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# WHY A PIT LATRINE

## A Manual for Extension Workers and Latrine Builders



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Illustrations: G.L. Lufeyo and IRC

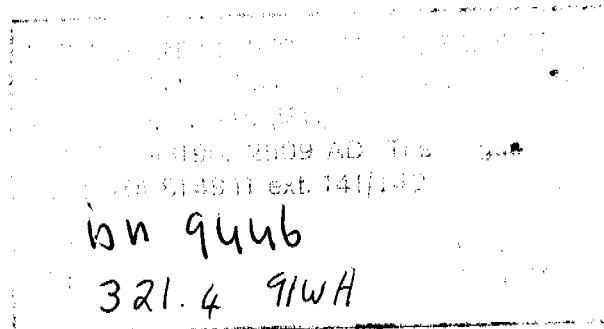
RECEIVED  
NATIONAL REFLECTION  
WATER

PIPED SUPPLIES FOR SMALL COMMUNITIES  
(PSSC) PROJECT ZAMBIA

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Joseph Mate

## *1. Introduction*

The discussion regarding the importance of a pit-latrine is not complete without mentioning the need for clean, safe and adequate water. These twin services cannot be separated if we are to achieve good health for all by the year 2000 and beyond.

It has to be noted and remembered that many problems and diseases are related to unsafe water and bad sanitation and hence the need to educate communities so that they can obtain their water from safe and protected sources.

It is equally important to emphasize the need for the provision of proper use of basic sanitation facilities.

It is the duty of extension workers to support and guide communities on the need and the use of improved water and sanitation facilities. Communities should fully participate in any programme or project promoting such improved facilities. Communities and extension workers should work as a team in order to promote good health. Remember that good health is a HUMAN RIGHT, but it has to be won.

### **Objectives of a Pit Latrine Programme**

The objectives of any pit latrine programme should be:

- \* To prevent diseases associated with lack of good sanitation.
- \* To get all households assume responsibility for their sanitation.
- \* To mobilize households to acquire appropriate sanitary facilities, e.g. by building their own pit latrines.

## 2. *For whom is this Manual Written*

This manual has been written for both extension workers and the community. It can guide extension workers in supporting communities to build their own pit latrines. And it gives guidelines to follow for all those who themselves want to build a pit latrine. It is indeed a do-it-yourself manual, written in a simple way, so that even somebody who is not a builder could build a pit latrine with little outside help.

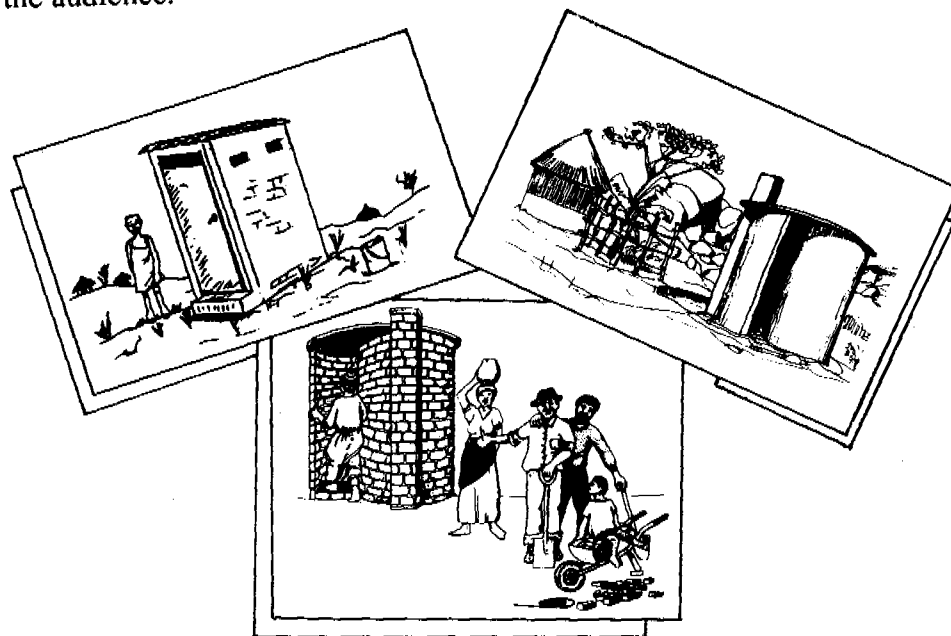
### **Simple Methods for Extension Workers to Mobilize the Community**

To motivate and mobilize communities in a sanitation programme, simple methods have been developed to be used by extension workers in discussions with communities.

1. The first method uses so-called **Unserialized Posters**. These are a series of about 10 drawings, e.g. of different types of latrines, some very nice, some in bad repair, etc. Other drawings may show common habits in excreta and urine disposal by children and grown-ups.

These pictures are shown to community members, men and women, who are asked to choose some of them and then tell a story based on the pictures, or explain why they find them interesting. In this way a discussion is started on sanitary habits and the benefits of improvements through the use of appropriate sanitation.

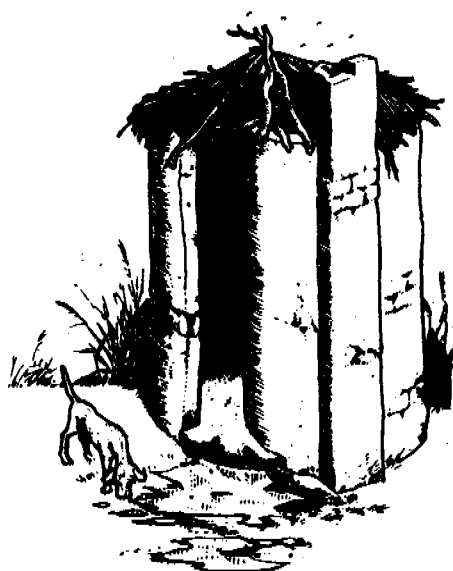
To make sure that community members will freely express their ideas, the extension worker using the method should be careful not to start the discussion with telling herself a story, or worse even, to explain the pictures to the audience.



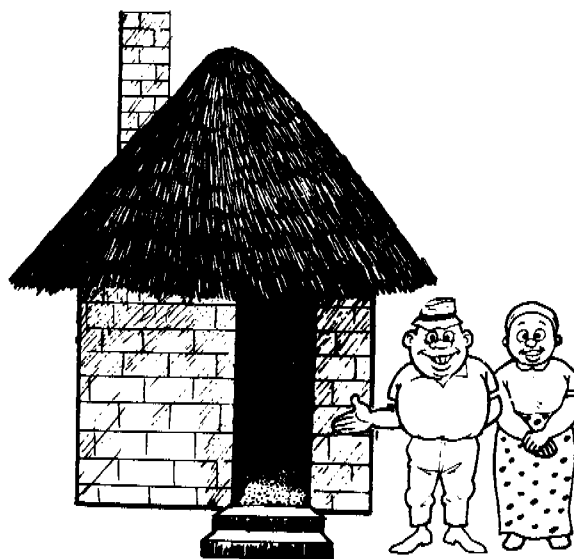
2. Another method which can be adopted in a sanitation programme is called **Story With A Gap**.

