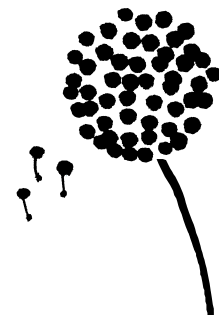


# Footsteps

No.46 MARCH 2001

APPROPRIATE TECHNOLOGIES



TEARFUND

## Adapting ideas

FROM THE EDITOR

This issue shares some of the good ideas for practical improvements in development sent in for the Millennium Competition, together with some other ideas, which have either been shared or requested by *Footsteps* readers. Many of these ideas are not necessarily new – they have simply been adapted to fit a particular local need. This is the reason for the term *appropriate technology*. Not all new technologies are useful – many may not be appropriate at all. However, having the confidence to take an idea, adapt it, test it and adapt it again until it meets the local need, is very important. Then a **new** technology becomes an **appropriate** technology.

All the ideas shared in this issue are very practical and concern the most important needs of our day-to-day lives – food production and preparation, water supplies, health, and fuel for cooking and

lighting. I hope that every reader will find at least one useful idea here to try out and adapt. Maybe the issue will remind you of a good idea that you've always meant to share, but you've never got round to doing so... While there is often limited room for long articles from readers in *Footsteps*, there is nearly always room to highlight good and practical ideas. So do please keep sending these in to share with the 40,000 *Footsteps* readers around the world.

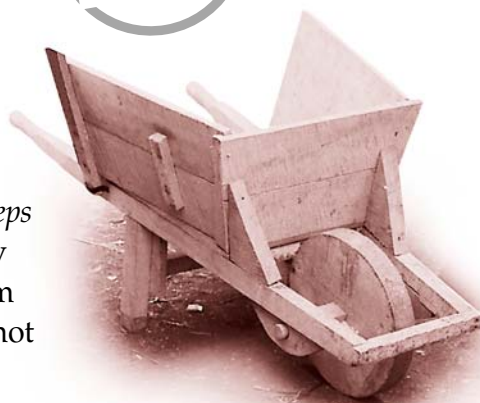


Photo: Didier de Failly

### Wheelbarrow

*Didier de Failly sent in this design for a wooden wheelbarrow produced by Bureau d'Etudes Scientifiques et Techniques (BEST) in the Democratic Republic of Congo. The original design came from a missionary in Angola back in the 1970s. It has been shared with various countries, organisations and faiths in the past 30 years. BEST use a wooden wheel and sides that can be partly or completely removed.*

Photo: Didier de Failly



*Isabel Carter*

### IN THIS ISSUE

- Millennium competition winners
- Letters
- Alternative fuels
- Rainwater harvesting
- Bible study:  
Using the resources we are given
- Theatre for disease prevention
- Hospital waste management
- Resources
- Solar drier

## Footsteps

ISSN 0962 2861

*Footsteps* is a quarterly paper, linking health and development workers worldwide. Tearfund, 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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On the next few pages we share more winning ideas from our Millennium Competition...

## Improving egg production

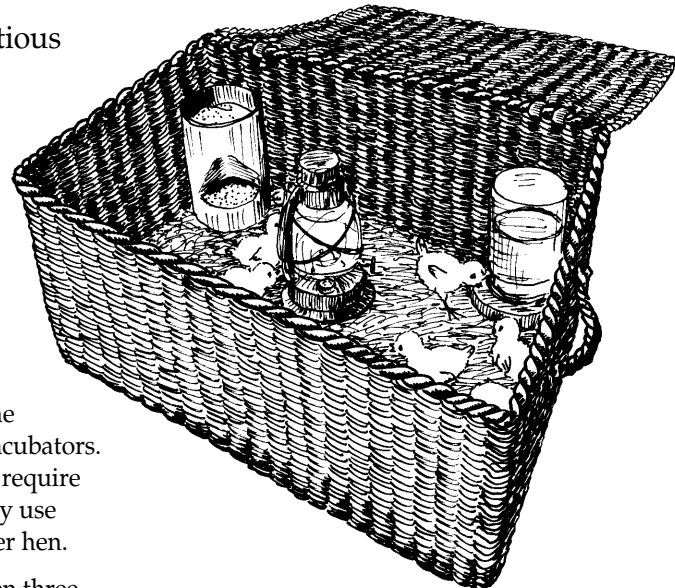


Farmers are usually cautious about using new technologies before they are sure of the benefits they will bring. They often adapt new ideas rather than adopting the whole technology.

Few grassroots farmers use the new technology of artificial incubators. Incubators are expensive and require electricity or fuel. Instead, they use natural incubation by a mother hen.

