

FOOTSTEPS

No.30 MARCH 1997

WATER, SANITATION AND HYGIENE

The three legs?

WE ALL KNOW THAT WATER is a wonderful gift. It falls as rain and collects in streams and rivers or under the ground. From there we can take it for drinking, for cooking, for bathing and for washing pots and pans and clothes.

by Richard Franceys

We must have water for life. We all have some form of water supply already – if we didn't we couldn't live. But many of us would like to have a better quality water supply closer to home. This is what costs money.

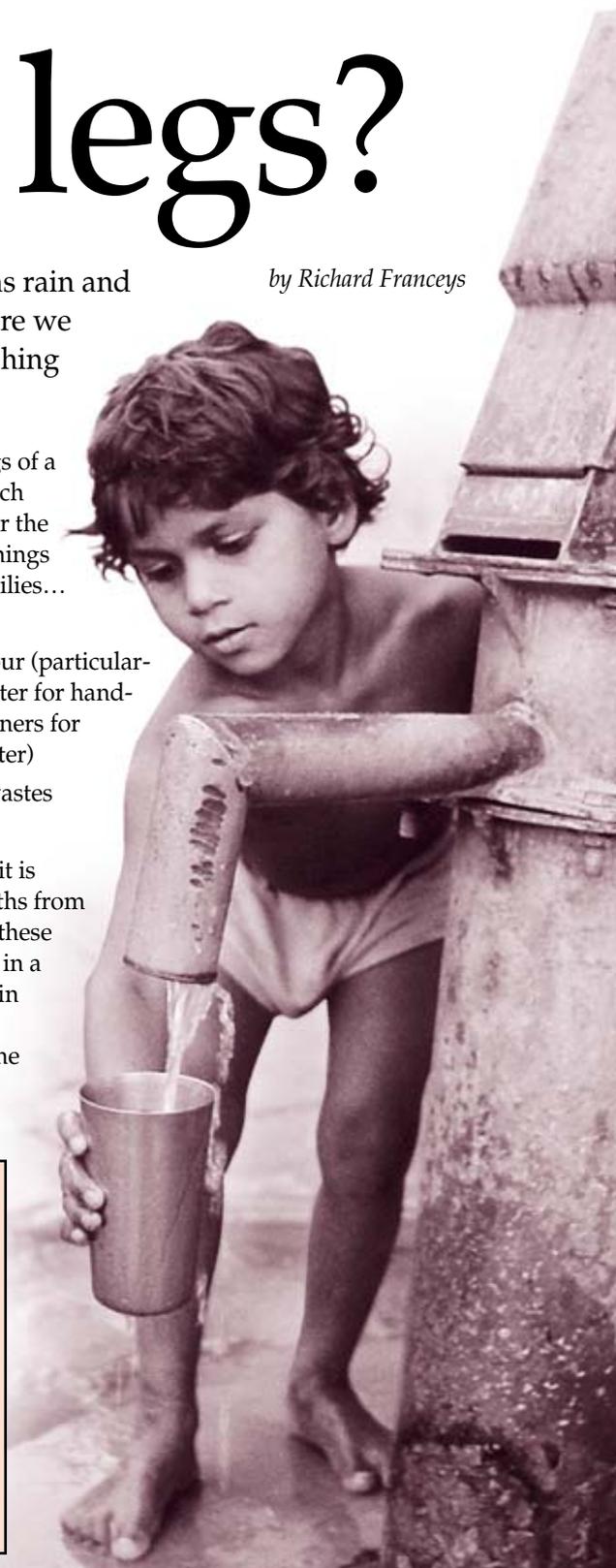
For health!

To spend this money, government or aid projects need to prove that supplying clean water brings benefits which can be measured. The most obvious benefit is improved health. None of us want our children or weaker relatives to suffer from diarrhoeal diseases such as dysentery and cholera. The World Health Organisation tell us that over 3 million children die each year through diarrhoeal disease. But the significant reduction in disease that can result from improving the water supply only occurs when sanitation and hygiene education are also

improved. Like the three legs of a stool or the three stones which support the cooking pot over the fire, we need three related things to reduce disease in our families...

- clean water supply
- effective hygiene behaviour (particularly the use of soap and water for hand-washing and clean containers for collecting and storing water)
- safe disposal of human wastes (sanitation).

UNICEF has estimated that it is possible to reduce child deaths from diarrhoea by a quarter if all these three things are encouraged in a community. Improvements in sanitation and hygiene each contribute to about 35% of the reduction. Surprisingly, increasing water quantity



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FOOTSTEPS

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Footsteps is a quarterly paper, linking health and development workers worldwide. Tear Fund, publisher of *Footsteps*, hopes that it will provide the stimulus of new ideas and enthusiasm. It is a way of encouraging Christians of all nations as they work together towards creating wholeness in our communities.

Footsteps is free of charge to individuals working to promote health and development. It is available in English, French, Portuguese and Spanish. Donations are welcomed.

Readers are invited to contribute views, articles, letters and photos.

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TEAR FUND 
CHRISTIAN CONCERN IN A WORLD OF NEED

For full health, we need – like the three legs of a stool – the three components of clean water supply, sanitation and hygiene.

contributes only 20% and 'safe' water quality contributes only 15% of the beneficial effect. In this edition of *Footsteps* we have articles about all of these 'legs'.

Water supply

Having more water closer to home not only improves health but also reduces the long time spent by so many women and children in collecting water. One improvement is to build a water tank for use by homes, clinics or schools. Details are included on page 10.

Hygiene behaviour

A latrine and hand pump project in Bangladesh spent nearly a quarter of its budget on hygiene education. This is very much more than most projects, which choose to put nearly all their resources into pipes and pumps. However, the result was that incidence of diarrhoea fell by a quarter and that the number of days on which the average child suffered from diarrhoea almost halved. We look at this very important and often over-looked subject on page 4. Water supply and sanitation on their own are not enough.

Sanitation

Having sanitation means being able to dispose of our human waste (urine and



Photo: Mike Webb, Tear Fund

Clean water supplies are just one factor in improving health.

faeces) safely. For most people, this means having the most suitable form of pit latrine. We give the details you need to consider for different designs on pages 12–14. When they are built and used correctly, even the simplest pit latrines can give an excellent service.

Sewerage systems which pipe away all the waste are very, very expensive. The common pattern in many towns is for the government to provide sewerage only for the rich people and commercial users – and then fail to charge for the full cost 'because it is for the public health'. The rich usually benefit from such systems at the expense of the poor.

Community involvement

In rural areas communities need to decide what they want and what they can afford. Government agencies and NGOs have to learn ways to support communities in their technical and financial decision-making, not to do the job for them. Community organisations also have a very important part to play in the growing towns and cities. They can enable households to build their own latrines and can also lobby for community rights over piped water supply rather than getting involved in construction.

Why do we have to pay in urban areas?

In urban areas the best provider of water is usually a government agency. Traditionally these organisations give a second rate service (varying water quality at low pressure for a few hours per day) only to middle-income and rich areas. Many poor families have to be content



with a third rate service through stand-pipes, if they are lucky. Others have ended up paying for their water through vendors – costing five times, ten times and even twenty times more in some cities than the amount a middle-income family pays for a private house connection.

This experience has taught us that water supply and sanitation is not something that we can leave to governments to provide through general taxation. In

urban areas perhaps we should be starting campaigns through our churches and NGOs saying: 'We want to pay for a good supply of water!' At the same time we should insist that richer people must also pay their full amount. **It is time for our water projects to stop subsidising the rich.**

Finally – the dilemma

Our dilemma is that, to help the poorest, people must pay more for water supplies.

Only then will poorer areas receive an improved supply instead of paying high prices to water vendors. Yes, water is a gift – but we all have to pay for the privilege of receiving it and disposing of it safely. And after getting this precious water – it is the way we use it which will make all the difference to our health.

Richard Franceys is a water engineer at the Water, Engineering and Development Centre (WEDC), Loughborough University, Leicestershire, LE11 3TU, UK.

Health links quiz

CHECK YOUR UNDERSTANDING of the links between clean water, sanitation and health. You can start with any question. If you think the statement is **true**, follow the link marked with a tick – but if you think it's **false**, follow the link marked with a cross. You will eventually get back to the question you started with. However, if you find you have missed out questions, you will know that somewhere you gave a wrong answer!

Try this out with your group and check people's understanding. The correct order if you get the answers right is given on page 17. Try to think of reasons for the answers!

With a larger group, you can copy out these sentences and place them on walls around the room. You will need to add some directions: 'If true, go to... If false, go to...'