Two pictures are used, one of an existing, bad situation, for instance a badly constructed or collapsed latrine.

Another picture shows a nicely built pit latrine with happy family members using it.



**BAD LATRINE**



**NICE LATRINE**

The audience is asked to comment on both pictures, and to explain what they could do to acquire the nice pit latrine. A list of materials needed could be drawn up, and other special requirements noted down.

Examples of lists of tools and materials for latrine construction are provided on pages 9 and 10 of this manual.

An example of a list of special requirements could be :

- provision of a mould for slab-making, by the Agency managing the sanitation programme;
- help in acquiring skills for slab making;
- some small credit scheme to help people who can not afford to buy at once all materials to build their own pit latrine;
- .... etc.

Although the extension worker will help with drawing up the lists and guiding the discussion, it is important to let the people express themselves freely, and particularly to also encourage poorer members of the community to join in the discussion.

### 3. *Why a Pit Latrine ?*

Why a pit latrine ? This question has been asked by many people, who may wonder why they should spend the effort and the expenses of building and using a good latrine.

There are several good reasons for having a good pit latrine available for each household:

- \* A well-constructed latrine offers privacy to its users.
- \* In a well-constructed latrine, excreta and urine are disposed of in a safe way, so that they will not contaminate the environment and cause infections and diseases.
- \* A well-constructed pit latrine is easy to keep clean. If it is well-maintained and properly used, it will contribute in an important way towards ensuring good health for the whole family.
- \* A pit latrine is comparatively cheap to build, particularly if it is constructed from locally available materials.
- \* Constructed and well-maintained pit latrine, with a 3m deep pit, can be used for at least 10 years by a family of six before the pit is full.

#### 4. *What is a Pit Latrine ?*



A pit latrine is probably the commonest and most simple excreta disposal system in the world. It is widely used in rural areas. It has considerable application in towns and cities.

It is the cheapest system available.

A pit latrine is fairly easy to build. With some instruction as offered by this book, and perhaps a little help from a skilled mason, any grown-up person could build a pit latrine.

In the following chapters a **PIT LATRINE WITHOUT A VENT-PIPE** is described.

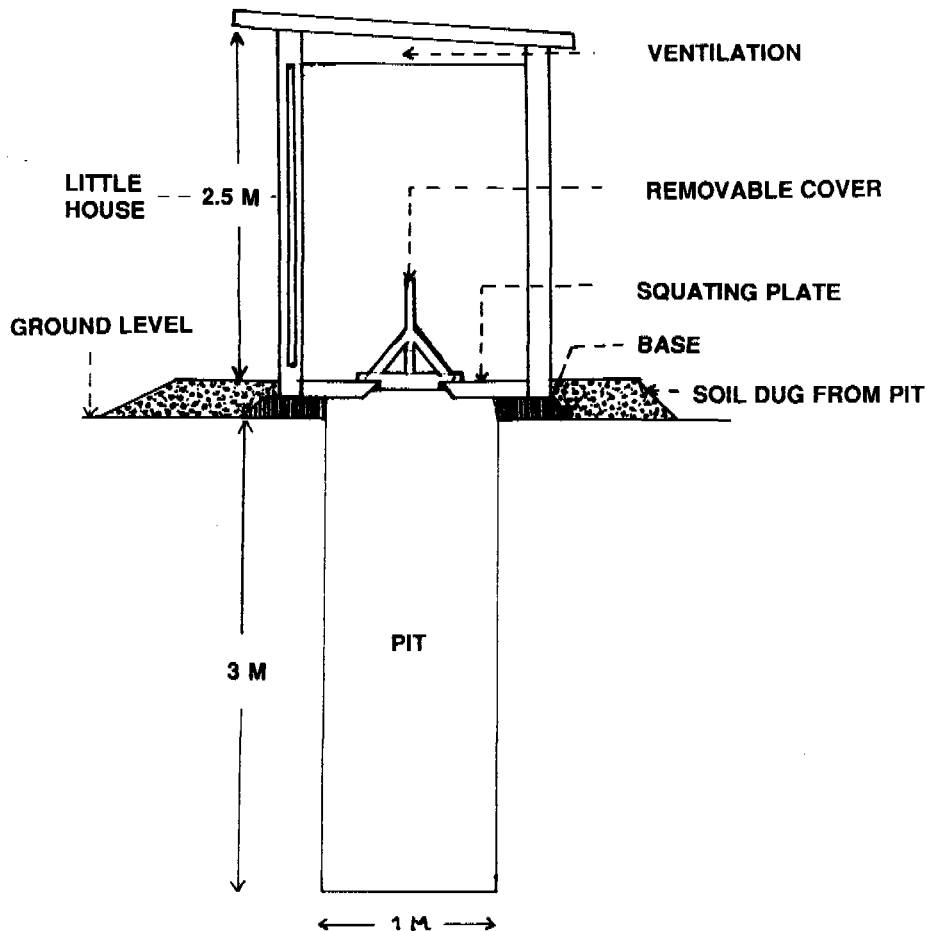
The last chapter will give details about a pit latrine with a vent-pipe (a so-called Ventilated Improved Pit latrine (VIP) latrine, or a Blair latrine). This type of latrine is somewhat more expensive and a little more complicated to build. It has, however, the advantage of being odourless and the fly problem is reduced to a minimum.



## The Main Features of a Good Pit Latrine

A pit latrine consists of three distinct parts, namely:

- \* The pit.
- \* The slab, or squatting plate.
- \* The little house, or superstructure.



### 1. THE PIT

The pit is a hole dug into the ground. The shape of the hole may be a square or circular, with a diameter of 1 m.

The depth of the pit should be at least 3 m.

In areas with a high water table, where digging below 2.5 m causes problems, the sides of latrine pits should be raised at least 0.5 m above the ground. This is to prevent a shallow pit to become full too soon.

The pit can be supported or lined by bricks, concrete, or old oil drums. This is especially recommended in sandy places, where latrines can collapse easily. It is important to leave holes for filtration at the bottom and at the sides of the lining.

## 2. *THE LITTLE HOUSE OR SUPERSTRUCTURE*

The little house may be built of permanent materials, such as :

- bricks
- blocks
- concrete
- corrugated iron sheets

or of locally available and affordable materials such as:

- poles or reed
- logs
- grass thatch.