Normally it takes a broody hen three weeks to hatch out eggs. The chicks stay with the hen until they are old enough to find their own food. It is many months before the mother hen begins to lay eggs again.

Here is a simple idea, which will shorten the time taken for the hen to begin laying again. Allow the hen to hatch out the eggs and to look after the chicks for two weeks. This length of time allows the chicks to adapt to their new environment and build up some disease resistance. The two weeks also allow the hen to rest



and regain energy. The mother and chicks should be provided with plenty of food during this time. After the two weeks, take the chicks away from the hen and place them in a large basket. Place sawdust or dried grass on the floor and use a hurricane lamp to provide heat. (CAUTION: fire hazard!) Provide plenty of food, water and fresh green leaves. When the chicks are a few weeks old, allow them to leave the basket and scratch for food, preferably in a pen or room to protect them from predators.

The hen, thinking she has lost the chicks, will begin laying again after just a week or so. It is likely she will lay even more eggs to increase the survival chances of the new chicks. Within two months she is likely to have laid and hatched out another clutch of eggs. Make sure that good, nutritious food is available for both hen and chicks.

*Bodzewan Blasius Kongnuy  
Murudev-Bamenda  
c/o Mr Bime Patrick  
CNPS Box 487  
Bamenda  
Cameroon*



Photo: PhotoDisc





# The hot pot

The hot pot is an insulated cooking basket, which continues to cook food after removing it from the fire. It has several advantages:

- It uses less firewood.
- It allows the cooking stove to be used to cook other food.
- It cooks food like rice well without burning.
- It can be made very cheaply from local resources.
- It can keep cooked food warm for several hours.

## Palm nut oil press

My design was originally based on machines made by Hander in Japan and UK. These machines were made from one piece of cast iron and they broke down a lot due to cracking.

As a result of this, I started to develop my own design in 1978 and made various adaptations over the years. The machines gained a large market throughout the Great Lakes region until I had to leave owing to the political, social and ethnic conflicts and settle in South Africa.

The machine is made from pieces of steel bought from ironmongers. As well as palm nuts, the machine can also press groundnuts, cotton and sunflower seeds. The oil collected is used for cooking and also for laundry soap.

*Sent in by Pastor BN Yenga, Burundi*



Photo: BN Yenga

Use a strong basket made from local materials. Put a thick layer of insulating materials such as wood shavings, cotton waste, kapok or maize husks into the base of the basket. Cut out a circle of sacking or cotton a little larger than the base of the basket and sew into place over the lining materials. Then cut out another piece of sacking or cloth to go round the sides of the basket, fill with lining materials and sew into place.

Make a large cushion from sacking or cotton and fill with insulating materials to fit on the top of the basket. Mix a thick paste from cattle manure and coat the

outside of the basket to improve heat storage.

Place a cooking pot with a tight fitting lid, containing rice, vegetables, soup or beans and the usual amount of water, on the stove. When the pot is boiling well, remove it from the heat without removing the lid and place into the hot pot, covering it with the cushion and basket lid. One to two hours later the food should be cooked. For dried beans, it may be useful to bring the pot back to the boil after an hour and replace in the hot pot to finish cooking. If using meat, it is best to bring the food back to the boil before eating.

*Sent in by Achiedo Sombo Daniel  
ICA - C1, BP 119  
Brobo, Ivory Coast*



## The adapted hot pot

REAP in Kenya have adapted this idea and use straw baskets with handles and smaller cooking pots to make it easy to transport a cooked meal to work (see drawing on right). They give these cooking times as a guide:

Food type	Cooking time on the fire	Time in basket	Comments
Maize and beans	45 mins – 1 hour	4–6 hours	Takes less time if soaked before the actual cooking
Meat stew	5–10 minutes	2–3 hours	Cut meat into small pieces to help it cook faster
Fish	10 minutes	1 hour	Dried fish takes longer than fresh fish
Potatoes, plantains	10 minutes	1 hour	
Rice	2–3 minutes	30 minutes	

# Community de-worming

by Lois Ooms



Photo: Lois Ooms

We treat the children with ketrax, which is a one-dose tablet.  
(Below) Dosages for different age groups.

We are involved in a community-based health programme and would like to share an idea which has proved very useful here and has also helped us to expand our community health work.

We work on the slopes of the Rift Valley in Western Kenya in an area where it rains nearly every day. We have found that nearly all the children here are infested with worms, especially roundworms (*Ascaris*). In the hospital we have often had cases of emergency surgery for bowel obstructions with the surgeon removing up to a bucketful of worms from one child. In addition to teaching about sanitation, hand washing and safe drinking water, we therefore found we had to do something about de-worming children. As we taught people, we realised that most parents were aware their children had worms but found it difficult to bring them for treatment because they had to pay for public

transport, a consultation fee, charges for a lab test and the worming medicine.