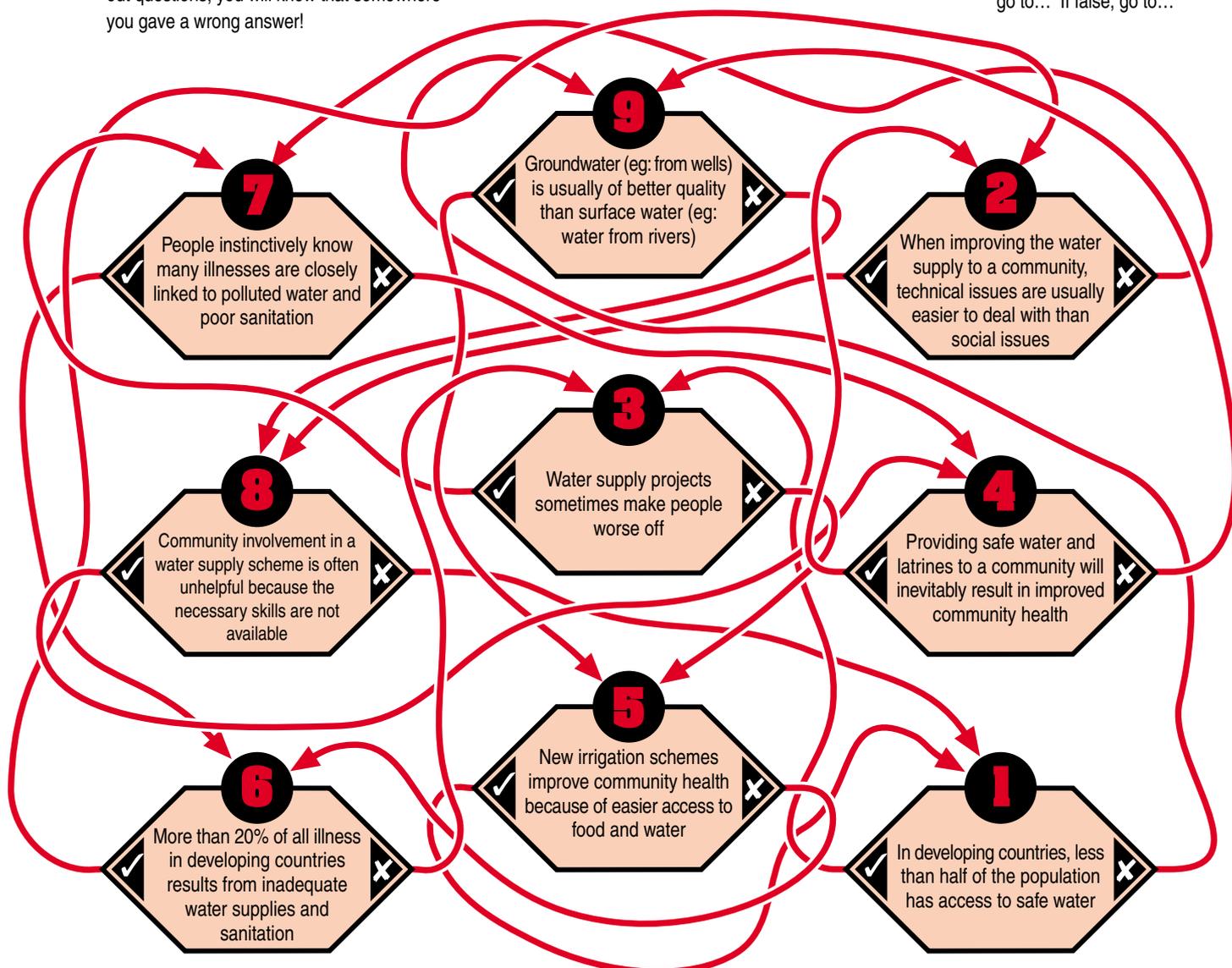




Photo: Mike Webb, Tear Fund

HYGIENE BEHAVIOUR

by Paul Dean

PROVIDING A CLEAN WATER SUPPLY and encouraging people to build latrines should surely be enough to ensure good health. In the past people have certainly believed this to be true. However, an evaluation of a water and sanitation programme by the Ministry of Health in Botswana (UNICEF), though it brought many positive benefits, included these interesting results...

- Water that was clean at source was highly contaminated by the time it was consumed in the home.
- Households adopting VIP latrines (page 12) still had a high incidence of diarrhoea.
- Approximately 75% of men with latrines in their compound still urinated in the bush.
- Approximately 75% of children with latrines in their compound did not use the latrine.

It was then discovered that nearly 85% of the households which had built VIP latrines had received no health education information either before, during or after construction. This may help to explain some of these results.

The bicycle in the latrine

Several studies report latrines being used as stores for food, bicycles or other things, rather than as toilets. This may be

because there was no advice about how and why to use the latrine when built, just like the project in Botswana above. Much of the money and energy put into the project, by community members as well as the project team, will have been wasted.

Few people would let a child use a bicycle without first finding out if they could ride it. If I give something to somebody I usually make sure that they know how to use it first – if not, I would teach them.

Understanding why

But that may not be enough either. Sometimes it's important to know **why** we have to do something, as well as **how** to do it. This is especially important when it is difficult to link the results of our actions with their cause. Understanding that my faeces contain substances that can harm me and those around me, and that I need to dispose of them carefully and wash my hands straight afterwards is not obvious.

In the same way, it may be difficult to understand why I have to clean out the container I collect my water in, why I should not drink from the cup I use to draw water out of the pot, and why I should cover the pot when not in use. The water does not look any different, even if I don't do all these things.

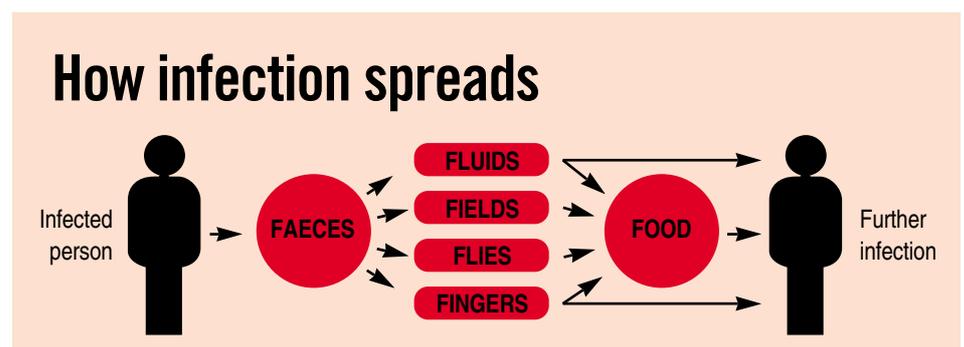
So **knowledge** is not always sufficient to solve a problem. It needs to result in a change in **practice** too, which usually first requires a change in **attitude** to the situation.

The cycle of infection

The UNICEF figures quoted in the article on page 1 show the importance of sanitation and hygiene in breaking the cycle of infection. This is because many of the infections that cause diarrhoea are related to poor sanitation and hygiene behaviour.

The diagram below shows the main ways in which disease is passed from an infected person to a new host. Sanitary disposal of faeces, hand washing after defecation and before handling food and drinking water are therefore very important activities.

Diarrhoea, dysentery, typhoid, many kinds of intestinal worms, bilharzia, scabies, typhus and trachoma (eye infection) can all be reduced through improving personal hygiene and





sanitation. Activities to improve these behaviour patterns should be part of any water and sanitation programme.

Local priorities

But social, cultural and economic conditions may result in people having other priorities which make it hard for them to change their attitudes and practices. Like so many other development activities, hygiene education should be relevant and realistic. It should not be limited just to providing information and promotion of latrines and hand washing. It is important to make sure that education is relevant to people's local concerns and resources.

Discussing how defecating or urinating into or close to water can transmit bilharzia will only be relevant in areas where bilharzia is a concern. Preventing small quantities of water lying around the house in tin cans, tyres and jars can control the breeding of mosquitoes which carry dengue fever – but only in areas where these mosquitoes exist!

Hand washing

Washing hands after using the latrine will be difficult if water is scarce. The use of a 'Mukombe' (*Footsteps 14*) or 'Tippy Tap' (page 20) may help. If no soap or wood ash is available, it has been shown that simply rubbing your hands in soil before washing them is better than just rinsing them in water. Improving water quality by boiling is difficult if time and fuel are in short supply. For most needs, a simple three-pot system or exposure to sunlight (*Footsteps 1*) could be adequate.

Water containers

People should be encouraged to scrub and rinse water containers with clean

water before refilling. Drinking water should be stored in covered jars in the home, using a cup on a handle or a long handled dipper to collect the water. This will prevent fingers touching and contaminating the water. People should never drink directly from the dipper.

Involving everyone

Programmes must also be participatory. This will allow everyone to talk through the problems, priorities and possibilities that exist and allow programme workers to find out local priorities, practices and preferences. It may mean holding meetings and education activities to fit in with local work patterns, farming practices or social activities, rather than for the

convenience of programme staff. For example, in some countries the poorest people are often landless and have to farm the land of others to earn money. They could therefore miss community meetings and be further marginalised if meeting times are not chosen carefully.

Above all, everything should be designed to meet the local situation and result in appropriate changes in **practice**.

Paul Dean worked for seven years in Uganda with Tear Fund and is now a consultant in Rural Infrastructure and Civil Engineering.



FROM THE EDITOR

WE'RE CELEBRATING reaching *Footsteps 30* by including an index and also adding an extra four pages – just for this issue. This allows us to reprint some useful material (with some changes) from Issues 1 and 9 when our readership was small.

In this issue we look at the three related subjects of Water, Sanitation and Hygiene. It is now realised that these three must go hand in hand to achieve real improvements in health. Richard Franceys and Paul Dean have helped to provide articles and practical instructions for each of these three key areas. Issues for both rural and urban situations are considered. We show how to build a water tank for use alongside a home, school, health centre or church. (We know from your letters that some groups successfully followed the instructions on building this tank from *Footsteps 1*.) In a future issue we will give a short article on making cement water jars which are ideal for use in the home.

We also look at how to understand and help change people's attitudes through hygiene education, and there's a quiz to check out people's understanding. We have some useful ideas for low cost latrines, in particular, the use of sanplats. Sam Kayaga of the National Water Supply and Sewerage Corporation of Uganda considers why we have to pay for water supplies. And we've included some ideas for visual effects to enliven health teaching or drama.

Many readers continue to send in good articles on a variety of subjects. These are included whenever possible. However, longer articles which do not fit any of the themes we are looking at are often difficult to find space for. I now have so many such articles that we are using the next issue as a 'follow up' to provide the opportunity of including a mixture of articles from readers.

Isabel Carter



Successful growing of high altitude vegetables in Haut-Zaire.

Organ transplants

IT IS HEARTBREAKING to learn from reading the *Footsteps* 29 article on Children at Risk what kind of life these street children have. The situation here in Nepal is similar, with the problem of child prostitution added to the mix of potential trouble.

However, I did want to comment on the portion of the article referring to the worldwide trade in body parts. I am aware of many such reports in the popular press but, as far as I know, none of these reports has been confirmed by any medical source. Organ donors and organ recipients must be closely matched for compatibility before any operation can have even the remotest chance of success. A kidney, eye or testicle from an unknown and untested donor is useless to the doctor performing the surgery. Street children face many hazards on the street, but serving as organ banks is probably not one of them. Let's put this rumour to rest once and for all.

Thanks for an eye-opening and educational article on this difficult subject!

Robert D Hott DVM
United Mission to Nepal
Rural Development Centre
Pokhara
Nepal

Seed thoughts

WE WOULD LIKE TO SHARE some of the results of our agricultural activities, which take place at an altitude of 1,000 metres. We have tried out different varieties of vegetables and measured the germination of seeds, how long the different stages of growth took, any problems, how easy we found it to collect seeds and our success in marketing the crops. We found peppers had a low

germination rate and suffered from various disease problems. Lettuce and cucumbers grew very well, but because they are eaten raw, we found there was little market for them. People are surprised to see how well our onions grow and all want some seed to try themselves. We have been able to collect seeds successfully except with cabbage and onions. We would value your opinion on our work.

Acheka Kambanane
Maison-Verte (WEC WAMBA)
BP 500 Isiro
Haut-Zaire

EDITOR:

Some vegetables will only produce seed one year after planting. Try allowing some cabbage and onion plants to remain growing, and you should find that next year they will produce seed heads.

Discussion starter

PAS A PAS has become a real blessing for us both in development and Christian witness. For some time we have been organising animation and training

meetings on the subject of development and health. These meetings bring together health workers, farmers, market gardeners and others who are interested in community development. At these meetings the copies of *Pas a Pas* are studied, commented on and analysed. This is followed by discussions and profound exchanges of ideas and experiences.