Logs and grass are not as durable as bricks and concrete. They have to be repaired and replaced more often. Accordingly, a little house built from locally available materials needs to be maintained more regularly.

The little house should be built in such a way that:

- \* It provides privacy : it should have a door or a protected entrance.
- \* It protects the user from bad weather : it should have a roof.
- \* Users do not have to bend too much : it should be at least 2 m high.
- \* There is sufficient light and ventilation : it should have openings in the wall. These should be placed high enough to guarantee privacy.

## 3. *THE SLAB*

The slab should be made of durable, impervious materials with a hard surface to facilitate easy cleaning. It should be big enough to rest comfortably over the pit, without a chance ever to collapse into the pit.

Materials commonly employed include :

- reinforced concrete
- wood, plastered with mud.

When concrete is used its thickness should be at least 6.5 cm, up to 10 cm. If wood is used it should be strong enough, and its thickness should be 15 cm or more.

To determine the size and shape of the opening and the footholds in the slab, it is recommended to get the measurements of any commonly used, existing slab. If possible, an existing mould for latrine slabs could be borrowed or purchased through the Agency responsible for the sanitation project or programme.

FOR A PIT LATRINE WITHOUT A VENT-PIPE it is important to have a lid, to cover the hole in the slab. This will prevent bad odours and flies coming into the latrine.

## 5. *Where to Build a Pit Latrine*

A pit latrine can not be placed just anywhere. Its location should be carefully chosen. The following issues should be taken into account:

- \* It should be placed at a comfortable distance from houses (5 - 10 m), and preferably not near the kitchen.
- \* There should be sufficient space around the latrine to dig another pit when the present one will be full.
- \* It should be at least 15 - 20 m away from any well or other drinking water source. A pit latrine built near a drinking water source may contaminate the source and cause diseases such as cholera, typhoid, diarrhoea and dysentery.