After much discussion we developed plans to help a whole community de-worm their children. De-worming not only removes the worms from the child but also really improves their general health. By treating all the children together, it will make it harder for the children to pick up worms again.

If a community decides it wants to do this, it sends representatives to our office to work out a suitable date. It must then provide twelve people to help us on the day selected. The community is also asked to provide lunch for our staff. The community representatives are responsible for letting people know the

AGE	DOSE OF KETRAX
1–2 yrs	25mg (half a 50mg tablet)
3–8 yrs	50mg (one 50mg tablet)
9–15 yrs	100mg (two 50mg tablets)
over 15 yrs	150mg (one 150mg tablet)

date. We also provide teaching for the community about the benefits of de-worming before the date chosen.

When we arrive, we usually work in four teams, with one community person to do the registration, one of our staff to be the cashier and two community people to help the children with swallowing the pills. We

Our system for community de-worming can treat 2,000 people in a day.



Photo: Lois Ooms

use levamisole (ketrax) which is a one-dose tablet (see table opposite). We charge for everyone we treat but the costs are very low indeed, ranging from KSh 3/= for children 1–2 years old to KSh 15/= for people over 15 years old (US \$1 = KSh 70/=). However, even with such a low charge we can still cover the cost of the drug and our transport.

With good planning by the community leaders, we can treat over 2,000 people in one day. Those who plan well have the primary school children come class by class in the morning, and then mothers with younger children come in the afternoon, as they often have domestic duties in the morning.

In five communities, this exercise has led the people to ask us to begin a full community health teaching programme, teaching about other common sicknesses, training traditional birth attendants, AIDS prevention and other subjects.

*Lois J Ooms is the community health coordinator at Litein Cottage Hospital, PO Box 200, Litein, Kenya.*

# Traditional salt

*by Revd Francis King'ang'a*

African traditional salt or lye (*uvusaaru*) has been used for generations in our area of Western Kenya. In recent years it has been replaced by common table salt. Lye was used for cooking vegetables, soap-making and for some medicinal purposes. Older people believe that using lye for daily cooking helped people to live longer because of its medical benefits.

It is very easy to produce lye from all kinds of local vegetation. In this area we use mostly bean husks, maize husks, pawpaw leaves, grass and papyrus reeds – which have few other uses here.

The vegetation is cut and burnt while still green. The ashes are collected and kept in

a large container. The ash is then mixed with rainwater in smaller containers and passed several times through clean cloths to remove the particles of dirt. The filtered liquid is stored either in large pots or plastic bottles. This liquid can also be heated at high temperature in pans and allowed to evaporate, leaving crystals of salt. The end product is thus either liquid salt in solution or crystals of salt.

We began producing lye in 1997 as a community-owned initiative project here

in Vihiga. It has encouraged the use of local technology and provided an income-generating activity for people. We have arranged to have the lye analysed in a science laboratory to learn about the balance of ingredients it contains.

*Revd Francis King'ang'a is the Project Co-ordinator at Vihiga Community Lye Production Centre, PO Box 1071, Maragoli, Vihiga, Kenya.*



*A display of traditional salt in both liquid and dry forms.*

Photo: OAC



## Uses of lye salt

- Lye is used as a cooking salt which gives flavour, softens vegetables and also contains a lot of calcium – a mineral that helps strengthen bones.
- Lye can be used instead of sodium bicarbonate to help in baking.
- It can be used as a soap for washing dirty clothes and also acts as an antiseptic.
- It softens hard water.
- The liquid lye can be used as a preservative.
- The crystals can be mixed with grains to protect against pests.
- Liquid lye can be used as a mouth wash.
- Lye can be used to make soap when mixed with animal fat.
- Small quantities of liquid lye help ease constipation and neutralise stomach acids.
- Lye can be used to preserve animal skins.





Soil erosion has left a large ravine which is preventing traffic flow and destroying houses.



Photo: ADRI

## Changing traditions

Our African tradition demands a total separation from sexual relations for husbands and wives after the birth of a child, until the child is weaned at between one and two years of age. But alas! We husbands cannot abandon our wives for such a long time. AIDS is rife. It is stupid for husbands to be tempted to fall into immoral ways because their wives are breast-feeding. In most cases, all that is needed is for a six-week rest after childbirth to allow the uterus to go back to normal. Dear readers, this is an issue we need to bring into the open.