Adrien Latyr Faye
Mission Evangélique du Plein Evangile
BP 6
Thiadiaye
Senegal

Learning about the menopause

I AM A NURSE in the Evangelical Hospital in Bembéréké, Bénin. I was greatly encouraged by the very good details on menstruation and the menopause in *Pas a Pas* 24. In our hospital there are many problems with these subjects. Thanks to this issue I have had successful discussions on the menopause with women who believed

Read me!

RECENT VISITS to a number of *Footsteps* readers by the editor have revealed that many readers don't read the Resources pages in *Footsteps* because they have no funds to pay for books. Please do! Every issue contains at least one (and sometimes more) free books or newsletters.

Here is a photo of one reader's library. She reads the Resources pages first and immediately writes off for any free materials. Nearly all the books and newsletters have been obtained free of charge!

Information is power! Writing to request information really does work. Also, please pass on information about free resources so *Footsteps* can share it with other readers.



they could no longer have sexual intercourse with their husbands. (They brought up the very reasons mentioned in the article.) Please be reassured that, thanks to the advice given, I have managed to convince these women. May the Lord accompany you in the work you are doing!

*Mahama Soussi
Hôpital Evangélique
BP 28
Bembéréké
Bénin*

Saving schemes

MY WIFE has put to good use the *Footsteps* issue on Credit and Loans. With other women she has managed to save US \$60 in two months. I have also learned to prepare a good, simple and effective book-keeping system which has proved of great help in our day to day management.

*Timanya Stephen
c/o St Pauls Cathedral
PO Box 142
Kasese
Uganda*

Protection of pygmies

PREPPYG is an organisation working to support and protect a pygmy group on the verge of extinction in Zaire. We are encouraging the pygmies to take responsibility for themselves through farming, education, improving living conditions and developing plant medicines.

The forest area where the pygmies have traditionally lived is being devastated and many species of plants and animals have disappeared. No-one is replanting trees or saving a plot of land for the pygmies. Poachers take animals and are a security problem. The pygmies' traditional activities of hunting and gathering of plants has become impossible. There are now less than 7,000 pygmies remaining in Butembo-Beni. We would welcome support from interested groups who may be able to help us with ideas and resources.

*PREPPYG
BP 251
Butembo NK
Zaire*

Neem products

EVERY TOPIC given so far in the centre pages has been a persuasion to try it out! Though we may know about the subjects, the fact is that we haven't tried them out until seeing them presented in a simple way with illustrations in *Footsteps*. Then we ask ourselves, 'Why haven't we tried this before?'

We would like to share a few of our experiences in farming with neem. Neem trees are very common in this part of Sri Lanka. Farmers here have been using different methods to control pests and fertilise the soil for over a thousand years before chemical pesticides and fertilisers were introduced by the West. Ours is a culture that respects all beings – humans, animals, trees and plants. We do not want to **kill** any living creature. We would rather **control** pests.

We find that using neem products respects the environment and will control pests without danger to animals, humans or the environment. We are a small organisation but we now produce three items from neem – Kimisara and



Some of the neem products from Sri Lanka.

Kuminal, which control pests, and Nimbil, which acts as a fertiliser. We also produce a washing soap containing neem oil.

*Gallege Punyawardana Alvis
Swarna Hansa Foundation
PO Box 16
Dehiwala
Sri Lanka*

Do what I do!

HERE IS A USEFUL ROLE PLAY FOR A WORKSHOP contributed by Rev Rabboni of Mbarara, Uganda. It is used to show how to encourage communities to change. Choose three participants, tell them the story and encourage them to act it out.

Two men are stranded on a river bank. A good Samaritan comes along and offers to help them reach the opposite bank. First he carries one over on his back. However, he is quickly exhausted and has to leave him on a small island in the middle of the river.

He goes back to the other man but this time he first teaches him how to swim. He tells him, 'Do whatever I do.' As they move into the water, he holds and supports him. This time it is much easier to cross. They go to the island and the good Samaritan tells him to help his neighbour to swim across – which they do successfully.

Encourage participants to discuss the issues this raises and consider how they could put this approach into practice themselves.



This photo was taken during a training course organised by the Archdeaconry for church and community leaders in Rukoni Parish, Ntungamo District, Uganda.

Photo: Rev Rabboni

Visual effects for health training

by Marilyn Gustafson

DO YOU TEACH HEALTH WORKERS? Do you use drama to share messages about health? Do you teach first aid or give training in emergency action? Have you ever wanted to catch people's attention by using demonstrations to show how to treat wounds or burns? If you use volunteers and make them look like realistic victims of accidents, you can be sure that you will certainly provide training that your trainees are unlikely to forget!

Willing volunteers who can act out their imitation injuries give trainees the opportunity to practise the skills they would need in genuine emergencies. Of course, these effects are also ideal for drama and role plays. We hope you will find these ideas useful. They are 'home made' preparations to give realistic effects for different injuries and burns.

What you will need

- **Good quality reconstruction wax** You can also use melted candle wax or flour paste (cooked flour and water), though these are not quite so good.
- **Wooden tongue blades**
- **Thin wooden sticks**
- **Red lip rouge**

- **Petroleum jelly**

- **Paste eyeliner** – in various shades; blue, black, purple, grey and rust

- **Artificial blood** – made with liquid starch or corn syrup and red food colouring (may stain clothes)

- **Small paint brushes**

Other useful items are hard biscuits, broken plastic drinking glasses and torn or burnt old clothing. You will also need some volunteer 'victims'. Be careful not

to really hurt them! Apply these visual effects just before you need them.

The effects

Bruising Use different shades of the paste eyeliner blended together to show bruising.

Wounds Warm the wax or flour paste and apply a thin layer with the wooden tongue blades. Make marks in the wax according to what kind of wound you want to demonstrate. Use some red lip rouge or artificial blood to colour the wax. You can use broken plastic in the wound to show glass fragments.

Fractures Use wax as above to show the wound. You can use broken biscuits to show exposed bones.

Burns For first and second degree burns, use red lip rouge. Dust this with grey face powder for a charred look. For blisters, apply a layer of petroleum jelly and cover with one or two layers of facial tissues. Again, dust a little with grey powder.

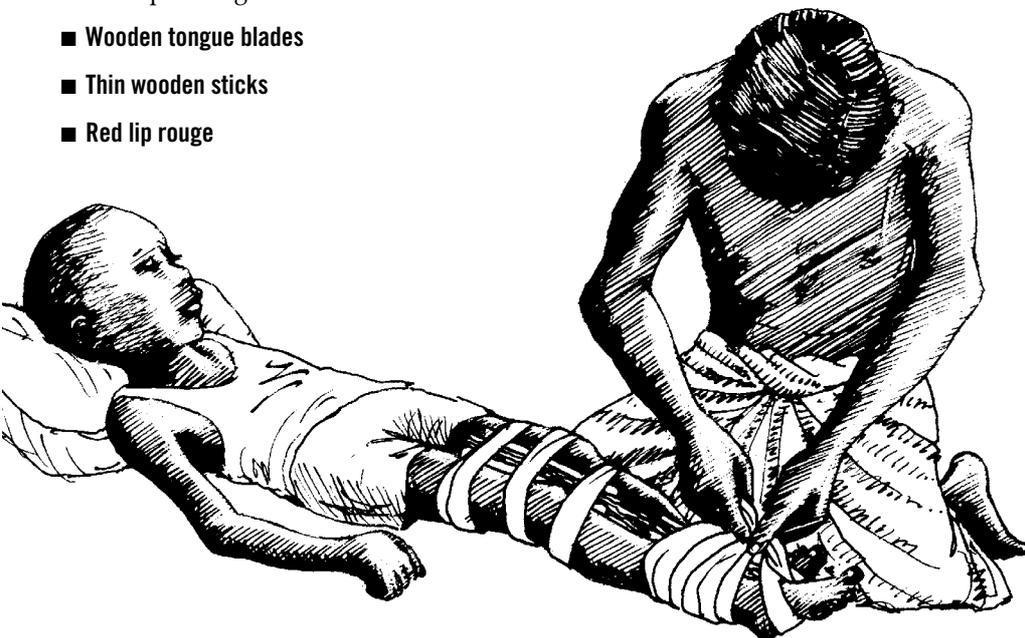
Amputations You can indicate these by taping back a leg, arm or finger. However you must not allow a limb to be taped up for too long. Then use wax, biscuits for broken bones and artificial blood.

Chest injuries These are best demonstrated on a man. Use wax to create the impression of a deep wound. Use artificial blood. You can also use a little bicarbonate of soda or anti-acid tablets added just before to illustrate the bubbling effect of a sucking chest wound.

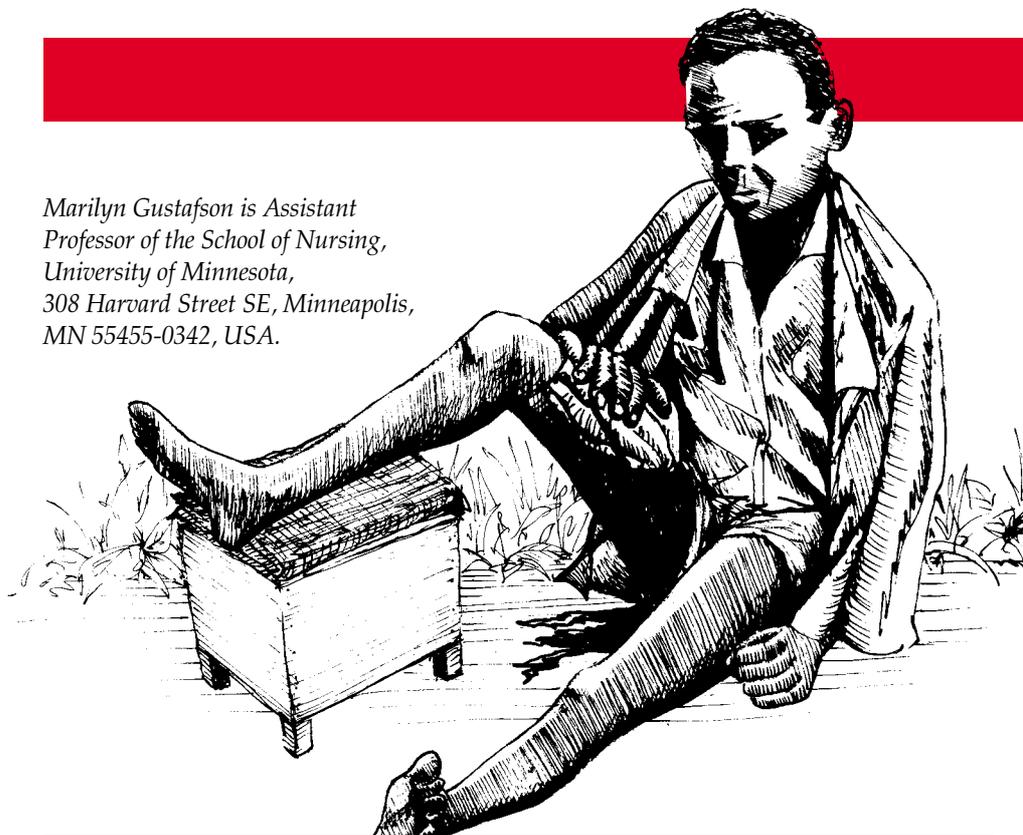
Add a bit of drama

Encourage your 'victim' to act out other symptoms as appropriate, such as shock, dizziness or pain. You may want to combine several of these effects. Most accidents involve several kinds of injury. Use your imagination to make the experience as realistic as possible. With several victims showing different injuries, you will be able to test your trainees' abilities to react in the most helpful manner.