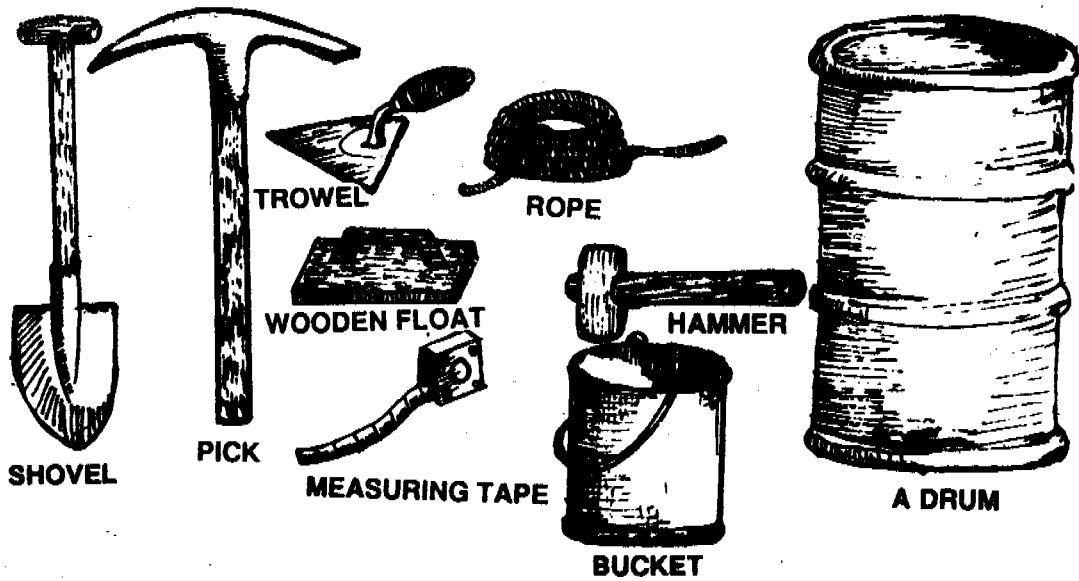


**A PIT LATRINE BUILT NEAR DRINKING WATER**

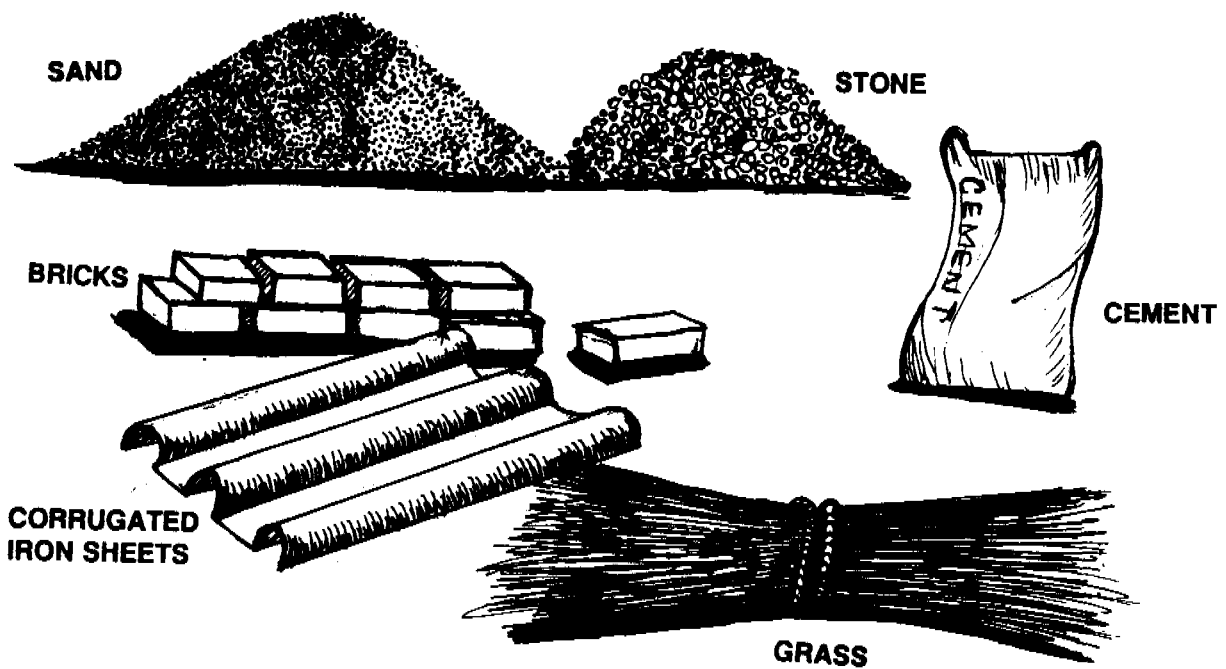
**CONTAMINATES IT AND CAUSES DISEASES**

## 6. How to Build a Pit Latrine

### Building Equipment

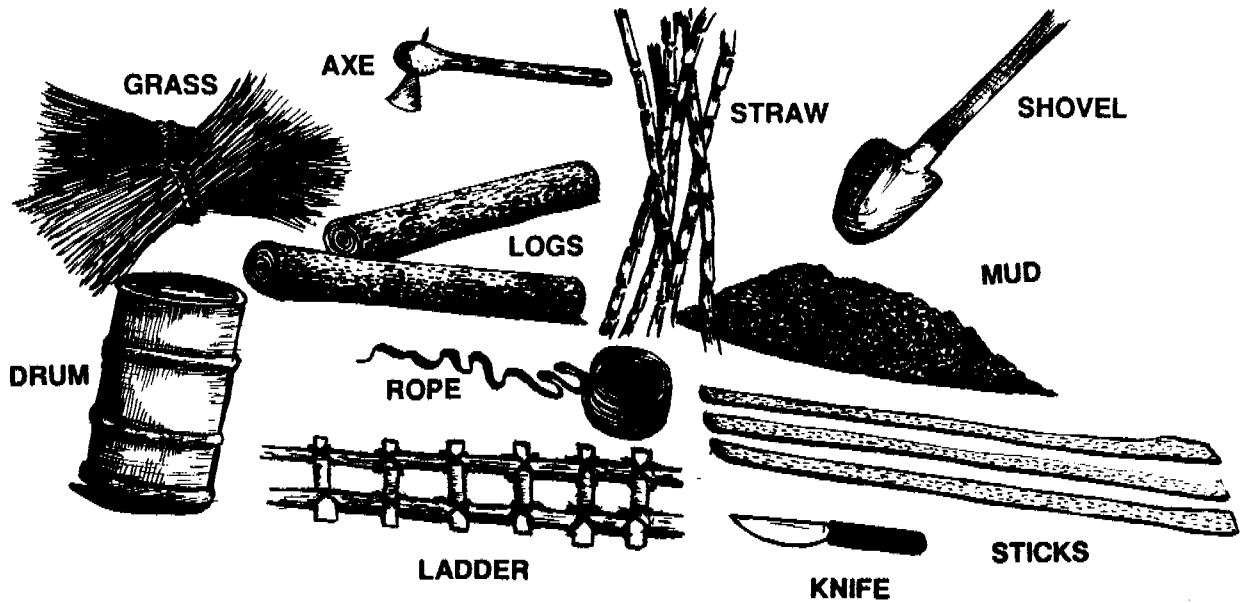


### Building Materials



Where there is a need to cut down on building costs, it is very well possible to use locally available materials, which are easily obtainable and cheap. Poles and reed can be used for the little house, grass thatch for both roofing and walls, and logs from Mukwa and Mubanga trees for slabs.

### TRADITIONAL MATERIALS



### Steps to be Followed in Building a Pit Latrine

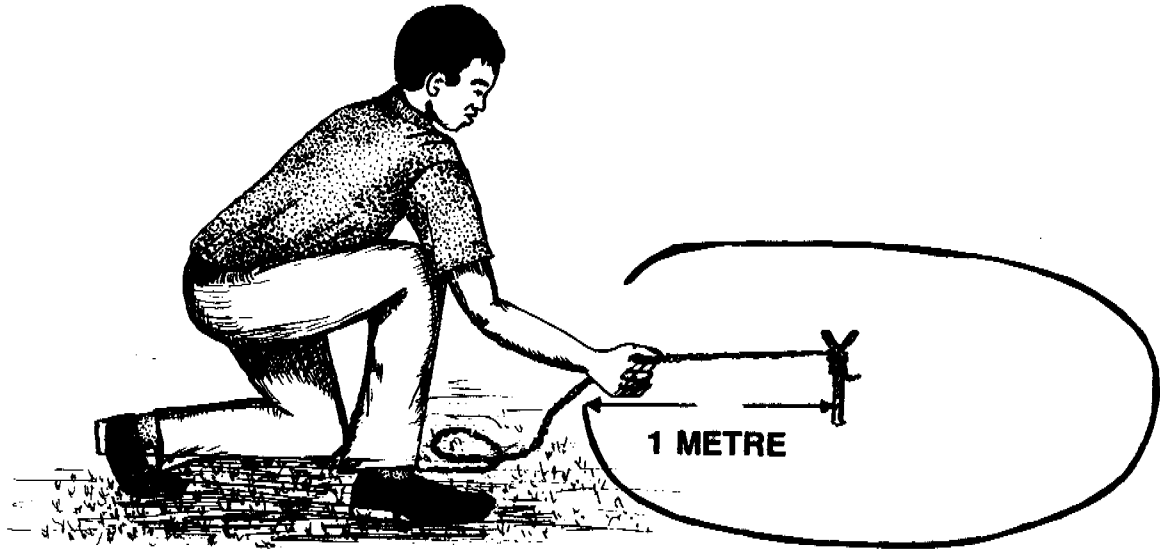
#### *STEP 1. SELECT A SUITABLE SITE*

Consider the nature of the soil, and the distance to dwelling houses (kitchens) and sources of water.



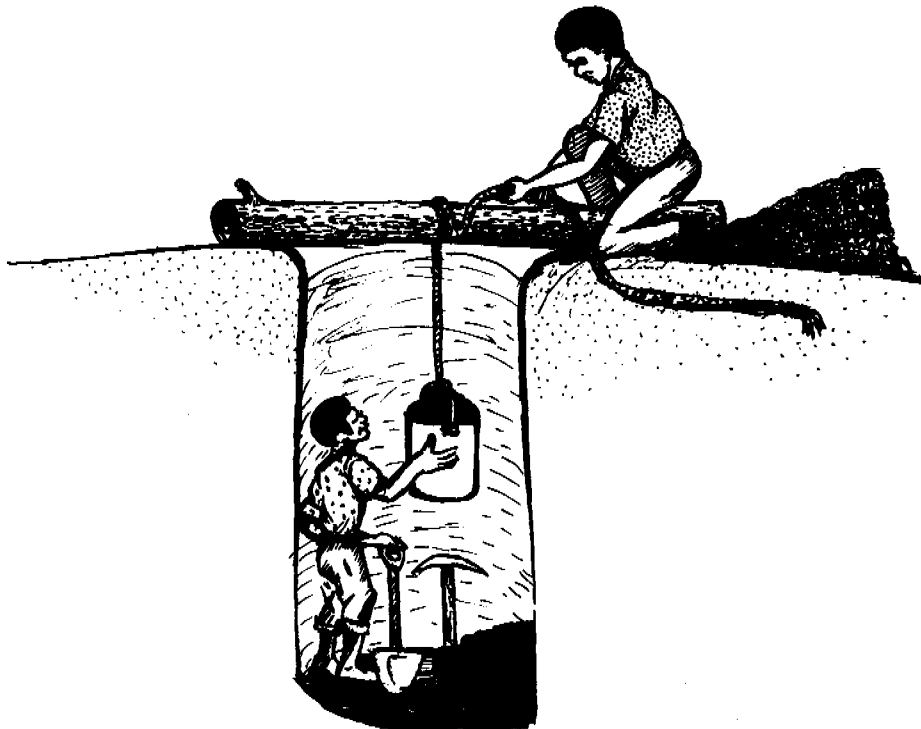
## *STEP 2. MEASURE THE SIZE OF THE PIT*

A tape measure or a ruler and a string with a wooden peg will be needed for this job.