*Ghislain Somba Byombo*  
Educator – OWR/EPULU-RDC  
c/o Karl Ruf  
PO Box 27557  
Kampala  
Uganda



**EDITOR:**  
*Though raising a good point, this letter does not include the reasons for this tradition developing. If a wife becomes pregnant again too soon and stops breast-feeding (due to another tradition), this may result in malnutrition in the older child if adequate weaning foods are not provided. This issue does not simply concern the well-being of men, but also of women and young children. Changing traditions is rarely simple and often raises many other issues.*

## The struggle against erosion in Munene

Our area, Kasenga in the southeast of the Democratic Republic of Congo, has had soil erosion problems for a very long time. A large ravine or gully has developed in the main town. Two main roads are today cut through by the growing ravine, many houses are being destroyed and soon access to the central port may be blocked.

In Munene, a pilot project was begun after a campaign of awareness-raising by the organisation Action for Holistic Rural Development (ADRI). After a series of training workshops, five members of the Village Development Committee decided to take action to stop the spread of the ravine, which was developing in the old Chimambo river. Last year this ravine was 4–5m deep (see photo).

The coordinator of ADRI joined the team. Tree trunks and branches as well as straw were used in this work. After the first rains, the level of the ground rose. The work continued and thanks to our success, many people joined the project. Children, important people, women and men began to contribute to the activity: authorising trees to be cut down, giving straw from abandoned houses that were falling down or carrying materials. At the end of the rainy season, we could see that the level of the ground had risen considerably, and the old paths could be used again.

The programme this year will include planting banana trees and other plants that conserve the soil along the raised area. We thank Tearfund and *Pas à Pas*

sincerely for Issue 15 on soil erosion, which was very useful for us in training the population.

*Mwanza K Chibamba*  
Coordinator, ADRI  
PO Box 20478  
Kitwe, Zambia

## Promoting soya beans

The Okapis wild life reserve is a protected inhabited area in DRC, managed by the Congolese Institute for Nature Conservation (ICCN). The population in the reserve only lives from agriculture and game hunting. However, meat is becoming more and more difficult to find because of poaching. Soya beans have therefore been introduced in the area, since soya contains high levels of vegetable protein, which can therefore directly improve people's lives.

Our education programme includes making useful agricultural techniques more popular and raising the awareness of the population about the sustainable use of natural resources. This is why we are trying to make the soya bean crop more popular in order to protect the game and wildlife, which is now so rare due to poaching. We also teach people the different ways of processing soya beans into soup, flour, cakes and coffee.

*Pataule Boniface*  
Educator and agroforestry worker  
c/o Karl Ruf  
PO Box 27557  
Kampala  
Uganda

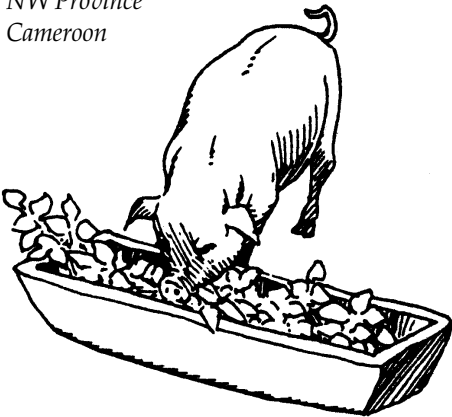
## Pig epidemic

I work with rural communities as an extension worker here in western Cameroon. The business of raising pigs provides an important part of people's income.

However, in recent years we have had a great problem with a new kind of disease. The pigs usually start by refusing food, then their ears and belly redden and within four days the animal is dead. There is no particular time of year or area where the disease is worse – it happens all over. We know it is not African swine fever because just two or three of the pigs in any pen will die.

Can anyone help us with information about this deadly disease?

Ngwana P Joseph  
PO Box 62  
Santa, Santa Sub-Division,  
NW Province  
Cameroon



## Experimenting with plants

I find *Footsteps* a training material of huge importance for learning and sharing new technologies. My work involves experimenting and growing new varieties of legume plants and fruit trees, and also producing seeds and vegetables for the small farmers in the area who visit



our centre for training. Here is a photo of part of our nursery with spice plants such as cinnamon and pepper.

Martin Orozco Sandoval  
Sector No 2, Frente a los Servicios Publicos  
San Carlos  
Rio San Juan  
Nicaragua

## Treating animal skins

We would like to respond to the request in a recent issue of *Footsteps* about technical knowledge for processing hides and running a small-scale tannery. We have run courses teaching tanning techniques and how to use the leather for items such as sandals and belts. We are preparing a booklet on this subject.