I hope you find these ideas help your training or drama to be eye-catching and effective. You may think up other ideas yourself. Let us know how you get on.



Marilyn Gustafson is Assistant Professor of the School of Nursing, University of Minnesota, 308 Harvard Street SE, Minneapolis, MN 55455-0342, USA.



FIRST AID

EMERGENCY TREATMENT

HERE ARE A FEW REMINDERS of the priorities of first aid. Before looking at burns and broken bones, remember your ABC...

A Airway

Make sure the airway is not narrowed or blocked.

B Breathing

Check the person is breathing. If they have just stopped, use mouth to mouth ventilation (though if there is bleeding, beware of HIV infection).

C Circulation (and bleeding)

Check to see if the heart is still beating. If it has stopped, use chest compression to try and restart the heart.

Burns Burns should be treated by immediate soaking in clean, cold water (or other clean fluid, such as milk or cola if no water is available). This relieves the pain and reduces damage by cooling the skin. Never

apply any cream or grease. Never try and pull off loose pieces of skin or clothes. Remove any rings, watches or shoes from the injured area before it begins to swell.

Broken limbs Use clean tweezers to remove broken glass or wood. Broken limbs should be tied firmly to a support to prevent any movement before the patient is carried to a clinic or hospital.

Wounds Bleeding can best be stopped by putting a firm pressure onto the wound for about 15 minutes. Never use a tourniquet. If possible, raise the injured part to help lessen the blood flow.

This information was taken from Footsteps 18 which gave details of emergency first aid treatment and a quiz to check people's ability to respond in an emergency.

Sins in Development Work

by Frank Rwakabwohe

DEVELOPMENT without participation
 Development without empowerment
 Development without women
 Development without the youth
 Development without the poor
 Development without action
 Development without the environment
 Development without plans for growth
 Development without men
 Development without the achievable.

DEVELOPMENT SHOULD BE...

- holistic, integrated, gender-sensitive and sustainable
- based on the basic Christian law of loving one another instead of exploiting or oppressing each other
- liberating
- sensitive to the environment
- able to treat all people as equal before God and with each other.

First used in Service Newsletter. Frank Rwakabwohe is Head of the Planning, Development and Rehabilitation Unit of the Church of Uganda, PO Box 14123, Kampala.



Ferro-cement Tank

Ferro-cement water tanks can be used to store rainwater collected from roofs. They use wire mesh to reinforce the walls. This means that the

walls do not need to be thick, so less cement is needed. If mesh is not too expensive, the tanks can be much cheaper than ready-made alternatives.

8 Prepare the mesh by winding it around the poles. The mesh should be applied everywhere is covered by two layers. Make sure the mesh remains vertical. A layer of mesh should not be at the same level as the first mesh. Tie the mesh together with fine wire.

1 This is what you will need...

(a) strong wooden poles or timber – at least 2m long. Use some poles to make a self-supporting ladder so you can get over the wall of the tank.

(b) clean sand

(c) cement

(d) at least two flat plasterer's trowels

(e) two short lengths of pipe – one with a tap

(f) galvanised wire mesh (chicken wire) with 12mm openings

(g) galvanised fencing wire

7 Before the cement hardens, carefully replace the mesh you removed in step 5. Stand or kneel on planks of wood to spread your weight and avoid damaging the first layer of mortar. Sprinkle water on the first mortar surface if it has begun to dry out. Then quickly add another 25mm layer of mortar. Plaster to within 25mm of the poles and leave the surface rough. You must now keep the surface of the new mortar damp until the whole tank is finished – old sacks, grass matting or polythene sheets can help.

6 Make the ground damp. Spread 25mm of cement mortar across the floor of the tank. Plaster to within 25mm of the poles so that they can be removed later. Make the surface of the mortar flat, but roughen it by scratching or brushing it. Work as quickly as you can.

2 Decide on the size of your tank. Do not make it more than 1.5m high without some expert advice because it will need more reinforcement.

Clear soft topsoil off the site so that the tank is constructed on firm ground.

5 Mix up the mortar. The mixture must not be too wet, so do not immediately if it is damp.

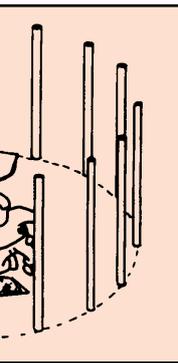
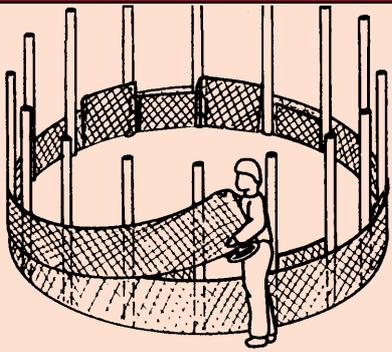
3 parts sand

1 part cement

3 Drive in wooden posts at 400mm intervals around the inside edge of the circle. They need to remain vertical when you pull the mesh around them, so make sure that they are very firm.

4 Lay two layers of wire mesh across the floor of the tank. Bend it upwards at least 300mm between the poles so it can be cast into the wall formed outside the poles. Tie the meshes together using fine wire (you can get some from unravelling the mesh). Now remove the mesh or at least raise it enough for step 6 to take place.

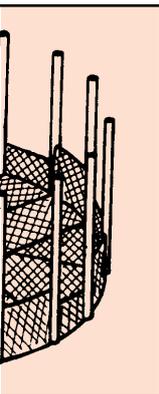
the wall reinforcement mesh around the poles so that the mesh is covered by at least one layer of mortar. Be sure that the poles are level as those of the other meshes together



Do not add all the water at once, especially if the sand is dry.

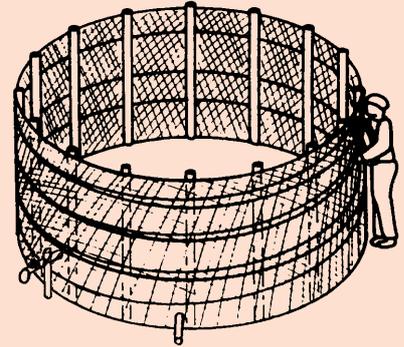


$\frac{3}{4}$ part water



9 Strengthen the mesh by winding a continuous spiral of wire around the structure. The rings of wire should be 150mm apart near the bottom of the wall, increasing to about 300mm apart at the top. An extra ring of wire should be used right at the top of the wall. Place a pipe and tap through the wall 100mm above the floor and hold the pipe firmly in place by tying it to a strong pole driven into the ground. Also add a pipe level with the floor. This pipe should have a lockable valve or removable cap on the outside end which

can be opened to drain dirty water from the tank whenever it needs cleaning.



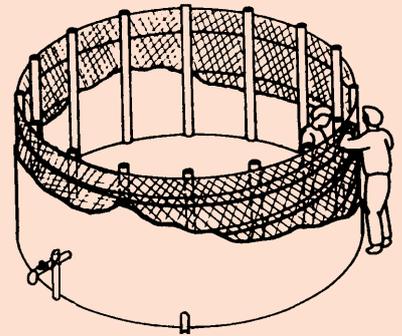
10 Begin plastering the tank walls with the mortar mix. This needs at least two people – one on the inside and one on the outside. They work together, pressing in the same place to compress the mortar into the mesh to form a layer about 10–15mm thick.

(An alternative and easier plastering method for the first layer is to wrap the outside of the tank with sugar sacks or matting held in place with a spiral of string with 50mm spacing between each turn. Someone inside the tank can then push the

mortar against this surface. Remove the sacks once the mortar is dried.)

Scratch or brush both surfaces to make them rough. After a day, add a second layer of mortar to the dampened outside surface of the tank, giving it a smooth finish.

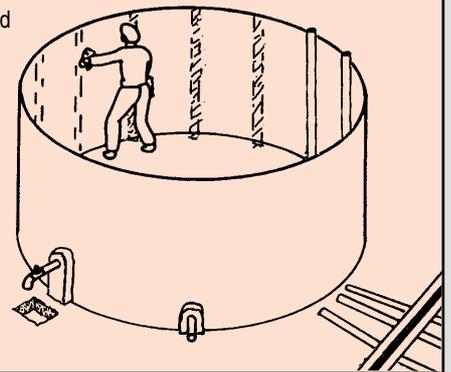
Always keep the hardened mortar damp and shaded for at least two weeks after you finish the tank or cracks will occur.



11 One day later carefully remove the poles. Compact stones into the holes left in the ground and carefully fill these with mortar. Dampen the exposed slots and fill these gaps with fresh mortar. Now add a final smooth layer of mortar (10–15mm thick) to the inside of the tank and to the floor. Again, keep surfaces damp all the time. Make the wall thicker where the pipes go through it. Support the

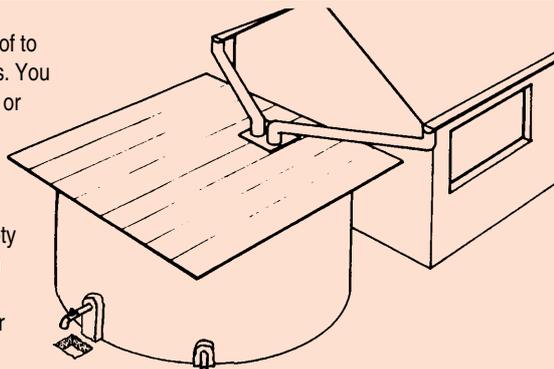
tap pipe on the outside with mortared brickwork. You may want to make a small pit under the tap so that a bucket can fit under it. Make sure this pit drains into a hole filled with stones.