## *STEP 3. DIG THE PIT*

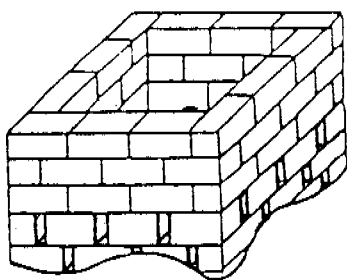
A pick, shovel, hoe, bucket and rope are needed for digging the pit.



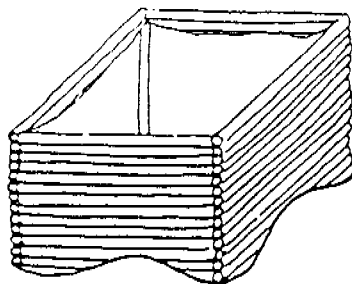
#### **STEP 4. MAKE A LINING FOR A RAISED PIT**

If the groundwater table is high, it may be necessary to raise the latrine above ground level. In that case, the soil dug from the pit can be used to build up a plinch around the pit.

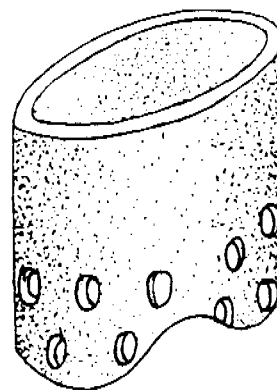
A raised pit latrine should always be fully lined, up to the top level of the plinch. Lining can be made of bricks, or poles. Sometimes old oil drums can be used. The outside of the lining should be plastered with mortar, to prevent any leakage.



**LINING OF BRICKS  
WITH HONEY COMB**



**LINING OF POLES**



**LINING OF CONCRETE  
RINGS WITH  
INFILTRATION HOLES**

#### **STEP 5. MAKE A SLAB**

In order to make a concrete slab you need:

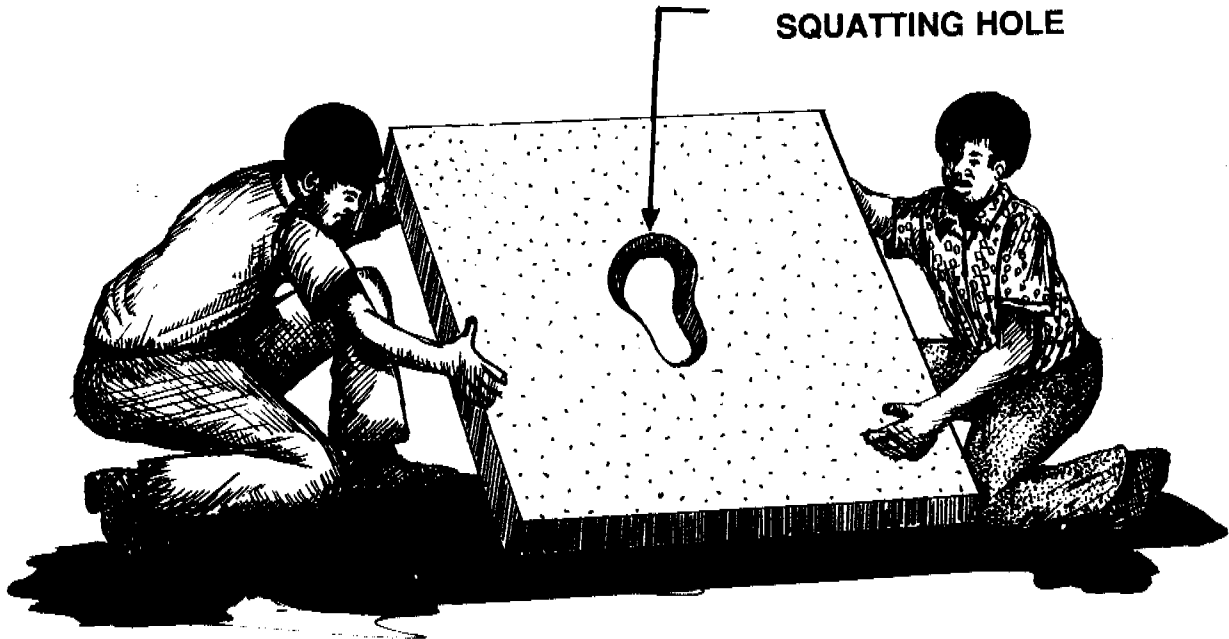
- a mould
- cement
- building sand
- broken stones
- reinforcement wire or chicken wire
- metal bars
- water for mixing.

The following mixture is recommended:

1 part or 1 bucket of cement, 2 parts or 2 buckets of building sand, 4 parts or 4 buckets of broken stones.

Once the mould is set up, some 3 mm reinforcing wire is cut and laid out to form a grid with wires 10 cm apart. After the wires have been cut they are laid on one side and the concrete mixture made up. Half the mixture is laid in the mould. The reinforcing wires are then placed in position, and the remaining concrete added and trowelled flat.

The moulded cast should be covered with grass and left to cure for at least five days. It should be kept wet during this period in order for it to dry slowly to be strong.



Alternatively, slabs can be made from local materials, using strong wooden logs, plastered with mud.

The squatting hole in the slab should be about 30 cm long and 15 cm wide. The hole for a vent pipe has the equal width for the vent pipe to be fitted.

DO NOT FORGET to leave a squatting hole between the wooden poles, or in the concrete slab. The opening should be comfortable, not too wide or too narrow. A good opening is about 30 cm long and 15 cm wide.

### ***STEP 6. BUILD A LITTLE HOUSE (SUPERSTRUCTURE)***

To build the little house, it is possible to use either locally available materials or permanent materials.

The little house should provide enough space for appropriate use of the latrine. The height should be at least 2 m, and there should be some openings in the top of the walls to provide enough light and air.

The entrance should be wide enough, and there should be a door to provide privacy.

A roof is built to protect the user from rain and sunshine.