We started our course by discovering together the best available source of tannin in the area. The participants brought in tree leaves and bark from

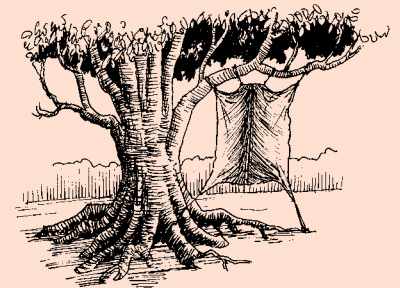
thirty different trees, which we tested with a solution made from ordinary iron pills (available at most chemists) and water. We added ten ground-up pills to a small bottle half full of water and shook it well. To test the samples, we put a bit of the bark in water and added a few drops of the iron pill solution to it. If tannin was present, the solution turned blue-black.

There are many ways to preserve animal skins, but many of the methods used by large tanneries require chemicals that are very hazardous to the environment and toxic to humans. We try to teach methods that use natural materials that can be disposed of safely. The box below shows a method used by one of the participants for tanning goat skins.

Bud and Marllys Larsen  
Community Development Co-ordinators for  
the Summer Institute of Linguistics

## Preparing goat skins

- Soak a goatskin (still with hair on it) in water.
- Spread wood ashes on the 'flesh side' of the skin and leave it for two days.
- Soak it in water again, wash out the ash, then squeeze out the water.
- Scrape off the hair with a knife, then wash the skin in water.
- Collect urine from female camels, sheep or goats with a shovel off the ground. Mix the urine and earth with some water, spread it all over the skin, and then leave for two days. The skin will now be stiff.
- Wash with water until the skin becomes 'white'.
- Pound a good source of natural tannin in a mortar and pestle and mix with some water. In my area we use 'agar' – a wild dried fruit from the acacia tree.
- Put the skin in the tannin or agar mixture until it all soaks in. Leave the skin saturated and bury it underground for three days.
- Take out the skin and wash again, squeeze out the water and stretch out.
- Spread oil (butter extracted from milk by shaking in a leather bag) over the hair side of the skin. Leave until it soaks in – one day and one night.
- Pound more tannin (or agar), soak again for 24 hours and wash in water.
- Pound red soft stones (to give colour) to make a powder. Spread and rub hard to get it into the skin (both sides) till skin gets soft.
- The skins should now be ready to piece and sew into goatskin tents or for any other use.



**EDITOR'S NOTE:** Always wash hands thoroughly with soap and water after handling the skins. Avoid skin contact with tannin solutions.

*These directions for tanning goat skins are from Mariama Khamed Attayoub of Niger and were submitted by Meredith Bunting.*

# Alternative fuels

Charlie Forst gives details of two cooking fuels which may be new to some readers. He works with ECHO, 17391 Durrance Road, North Fort Myers, FL 33917-2200, USA.

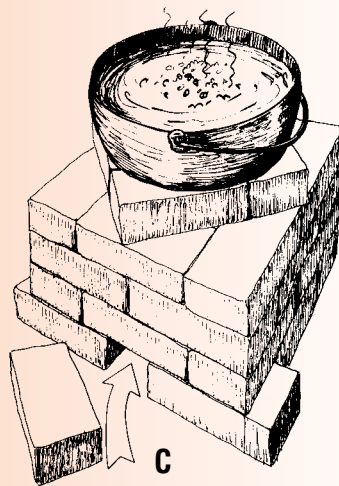
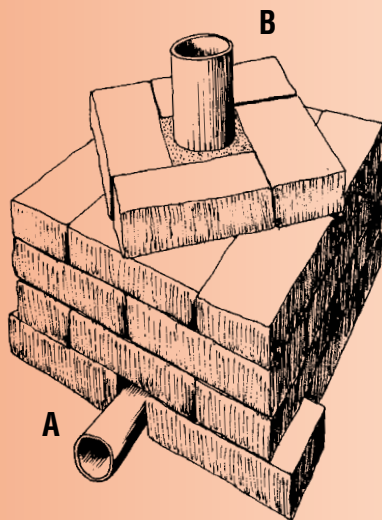
## Sawdust stove



Photo: ECHO

This stove is very simple to make and use if there is a good supply of sawdust available. It burns with a high temperature and makes little smoke. This design uses 28 fireproof bricks to make a small square. It could also be made in a large tin or metal bucket. If you have no wood sawdust, try using this idea by putting maize husks through a grinder or mill to obtain powder. Rice husks, wood shavings and other dry organic materials can also be used.