Keep the whole tank damp for at least two weeks before filling.



12 Cover the tank with a roof to keep out dirt and insects. You can use corrugated iron or a domed ferro-cement roof. Fill the tank very slowly with water.

If you find any cracks you can repair them when the tank is empty by chipping away the mortar from the mesh and then filling the hole with fresh mortar. Keep this repair damp for at least two weeks.



Let us know how you got on!

Planning a pit latrine

Compiled by Brian Skinner, Richard Franceys and Isabel Carter

BEFORE THE DECISION to build a latrine is made, there are many things to consider. Get some expert advice if you can.

The type of latrine

We will look at three types of hygienic latrine...

- a pour-flush latrine – suitable where people use water or soft toilet tissue for cleaning themselves
- a sealed-lid latrine
- a ventilated improved pit latrine (VIP).



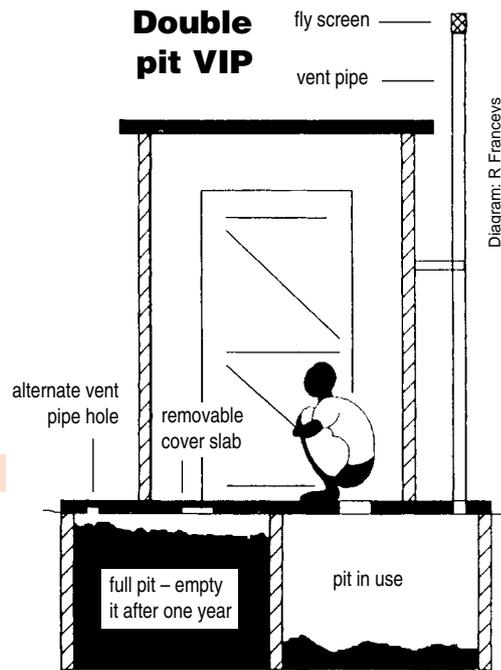
Where to build it

It is convenient to build it near to the home but it should not be within 15m of a well or a spring source or it may pollute the water.

One or two pits?

You can dig a single pit about 3m deep (or deeper if you want it to last longer). If you cannot dig so deeply, then you can dig two shallower pits. With a pour-flush latrine these pits can be outside the shelter, connected to it by pipework. With the sealed-lid latrine or the VIP latrine the shelter has to be partly over both pits.

Digging two pits means that first one pit is used until it is nearly full. Then it is sealed while the second pit is used. After at least a year the material in the first pit can be safely emptied and used to improve the soil in a garden. The emptied pit is then ready for use again.



Digging and lining the pit

At least 0.5m depth of lining is recommended at the top of a pit in all types of soil. This supports the squatting slab and may also support part of the shelter. For the rest of the pit the need for lining will vary depending on the soil strength...

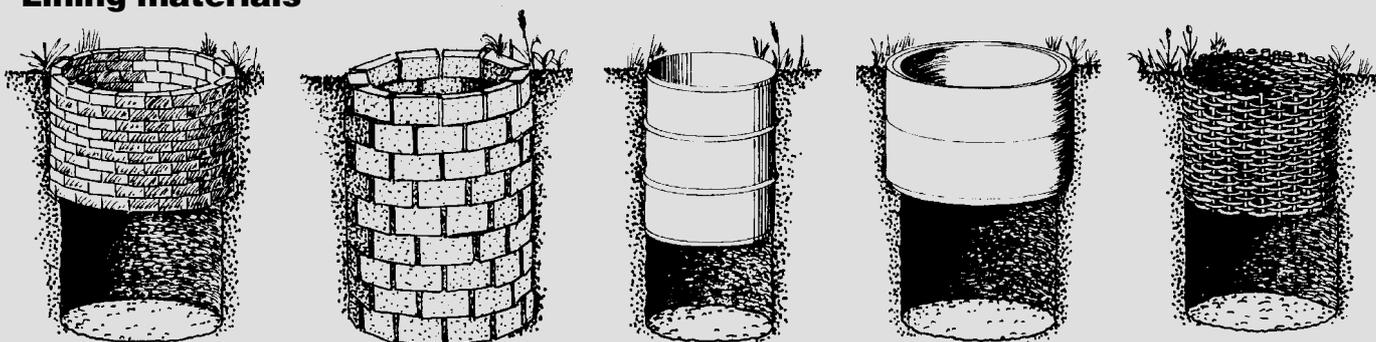
Hard firm soil – may not need lining below the top 0.5m.

Rocky ground You can build some of the pit above ground surrounded with a mound of earth and steps leading up to the latrine.

Soft loose soil You will need to line the pit to prevent the sides falling in.

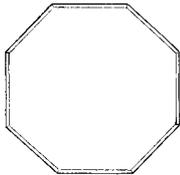
The lower part of a lining should have small holes so that liquid can seep through the holes and out of the pit.

Lining materials



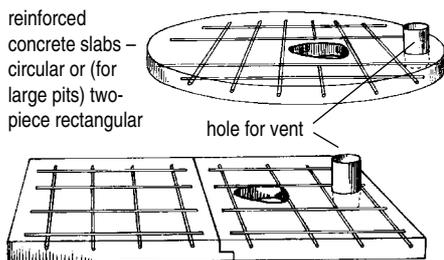
Circular pits are stronger than other shapes.

If you have firm soil and do not need to line the whole pit, first dig only to the depth of the lining and then build up the lining wall. When the lining wall has hardened you can continue to dig a slightly smaller pit inside the wall. A guide frame and a plumb bob (eg: a stone on a piece of string) are useful aids for obtaining the right size of hole with vertical walls. An octagon (8 sides) is a good guide for a round hole.



The covering slab

For sealed-lid and VIP latrines, the best material for the squat slab is concrete, since this is strong, rot-proof and easily cleaned. Flat slabs will need to be at least 80mm thick with 6mm diameter bars every 150mm in both directions. (See page 15 for thinner kinds of slabs.)

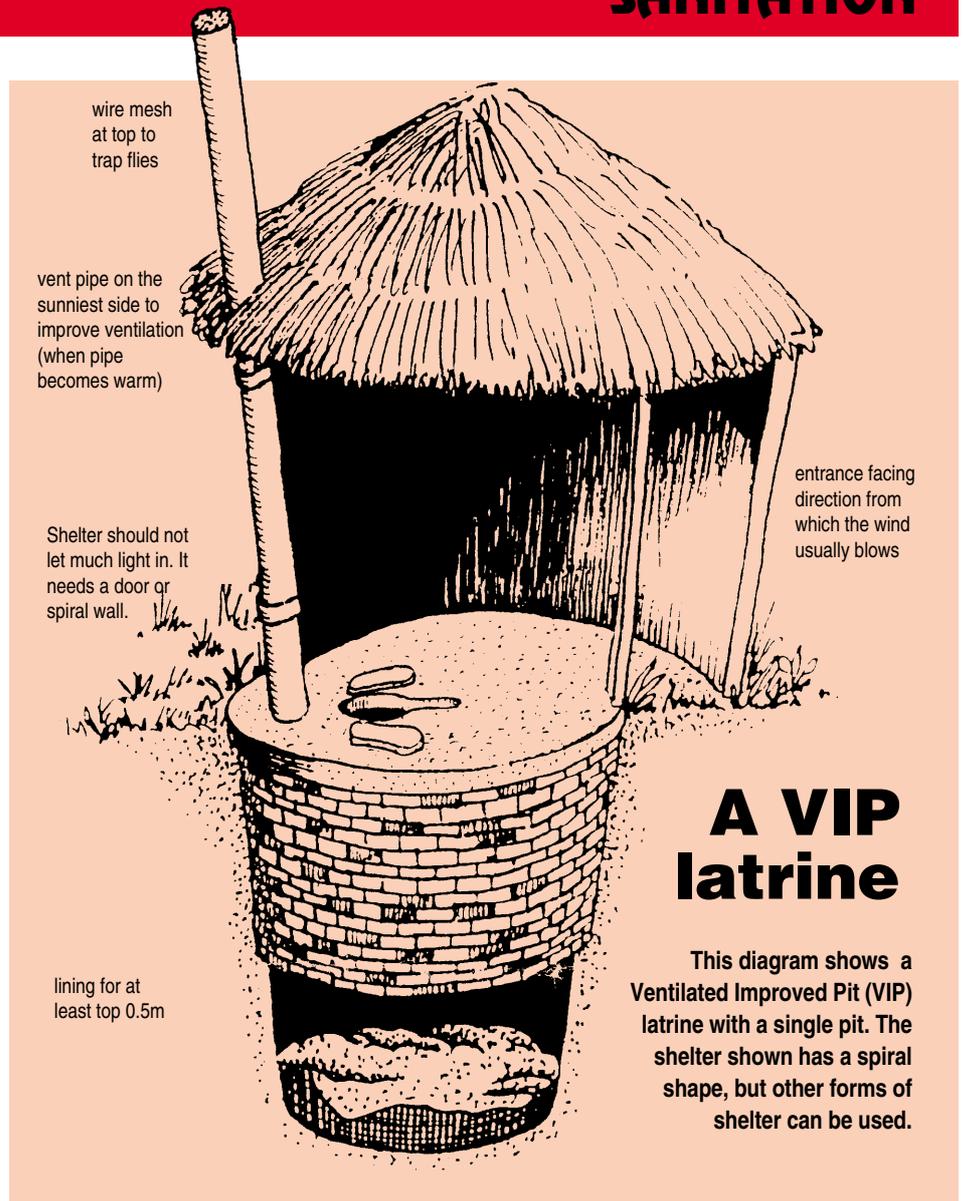


The size of the slab can be the same size as the outer lining if this is built of brick. If the lining is made from an oil drum or basketwork it needs to be slightly larger so that at least 200mm of the slab rests on the ground all round the pit. There should not be any gaps under the slab to let flies or smells leave the pit. You can also build a floor out of traditional materials like wood covered with mud – but add a sanplat (page 15) so that the area around the squat hole can be washed clean.

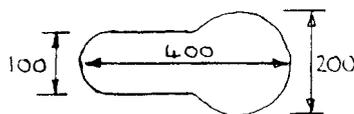
Pour-flush pans can be placed directly above a pit in which case the floor needs to be strong. If two pits are used the pan and shelter floor do not need to be directly over the pits and can be unreinforced. Concrete slabs will still be needed to cover the pits.

Size of squat hole

The hole should not be too large, or small children can fall into the pit. A keyhole



shape 100mm wide and 400mm long with a 200mm diameter circular hole at one end is a good size.