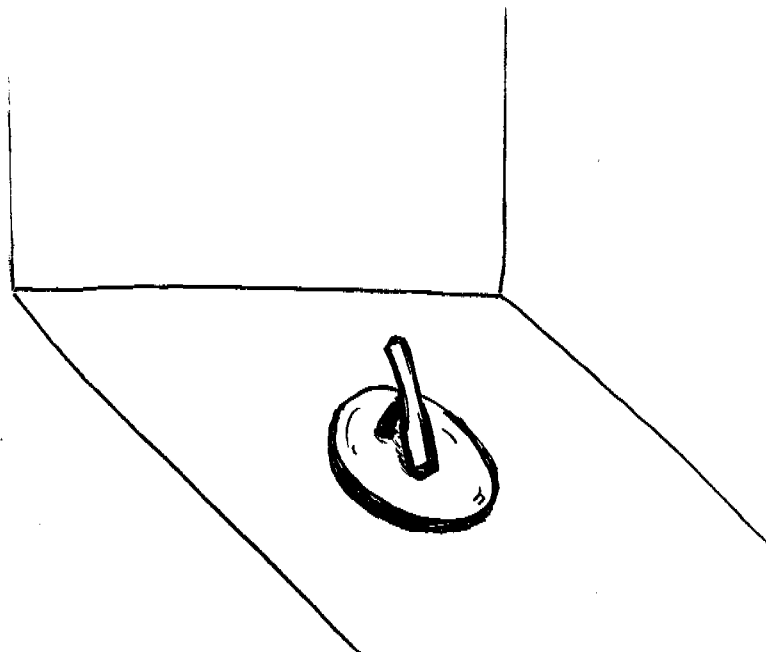




### *STEP 7. MAKE A WOODEN COVER*

FOR PIT LATRINES WITHOUT A VENT-PIPE a wooden cover has to be provided for the opening in the slab, to prevent bad smells which will attract flies entering the latrine. Flies collecting germs in the latrine may later sit on food which may be eaten by people. In this way diseases will spread.

The cover can be made from a plank, with a handle attached on top. It has to be big enough to cover the latrine opening completely, and it has to fit tightly over the opening.



## 7. *How to Use a Pit Latrine*

In order to benefit most from the advantages of a good pit latrine, some rules of usage have to be kept:

- \* Do not soil the latrine. A dirty latrine attracts many flies and other insects. Children should learn to squat right above the opening.
- \* It is very important that everybody should wash his hands after using a latrine. By touching other people or handling food with dirty hands, diseases like cholera, diarrhoea and dysentery are spread.
- \* **IN A LATRINE WITHOUT A VENT-PIPE**, flybreeding and bad smells are prevented by always covering the latrine opening with a wooden cover.

In a latrine with a vent-pipe the opening should not be covered tightly, to allow the air to circulate freely. A good VIP latrine will not smell badly. It can be kept completely odourless by daily throwing a handful of ash in the pit.

- \* Keep the latrine floor and the slab clean by washing and scrubbing them every day with water. Dirty pit latrines easily become a focus for the transmission of all kinds of diseases.
- \* Use the latrine **ONLY** for defecation and urinating. Some small pieces of paper for wiping may be used and thrown into the pit. **NEVER THROW ANY RAGS OR OTHER OBJECTS INTO THE PIT.** This may considerably reduce the useful life of your pit latrine.



## 8. *Maintenance of a Pit Latrine*

A pit latrine needs to be well-maintained to provide its full benefits to the users. Important issues for maintenance are :

- \* Cracks in the slab and the little house need to be repaired immediately. Check regularly for cracks and damages.
- \* The contents of the pit will have to be kept moist. Moist faecal matter digests more rapidly than dry matter. If the slab is cleaned every day with water, this will provide sufficient moisture to prevent drying of the pit contents.
- \* A pit latrine with a 3 m deep pit, used by a family of six, will last about 10 years before it is full. After several years of use it may be wise to check the pit regularly, at least twice a year, to see how full it is. When the pit is full, say 40 cm below ground level, it must be covered and a new pit provided for use.
- \* Do not wait with digging a new latrine till the old one is completely full. Start digging a new pit when the old one is almost full (60 cm below ground level). If the old slab is still good, it can be used to cover the new pit.
- \* Sometimes it is possible to use the materials of the old superstructure to build a new little house.

## 9. THE VENTILATED IMPROVED PIT LATRINE (VIP LATRINE)

The Ventilated Improved Pit Latrine is one of the best latrines in terms of preventing fly breeding and smell. It has been developed through the Blair Research Laboratory in Zimbabwe and is widely used in rural communities in Zimbabwe.

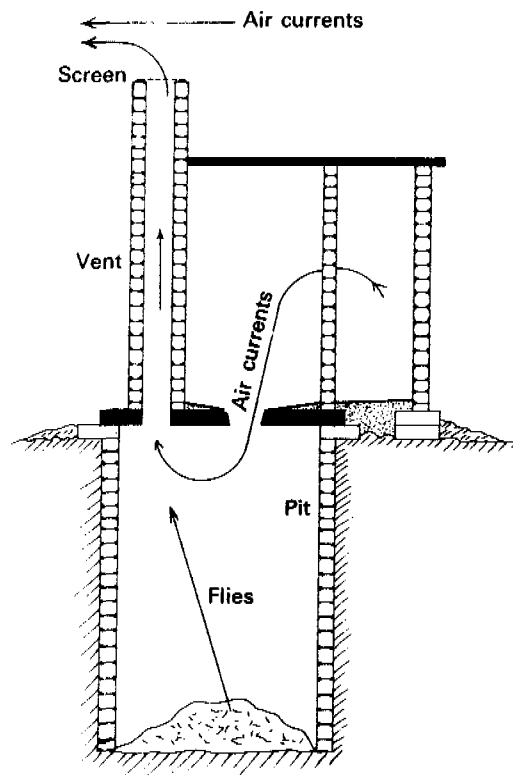
The VIP latrine is designed in the same way as the conventional pit latrine, which has been described in previous chapters, with one important addition : IT HAS A VENT-PIPE WITH A FLY SCREEN.

It has specifically been developed to overcome the problems of odour and fly breeding commonly found in pit latrines.

The VIP latrine works well because it employs the features found in the Natural World to make it operate. Two basic forces are operating :

- air currents
- behaviour of flies.

In a VIP latrine bad odours are led out of the latrine pit through the vent-pipe. The latrine itself stays odourless. In a good VIP latrine there is no fly breeding, because flies are trapped inside the pipe and outside on the fly screen.