- 1 Fit a narrow bamboo or plastic pipe at the base, going into the centre to act as an air inlet (A). Balance or hold in place a wider bamboo tube or pipe in the centre of the stove and tightly pack sawdust around this until the stove is filled (B). Remove the pipes very carefully by slowly twisting them. Place four bricks on the top to hold a pan. Light the sawdust at the bottom by first dropping in some paper and then a lighted match. If too much air is entering through the air inlet hole and the stove is too hot, partly close the inlet with a brick or stone (C).



- 2 Once lit, the stove will produce a great deal of heat and burn for up to six hours. It may be useful to place a flat piece of metal with a hole cut in it, on top of the sawdust. This metal plate drops down as the sawdust burns and helps to ensure even burning.

## Methane digester



Photos: ECHO

*Charlie's methane digester will produce enough gas for cooking and lighting for a whole family.*

**3**





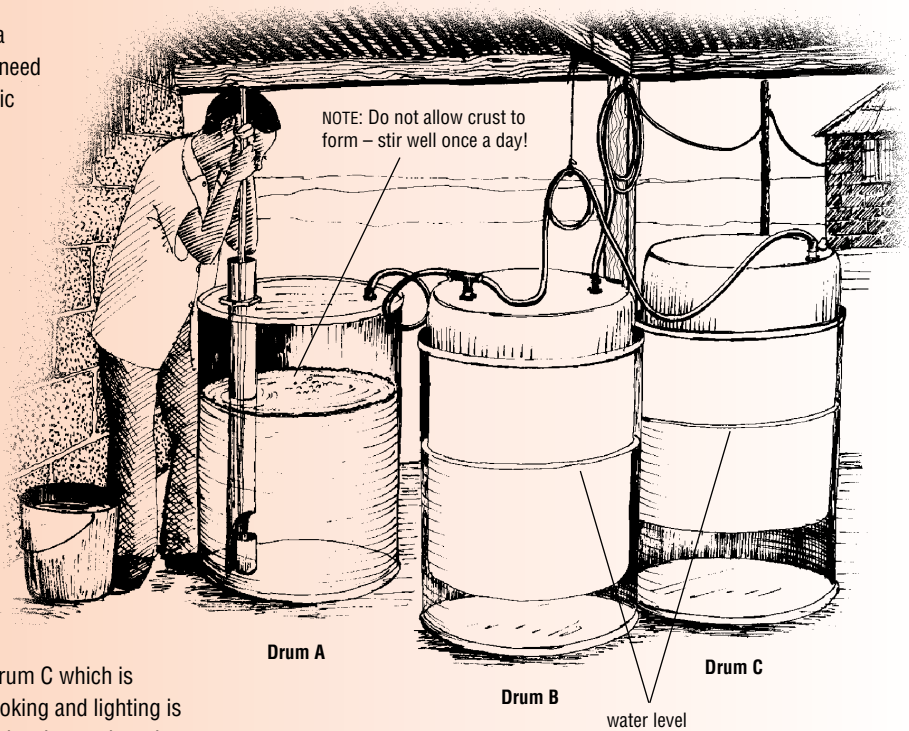
Many *Footsteps* readers have asked for information about methane digesters over the years. Until now we have not been able to pass on much useful information for small-scale digesters. However, this design by Charlie Forst of ECHO is for a simple household unit that requires the manure from three or four cows or buffaloes or six goats and will produce enough gas for cooking and lighting for a whole family.

The idea behind the use of methane digesters is to capture the methane gas released from animal manure so that it can be used for household gas – for cooking or light. All kinds of plans have been designed, but the world is full of failed methane digesters. This idea is simple and practical but the digesters do need daily attention for them to work successfully. After use in the digester, the manure makes excellent fertiliser.



**1** You need to obtain five large drums (44 gallons or 80 litres in volume). Plastic drums are best, but if only metal drums are available, a coat of paint on the insides will help prevent holes developing (pour paint inside Drum A and roll it around to ensure an adequate covering). Two of the drums must be a little smaller so that they fit well inside the outer drums with room to move up and down freely.

**2** Drum A – the digester – needs a tight-fitting lid (which does not need to be removed). Fit a large plastic tube or bamboo pipe into the digester, reaching into the base of the drum, with the side cut away to aid mixing the manure. Fit a tight-fitting plastic tube into the lid of the digester, ideally with a tap to control the flow of gas. Seal all connections with tar.



Fit an upturned empty plastic drum into Drum B. No lid is needed for either of these drums, as water is used to form a seal. The tube with gas enters the top of the upturned drum and is fitted with a double connector. Gas initially enters Drum B, but as this fills up, so gas enters into Drum C which is made in just the same way as Drum B. The methane gas for cooking and lighting is removed from another plastic tube from Drum B. This tube carries the gas into the kitchen. Use bricks or stones as weights on drums B and C to build up pressure.