Squat hole cover

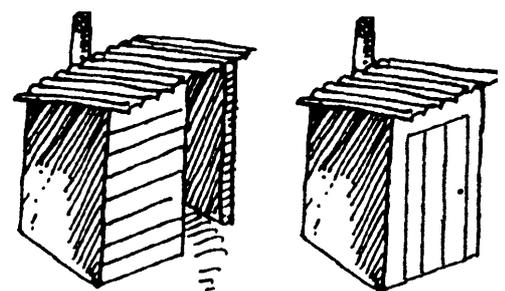
A squat hole cover should only be used with the sealed-lid type of latrine (it would stop proper ventilation of a VIP latrine). This cover (lid) needs to be tightly fitting to control smells and flies.

The shelter

The shelter can be built from any available local material. For a VIP it needs to be fairly dark inside but this is not necessary for the other two types of latrine. If people are unlikely to close a door after using a VIP, a better design is to build a spiral shaped shelter. This does not need a door but still provides privacy.

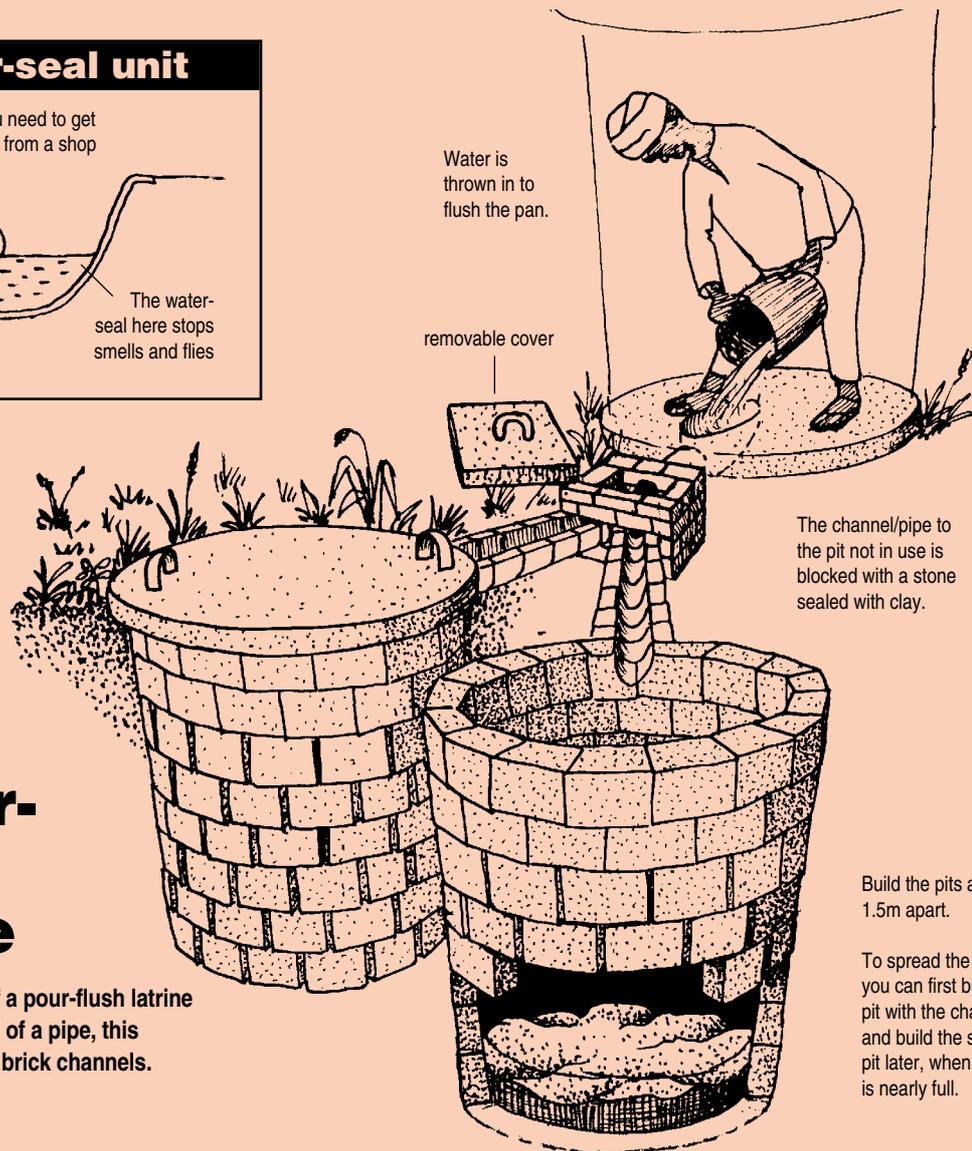
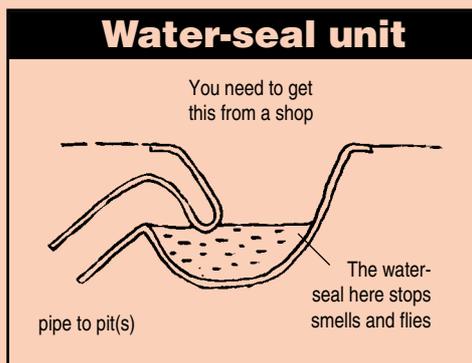
VIP latrines

VIP latrines must have a vertical pipe, ideally at least 150mm diameter, or brick chimney connected to the pit. The top of the pipe should be covered with mesh to stop flies using the vent to enter or leave the pit. To prevent the mesh deteriorating due to the sunlight or corrosive gases from the latrine it should be of glass fibres or stainless steel and not plastic or normal steel mesh. The holes should be about 1.2–1.5mm square.



VIP with a square spiral shelter

VIP with a door



A pour-flush latrine

This is an example of a pour-flush latrine with two pits. Instead of a pipe, this design uses covered brick channels.

Build the pits at least 1.5m apart.

To spread the cost, you can first build one pit with the channels – and build the second pit later, when the first is nearly full.

Wind blowing across the top of the vent pipe sucks air out of the pit while fresh air flows into the pit through the squat hole. This flow of air is helped if the door faces the direction from which the wind normally blows.

The VIP shelter needs to be fairly dark to discourage any flies that enter the pit

from leaving it through the squat hole, carrying disease-causing organisms with them. This works on the principle that flies are attracted to light. To a fly in the pit, the squat hole will not be brightly illuminated so it will try to leave by going up the vent towards the sunlight shining down into the pit. The mesh will stop it escaping and it will eventually die.

Children's latrines

Young children are often afraid to use a latrine, or find it difficult to manage. An alternative idea for very young children is to dig a shallow pit (0.5m deep) with a small slab with a cover (just like the sealed-lid latrine but smaller). No shelter is needed. Encourage children to use this and always to replace the lid. If you find that this shallow latrine becomes smelly, you may find that adding some ashes will help. Move the slab to a new hole when the bottom 200mm is used and fill the used hole with soil.

Keep the latrine clean!

Wash the latrine slab regularly with a brush and soapy water. (Rinsing water left from washing clothes is ideal.) Make sure that hands are washed each time the latrine is used.

Take pride in your latrine. The benefits to your family's health are enormous! Encourage all your neighbours to follow your example.



Simple, low-cost improvements for latrines

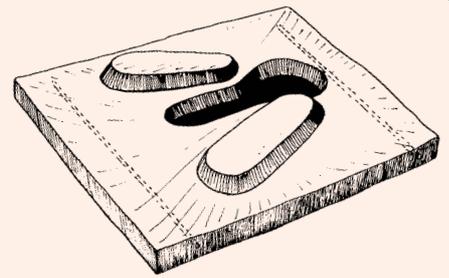
LATRINES are commonly made with reinforced concrete slabs, as shown on page 13. However, this method uses a lot of cement and can be too expensive for many. This means that people

Sanplats

These are small slabs of concrete which are placed over the hole of an existing latrine, resting on a floor made of logs and clay.

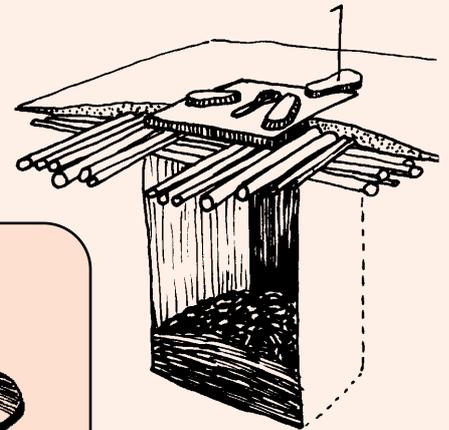
1 Make a small concrete squatting slab 600mm x 600mm x 40mm thick, using a mix of cement (1 part), sand (2 parts) and small stones (1.5 parts). Make the top of the slab smooth and sloping towards the squat hole. The slab can be un-reinforced because during use it is supported by the clay and logs. However, it is best to use a small bar or some thick wires in the slab at each end of the squat hole to prevent the slab cracking.

2 Add footrests. They should be about 350mm long, 150mm wide, 20mm high and shaped as shown above. Cut out the squat hole with sides sloping inwards to support a removable concrete cover.



Line the squat hole with wet paper and then cast a lid inside it to make a good cover.

3 Keep the slab and lid wet for at least a week so the concrete becomes strong. Place the sanplat over the hole of an existing latrine, making the top level with a clay floor. Make sure people replace the lid when it is not in use.

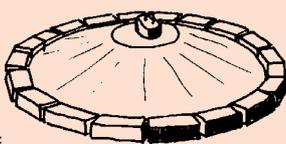


Domed concrete slabs

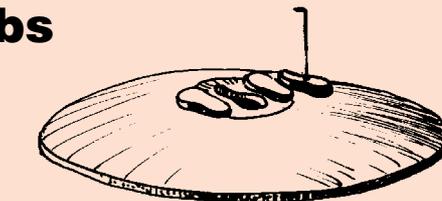
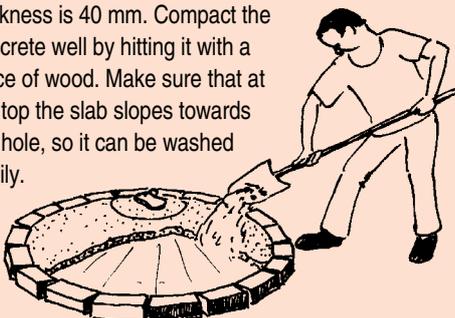
Unlike the traditional concrete slabs, these are not reinforced and are much thinner. They gain strength instead from their domed shape.