### Air Currents

As the illustrations shows, a vent-pipe is fitted in the slab of the latrine, with an opening towards the pit. Any air current across the top of the pipe will cause an updraught in the pipe. The air forced to rise up in the pipe is replaced by new air which is sucked in through the squatting hole in the slab. In the VIP latrine, air is

continuously passing through the squatting hole and the vent-pipe. When this air movement is taking place, it is impossible for the foul gases in the pit to escape up through the squat hole into the latrine house. All the odours pass up the pipe and are diluted in the atmosphere. The interior of the latrine remains odourless.

## **Behaviour of Flies**

Flies are attracted to a latrine by odour and away from it by light. Once inside the pit, flies breed and when they emerge they fly towards the strongest light source, which in conventional latrines is the squatting hole.

In the VIP latrine, most of the odours are sucked up the pipe and escape into the air. Likewise most of the light in the pit passes down the vent pipe.

Flies approaching the latrine from outside are therefore strongly attracted to the top of the pipe. They can not get into the latrine, however, because the top of the pipe is fitted with a flyscreen.

It is always possible for some flies to get into the latrine and into the pit, entering through the door of the little house and then through the squatting hole into the pit. Flies from within the pit will be attracted towards the light, up the vent pipe. They cannot get out into the air, however, because they are kept back by the flyscreen. They will be permanently trapped in the pipe and die - falling back into the pit.

## **Special Features of a Vip Latrine**

To make this system of air control and fly trapping work properly, a VIP latrine needs to be provided with some special features :

### *1. THE VENT-PIPE*

The minimum size for an efficient vent-pipe is 11 cm diameter. The most convenient material is PVC. Also asbestos pipes are convenient to use.

When both these types of pipe are not available, it is possible to build a pipe from bricks. It is then very important to ensure that the pipe is completely closed. Any cracks and openings, even if they are small, will cancel the effect of the air control and fly trapping.

The inside of a brick pipe can never be as smooth as a plastic pipe. Rough internal walls interfere with the air flow, and reduce the efficiency of the pipe. Therefore, the internal walls of a brick pipe should be made as smooth as possible, and the pipe should measure at least 22 x 22 cm on the inside.

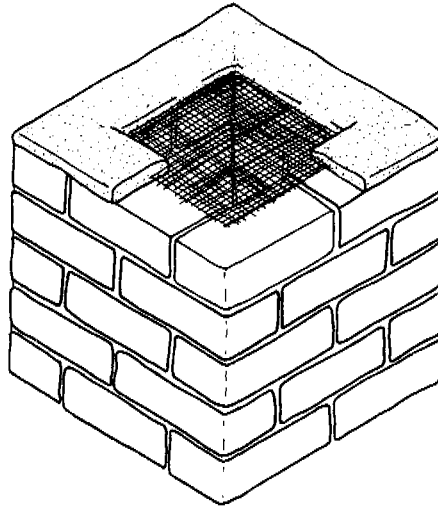
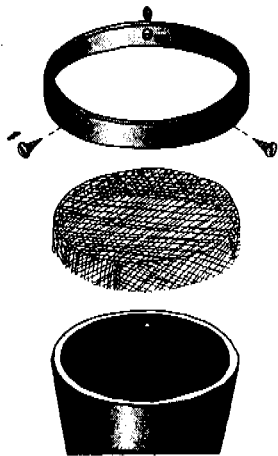
Any vent-pipe should be built up at least 40 cm above the roof of the latrine.

## 2. THE FLYSCREEN

The top of the vent-pipe must be covered completely with a wire screen. The gases from the pit which pass through the pipe are very corroding. Therefore, screens should be made from anti corrosive material, like stainless steel, or aluminium, or PVC coated fibreglass.

Screens should be firmly attached to the top of the pipe, to prevent loosening.

The PVC vent pipe with fly screen



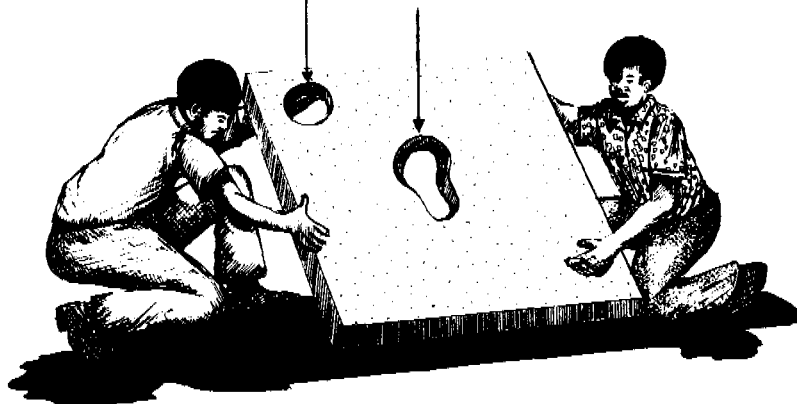
The Brick vent pipe with fly screen

## 3. THE PLACING OF THE PIPE

The exact position of the pipe is not critical and it can be fitted inside the little house as well as outside. What is essential is that the pipe is fitted directly over the pit, at least 15 cm away from any side of the pit, to draw gas from the pit efficiently.

HOLE FOR A VENT PIPE

SQUATING HOLE



If a pipe is to be fitted inside the little house, it can best be fitted into the slab. For this purpose the slab is constructed with an extra hole, beside the squatting hole. See also Chapter 6, Step 5, for instruction on how to fit a hole for a vent-pipe into the slab.

If a pipe is to be fitted outside the little house, it is important to ensure that the pipe is directly above the pit, and securely tightened in its place.

#### *4. THE LITTLE HOUSE*

To get the best air flow possible, the little house should be closed, with a good roof. It should have no extra openings for light. Some illumination is provided by the doorway. The interior can also be lightened up by painting the walls white.

It is important to keep the squatting hole in the darkest area of the latrine, to discourage flies from the pit to leave through the squatting hole.

The little house should not be build very near to a tree, or under it. The tree will hamper the free movement of air, which leads to poor ventilation and odours in the latrine.