**4** When setting up the digester, only cow manure should be used, in order to build up the right culture. Goat or buffalo manure will not work! Once established, collect all the fresh manure from the animals in a bucket each day. Remove about 2% of the slurry (a mixture of manure and water) from the digester each day. Allow this to settle. Remove the liquid and mix it into the fresh manure. You may need to add a little water to get a runny mix. Add this carefully into the digester through the large tube and stir very well. It is essential to stir the digester really well once a day. Otherwise a crust develops and the digester will not work. You cannot go away for a few days and forget a methane digester!

**5** The old manure can now be used as fertiliser. However, it is very strong and may burn plants unless diluted or mixed into compost.

**6** Methane gas is potentially dangerous. Don't smoke near the digester. Place it well away from the cooking area.



*Charlie attaches an old tin can to a stick and uses this for removing, mixing and pouring the slurry. For effective mixing of the slurry in the digester, he adapts this tool and adds a simple valve. He removes the base of the can and hinges it at one side with wire, and uses a larger wire loop as a stop on the other side. This enables him to 'pull' up slurry from the base of the drum and mix it well.*

# Low-cost rainwater harvesting

by Dai Rees

The Development Technology Unit of Warwick University aims to research and promote technologies appropriate for practical use in the Third World. The Unit has recently developed three small jars (between 500 and 750 litres) for rainwater storage. Their aim was to develop a number of safe, low-cost alternatives for rainwater storage.

The research work was carried out at Kyera Farm, a training centre for organic farming near Mbarara, Uganda. Three sample tanks were developed at the farm and then ten tanks were built in the nearby village of Kyera. A study is now under way to look at the benefits that such small tanks can bring to the users.

Indications from a similar study in western Uganda show that up to 70% or 80% of household water needs can be met with small rainwater jars. Rainwater harvesting works best when rainfall is fairly regular through the year.

## Water supply from the rain

Rainwater harvesting, or collection, is common in many parts of the world. Water is usually captured from the roof of a house and used for drinking, cooking, washing clothes, personal hygiene, watering plants and animals, and numerous other uses. Typical traditional methods of catching the water vary from small buckets to large tanks. Old oil drums are commonly seen outside homes in Uganda using short lengths of home-made guttering to catch the water.

Small jars are useful in areas where there is a good distribution of rain throughout the year, with two rainy seasons. The householder may still have to collect water from the traditional water source during the drier periods, but for much of the year, the family members will have water at the home. This can save a significant amount of time and effort in water collecting.

## The brick jar

The brick jar was developed to make use of this common local building material. The jar is made from a simple brick cylinder. A tap brings water out at the right height for a jerry can. The cover is made from ferro-cement mortar and a filter basin is used as described for the ferro-cement jar. It is a good idea to include some reinforcements in the brickwork, such as bands of wire.



Photo: Vince Whitehead

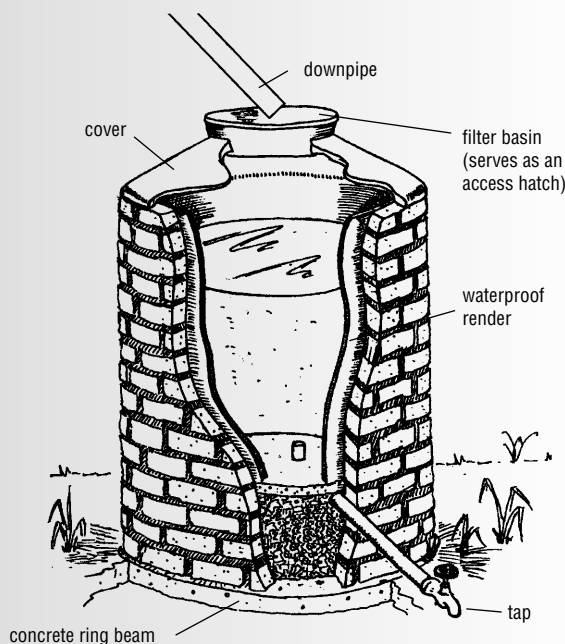


Photo: Corel



## Costs

This table shows the approximate costs of the different jars:

Type	Size (litres)	Cost (£)	Cost (\$)
Brick jar	750	£33	\$50
Ferro-cement jar	500	£28	\$42
Plastic tube jar	600	£20	\$30

Costs of gutters are not included.