1 Lay bricks side by side on a flat piece of ground so that their ends form a circle with a diameter of 1.5m.

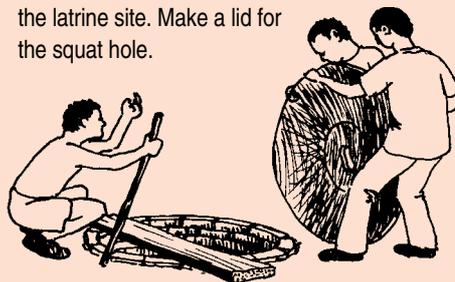
2 Compact (by treading on it) a pile of damp sand inside the circle so only the top 40mm of each brick is showing, and the centre of the pile of sand is 100mm higher than the level of sand by the bricks. You can rotate a shaped piece of wood to get a good shape. Cover the sand with wet paper. Add an oiled wooden mould for the squat hole.



3 Mix concrete (same mix as for the sanplat above) and lay it on the sand so that the thickness is 40 mm. Compact the concrete well by hitting it with a piece of wood. Make sure that at the top the slab slopes towards the hole, so it can be washed easily.



4 As the slab hardens, add footrests and make the slab as smooth as possible using a metal trowel. As soon as the surface hardens, cover the slab with sand and keep this wet for at least a week. Then you can roll the slab to the latrine site. Make a lid for the squat hole.

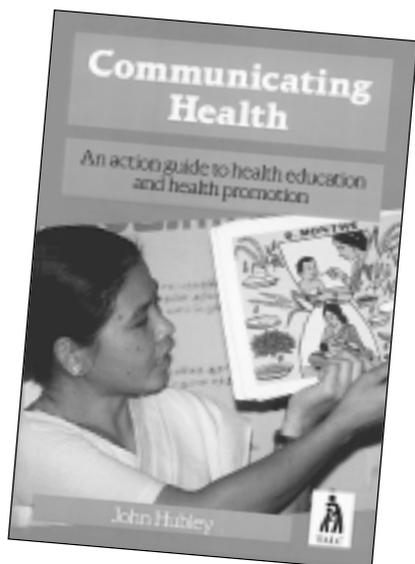


5 You can use the slab over a 1.1m diameter unlined pit, but there is a danger that the sides might collapse, so it is better to have a pit with a lining at the top to match the diameter of the slab.



either do not build latrines or build them with mud floors which are hard to clean. Here are two methods of building latrine covers which are easy to keep clean but which use much less cement. Eight sanplats, for example, can be made from one bag of cement.

The key to success is to use new cement and clean sand and to compact the concrete well before trying to get the smoothest surface possible.



Communicating Health: Action Guide to Health Education by J Hubley

This book, published in 1993, investigates the way in which communication can help to improve people's health and discusses ways in which health education and health promotion may be used to help communities and families take action on the health issues that affect their lives. There are practical guidelines on how to carry out effective communication in a variety of settings, including the family, community, schools, health services and the mass media.

A low-cost version of this book is available from TALC, price £8.80 including surface postage. Order from:

TALC
PO Box 49
St Albans
Herts
AL1 5TX
UK

Latrine Building: A handbook to implementing the sanplat system by Bjorn Brandberg

The sanplat is a simple and highly effective 'first step' in the improvement of sanitation (see page 15). This book describes a variety of latrines that are affordable and appropriate to the needs of rural communities and can be built using locally available materials and skills.

Newly published in 1997. Price £11.20 including air saver postage (UNESCO coupons also accepted). Order from:

IT Bookshop
103-105 Southampton Row
London
WC1B 4HH
UK

IT publications can also be ordered and paid for in local currency from booksellers in many countries. Write to IT at the above address for details of your nearest stockist.

Information for Health Education on Diarrhoeal Diseases

AHRTAG

The book is divided into two sections. The first lists a variety of resource materials – including literature, visual aids, activities and audio-visual materials – on diarrhoeal diseases and health education. There are sub-sections covering background and technical matters, health worker training, and health education itself. Where appropriate, there are brief description of the contents, the intended uses and users. Source organisations, the cost and the languages available are also detailed.

The second section gives the names and addresses of the source organisations referred to in Section 1, and many others with interests that are related – such as nutrition, water and sanitation, essential drugs and participatory learning.

Published in 1995 and free to readers in developing countries (£5 or US \$10 elsewhere), this will be a useful resource for almost anybody involved in health or water and sanitation activities. Order from:

AHRTAG
29-35 Farringdon Road
London
EC1M 3JB
UK

CORRECTION

In *Footsteps 28* we reviewed the excellent publication on herbal medicines – *Natural Medicine in the Tropics*. Please note that although the details for Africa are correct, readers outside Africa should send US \$30 to ANAMED to cover the cost plus postage – instead of US \$5. ANAMED's finances are suffering!

Community Water Development Edited by Charles Kerr

This is a collection of articles from the *Waterlines* and *Appropriate Technology* journals, looking at water sources, pumps, wells, training and maintenance. It contains valuable, practical information. The book has 280 pages and costs £16.20, including air saver postage, from IT Publications (address above).

A Guide to the Development of On-site Sanitation

by R Franceys, J Pickford and R Reed

ISBN 92 4 154443 0

This lengthy and detailed book provides technical information about the design, construction, operation and maintenance of all kinds of sanitation systems from pit latrines to septic tanks. It describes in detail the planning and development processes. Particular emphasis is given to the need to involve the community at all stages from planning to evaluation and to provide continuing support for them after the construction is complete.

It is available in English, French and Spanish. Though expensive, it is a useful guide and reference. It costs £27.30, including postage, with a reduced price for readers in developing countries (please enquire).

Obtainable from IT Publications (address above) and WHO.

Developing and Managing Community Water Supplies Oxfam Development Guidelines No.8

by Jan Davis and Gerry Garvey, with Michael Wood

Based on direct field experience, this book discusses the issues and stages in the development of a water supply programme. It covers various stages of the programme cycle: from initiation, through the planning stages, writing proposals and implementation, to community management of the supply and evaluation. The importance of involving all community members in decisions about the programme is emphasised. The need to include hygiene education and the importance of links with sanitation from the very beginning of the programme is also emphasised.

The book includes many short case studies to illustrate some of the difficulties



FREE NEWSLETTERS

Three very useful free newsletters may be of interest to farmers and foresters. *Spore* is available in English, French and Portuguese and is produced every two months. It covers a wide number of topics related to agriculture from a technical point of view. Write with details of your work to:

CTA
Postbus 380
6700 AJ Wageningen
The Netherlands

CTA also publish a number of useful publications on agriculture. Ask for a catalogue if you are interested in ordering books.

Agroforestry Today is aimed at researchers, foresters and farmers who use agroforestry techniques. It looks at the latest research findings and recommends tree species for different environments and purposes. It is published every three months and is available in French and English.

Miti ni Maendeleo is a newsletter for farmers and development workers in East Africa.

For either of these, write with details of your work to:

ICRAF
PO Box 30677
Nairobi
Kenya

experienced, some of the solutions found and an evaluation of their success. The examples all help to show how a partnership approach can work in practice.

Although written from the view of an external agency, there is much that will be relevant to self-help programmes too. Price £11.20 including air saver postage. Order from IT Publications (address above).

Water Aid reports

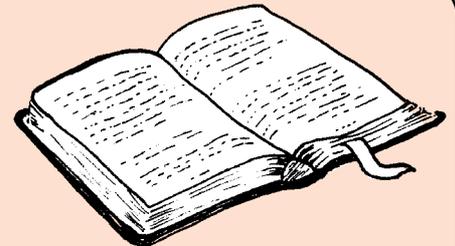
Water Aid have copies of two recent reports on urban water supplies. They are called "Mega slums: the coming sanitary crisis" and "Thirsty Cities". Both are written by Maggie Black and about 20 pages long. They are available free of charge to those working to provide urban water supplies. Write to:

Water Aid
Prince Consort House
27-29 Albert Embankment
London
SE1 7UB
UK

BIBLE STUDY

Water for life

by Richard Franceys



THE BIBLE has a surprisingly large number of references to water – over 300 in my concordance, not to mention another 80 on rain. Which is the first verse that comes to **your** mind when you think about water?

The Bible looks at water in many different ways – as a symbol of destruction (Genesis 6-9), a symbol of cleansing (eg: Exodus 30:18), a symbol of blessing (Jeremiah 17:8) and as a symbol of spiritual need (Psalm 42). In this Bible study we want to focus on water **and** sanitation as a symbol of physical life and spiritual life.

Water for life!

Please read Deuteronomy 28:12: 'May the Lord open the heavens for you, his rich treasure house, to give rain upon your land at the proper time,' and Psalm 65:9.

• *What is the Bible saying about our need for water? What does it say about God's provision for our spiritual needs?*

Sanitation for life!

Looking at the spiritual and physical again, in this issue of *Footsteps* we have tried to emphasise that to receive the benefits of a clean water supply we also need sanitation and good hygiene behaviour. The Bible also understands this point as we discover when we read Deuteronomy chapter 23:12-13.

• *If the Israelites were given this instruction hundreds of years ago, what responsibility do we have to ensure that everyone has adequate sanitation today?*

Just as the body needs drinking water for physical life as well as 'living water' for spiritual life, so our physical body only survives by getting rid of waste – the importance of this is shown in the Deuteronomy quote. And spiritually, the soul can only survive if it gets rid of spiritual waste – that is, sin.

• *How can we be rid of our spiritual waste? Look at Ephesians 1:7 and 1 John 1:7-9.*

Hygiene for life!

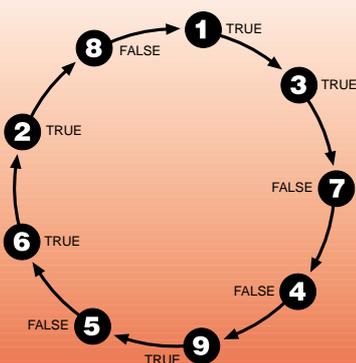
In the early chapters of Leviticus we learn of many rituals that were used to bring cleansing. Read Psalm 24:3-4 and reflect on our need for spiritual cleansing. Jesus' sacrifice provides us with the means for spiritual cleansing. Are we as careful to keep our physical bodies clean?

God's gifts

We will end with a verse that shows God's continuing love and care for us. Read Isaiah 41:7 and reflect on God's promises to us.

• *What can we do in our community to ensure that the poor and needy can receive God's gifts of water?*

Health Links Quiz (page 3) Answers



WHY PAY



FOR WATER?

by Sam Kayaga

Photo: Greenleaf

MANY PEOPLE wonder why they have to pay for water, a product which is available naturally. Though there seems to be plenty of water on this earth, less than one percent is available in a form that is suitable for human consumption. Water must be transported, stored, and distributed to the consumer. These activities need financial and human resources.