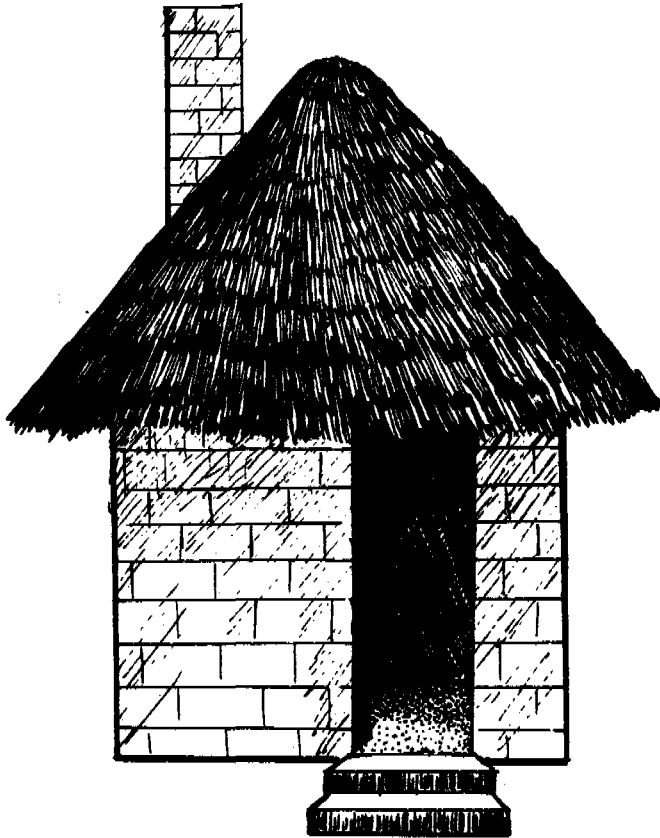
#### *5. THE COVER FOR THE SQUATTING HOLE*

Contrary to the conventional latrine, the squatting hole of a VIP latrine should not be tightly covered. This would prevent the circulation of the air and the properties of the VIP latrine would be lost.

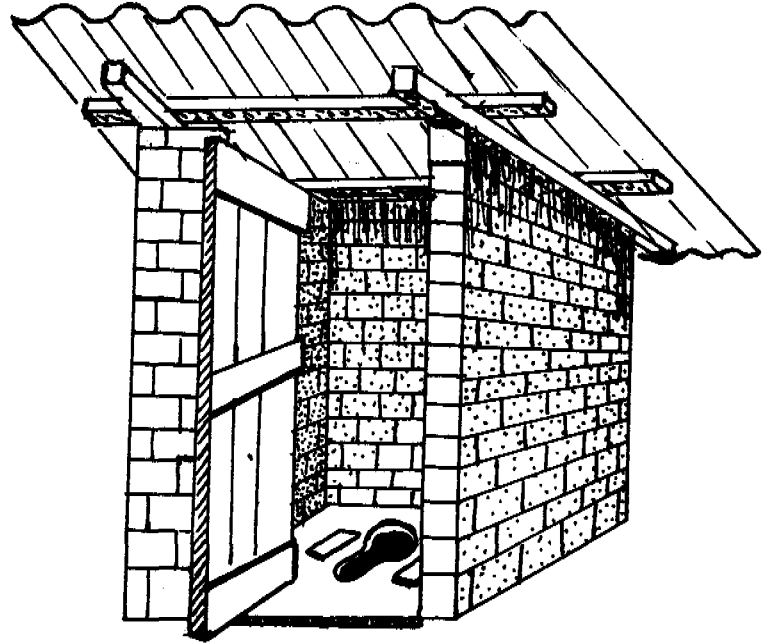
It may be still desirable to cover the squatting hole somewhat. Care should be taken that the cover fits loosely and leaves sufficient space for air to flow freely.

10. TYPES OF PIT LATRINES

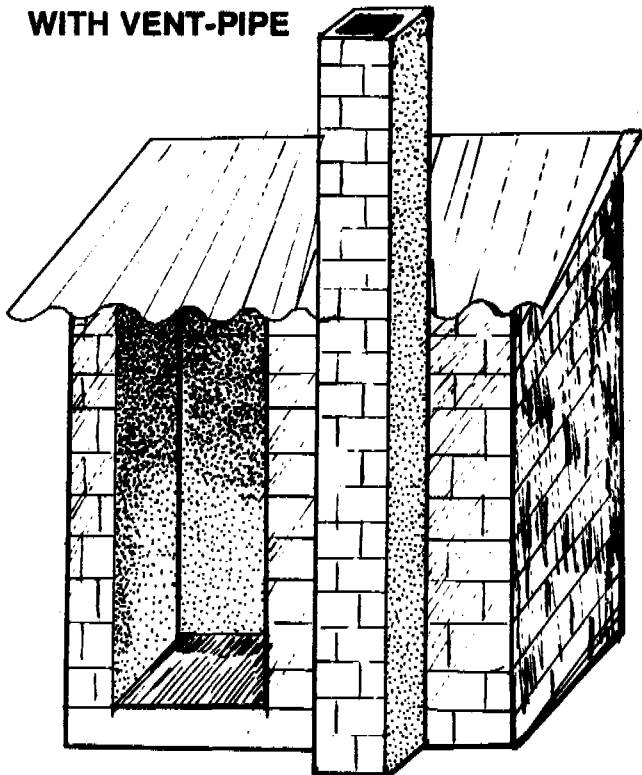
SUN-BAKED OR BURNT BRICKS WITH A THATCHED ROOF AND A VENT-PIPE



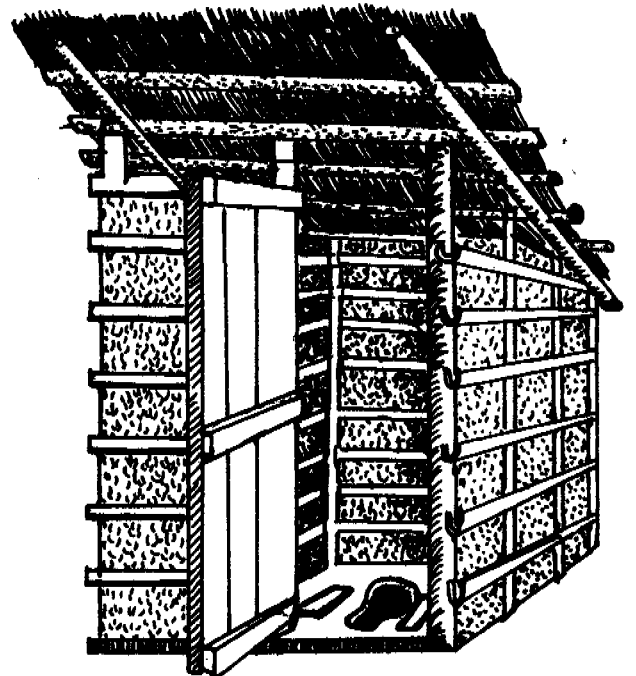
CONCRETE BLOCK WALLS AND CORRUGATED IRON OR ASBESTOS ROOF



SUB-BAKED OR CONCRETE BLOCKS WITH VENT-PIPE



MUD WALLS AND GRASS THATCHED ROOF





## WHOM TO CONTACT

The VIP latrine is strongly recommended by the Ministry of Health, because it is even better than a conventional latrine in the prevention of diseases.

Anybody who is interested in building one, and who would want some advice, could contact :

- \* Ministry of Health, Public Health Services Section, in each Province. District and local health centres as the case may be.
- \* Piped Supplies for Small Communities (PSSC Project) Zambia.