fabricate/fix frame	Item	01
12.2	Fabricate fix door/hinges	Item	01
13	PVC vent pipes & drain pipe		
13.1	Supply & fix 4" PVC vent pipe/bends/ sockets/ end caps	10 L ft 02 Nos T Socket. 02 Nos. Elbow 02 Nos. E/caps	
13.2	Supply & fix 1 ¼ " PVC w/water & urine pipe with bends, sockets etc.	07 L. ft 03 Nos. elbow	

Other items required
Coir ropes for setting out, Thatchis, Short timber stakes, standard mason's tools (trowel & plumb line)
Digging equipment – mammoty, crow bar, metal sieve

How will you use this manual?

If you are a,

1. **Mason:** This manual will provide you with guidelines to construct a Urine Diverting Dehydration Toilet (UDDT), according to correct standards. It contains technical drawings and a list of required building material.
2. **Public Heath Inspector/Field Level Officers:** You can use this manual for your site visits. It will help you to guide the people; irrespective of whether they are users or potential users.
3. **Lay People:** This manual is a guide which helps you to select the appropriate type of UDDT suited to your needs. It will also help you to assist the mason during construction. Furthermore it includes information on operating and maintaining the UDDT, handling of urine and faeces and troubleshooting of UDDT for your reference.

PRACTICAL ACTION
Technology challenging poverty

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