The effectiveness of an organisation providing urban water supplies is usually judged by two key indicators – *service levels* and *sustainability*. If the organisation is providing a good water supply or *service*, the next question is whether it is *sustainable* over a long period of time. Many organisations supplying water in low income countries face problems over service levels and sustainability because the users are unwilling or unable to pay for the service.

In some cases there are historical reasons which explain why people are unwilling to pay. For example, at independence, many African countries tried to provide free services. Often this was possible because populations were small and economies were healthy because of the high prices received for exports of cash-

crops. Water demands were also low because of low literacy and poor awareness rates of the importance of clean water.

Later the early infrastructures began to deteriorate, requiring higher maintenance levels and, sometimes, complete replacement. Also, with the high population growth rates in many low-income countries, there was a clear need to expand water supplies. The result was that water supplies deteriorated as demand increased and the economy worsened.

Cost recovery for sustainability

The capital development budgets of many water utility companies in low-income countries are mainly financed by external donor agencies or through local

loans. Given the changing international environment, donor funds are beginning to run out. Urban water supply organisations are therefore left with no choice but to charge so that their services can become effective, efficient and sustainable.

Water prices must be based on the actual cost of delivering the service to the users. This includes:

Production costs – for operation and maintenance, including electricity bills, water treatment costs, materials, supplies, spares and equipment, payroll, fuels, oils and repair of leaks.

Capital costs – to cover long-term investments such as pumping equipment, extension of distribution pipes, reservoirs, land and water rights.

Short-term capital costs – such as transport, metering costs, connection charges and laying of services.

Loan repayments.

If costs are not met...

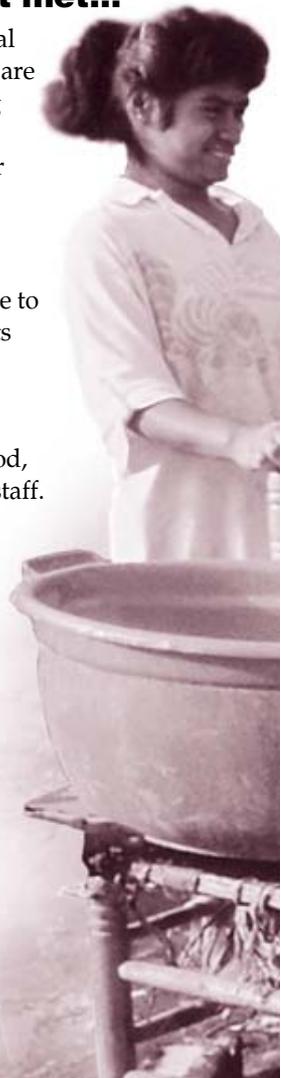
What happens if the real costs of water supplies are not met? The following are some of the consequences for the water supply organisation:

FINANCIAL

- Organisations unable to balance their budgets and always in debt.

TECHNICAL

- Unable to attract good, technically capable staff.
- Unable to expand services due to lack of funds and lack of staff motivation.



- No research into new ideas, including appropriate technologies, causing permanent dependence on expensive imported technology.

INSTITUTIONAL

- Unable to develop good institutional structures.
- Unable to attract suitable staff.
- Unable to carry out effective training.
- Unable to develop organisational independence.

HEALTH

- Unable to supply good quality services, due to irregular supplies of necessary chemicals, poor maintenance practices and poor quality control (again, partly due to lack of staff motivation).
- Intermittent supply of water, together with high water losses, resulting in low quantity of water supplied.
- Water supplies fail to reach a high percentage of the population, leading to high incidence of water-related diseases and resulting in high infant mortality rates and low life expectancy.

SOCIAL

- Water supplies would be low, and normally concentrated among the high income, more powerful groups. The poor are often ignored as a result.

- Few job opportunities available because of lack of expansion of services.
- Poor health has social implications.

ENVIRONMENTAL

- Higher risk of environmental pollution due to use of cheap but environmentally unfriendly methods of water extraction and provision and waste water discharge.
- Overuse and misuse of water due to its cheapness, resulting in water source over-exploitation. In the case of water used for irrigation, this could lead to inundation of land and sometimes salination of the land.

POLITICAL

- All the above consequences affect the political climate of the society and can lead to friction between leaders and society.

Conclusion

I believe it is therefore essential for those who benefit from water services to pay some fees to ensure a sustainable service. Ideally the fees charged should cover the full cost of supplies. However, income in the majority of households in low-income countries falls below the so-called poverty line of \$200 per person per year. Such incomes may not sustain the usually sophisticated technology that is often imposed onto the third world. Overall costs

could be reduced if organisations considered instead using affordable and appropriate technology.

Different levels of service could be provided for users in different income brackets. Much higher fees could be charged to wealthy households, with the intention of providing subsidies for the poorer. This could also be done by including water costs in a national taxation system.

Whatever the fees charged, whether water subsidised or not, users should pay a contribution, which helps encourage a sense of ownership. This ensures that users value the service, guard the installations jealously, and may be willing to help with operation and maintenance, given a good level of mobilisation.

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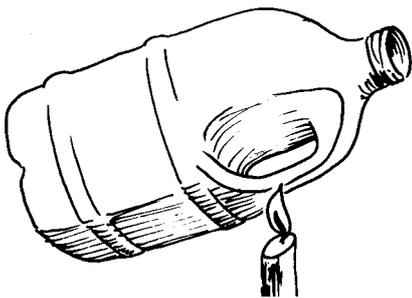
Photo: Mike Webb, Tear Fund

The 'Tippy Tap'

by Elena Hurtado

SHORTAGE OF WATER is the main reason why people fail to wash their hands regularly. Here is an idea which only uses about a tenth of the amount of water usually used to wash hands. The Tippy Tap is made from an old plastic container with a hollow handle. It is based on the *mukombe* (Footsteps 14). It also uses less soap as the soap is hung up and protected from rain so it does not become soggy.

1 Gently warm the base of the container handle over a candle, turning the handle around until it is shiny and soft all the way around.



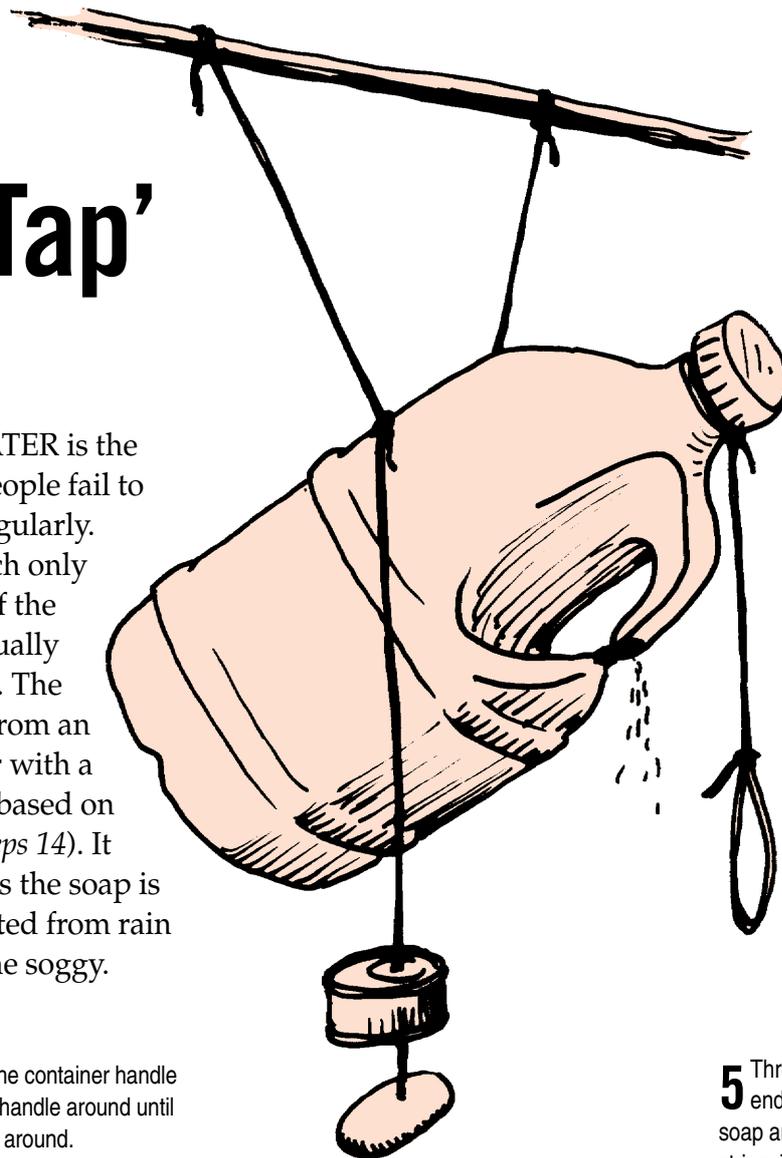
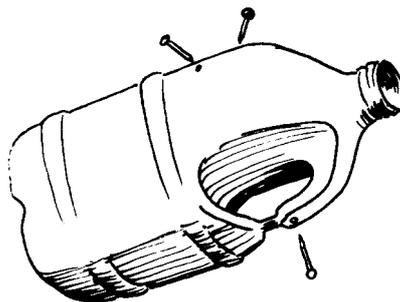
2 Remove the candle and quickly pinch the soft base of the handle with pliers so that it is sealed tight to prevent water flowing through it. Hold the pliers there until the plastic cools, ensuring that the seal is completely closed.



3 Heat the point of a small nail over a candle. Use the hot nail to make a small hole on the outside edge of the handle, just above the sealed area.



4 Heat the nail again and make two larger holes on the back of the bottle. The holes should be half way up the bottle and about a thumb width apart. These holes will be used to thread string to hang the Tippy Tap.



This article first appeared in Dialogue on Diarrhoea and is used with kind permission of AHRTAG. The Tippy Tap was designed by Ralph Garnet and Dr Jim Watt in Canada.

How to use...

- Run water over hands.
- Use the soap.
- Rinse off the soap with clean water.
- Dry with a clean cloth.

5 Thread string through the two holes and tie the ends of the string to a stick. Thread a bar of soap and an empty tin can through another piece of string. The tin will protect the soap from rain and sun. Attach this string to one of the supporting strings.

6 Tie another piece of string around the neck of the bottle and leave it hanging. This string is used to pull the Tippy Tap over so that water comes out of the hole in the handle.

7 Fill the Tippy Tap with water until it is level with the holes in the back of the bottle. Use the stick to hang the Tippy Tap in the bathroom or outside in a tree. The Tippy Tap is now ready to use.

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