A study in Kabarole District, Uganda, during the dry season, showed that with just twelve rainy days in two months, a family of five could obtain 60% of all their household water from the tank – a total of 118 jerry cans (of 20 litres each). If their traditional water source was 500 metres away, in two months they would save nearly 50 hours of their time by using the water tank.

The quality of water from a rainwater system is an important concern. Usually, if water is filtered as it enters the tank and stored in dark conditions, then the quality of the water will be good and will improve with time. It is also recommended that during the first five minutes of heavy rainfall after a dry spell, this water is discarded by pushing the downpipe

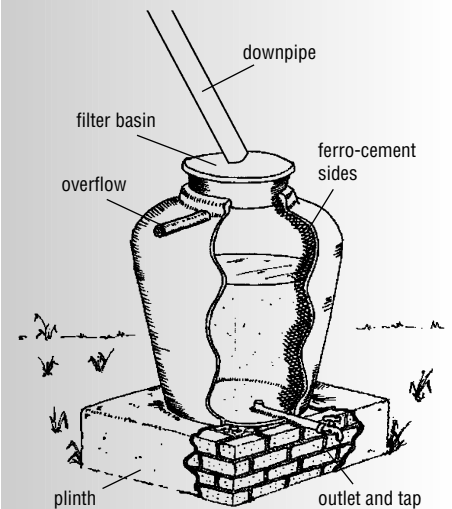
aside. All openings should be covered with mosquito mesh to prevent mosquitoes from breeding in the tank. Given good rainfall, one side of the roof of a typical dwelling will provide sufficient collection area to provide the household needs of an average family.

## Local production

Local masons were involved as fully as possible so that they could share their knowledge with the project team, and also learn about the new designs. It was hoped that the masons would then go on to build other jars in the area and would also be able to maintain the systems already built. A good pool of skilled masons was found in the area. Three tanks were designed, each using slightly different techniques and materials.

Galvanised iron sheet gutters and downpipes are available in Mbarara town and these were used on all the jars

## The ferro-cement jar



This design is already well known. The technology involves using chicken wire sandwiched between layers of cement mortar. A shaped mould is made from sacks and filled with sawdust. The mould is then plastered with sand/cement paste in a ratio of 3:1. This is then covered with ½" chicken wire and given a second coat of mortar. A tap and overflow are fitted and a plastic basin used to form the opening at the top – a filter is fitted here to remove large particles from the water. The jar is raised above the ground so that jerry cans can be filled easily from the tap.

## The plastic tube tank

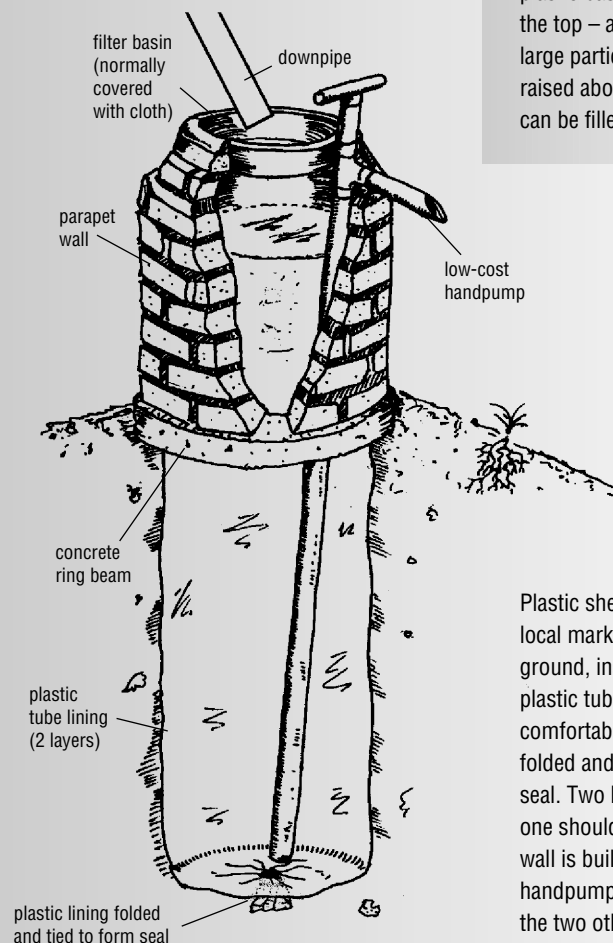


Photo: Vince Whitehead

Plastic sheet in tube form is available in the local marketplace. A hole is dug in the ground, inside which the largest size of the plastic tube sheeting available can sit comfortably. The end of the plastic tube is folded and tied several times to form the seal. Two layers of plastic are used in case one should puncture. A surrounding brick wall is built, an overflow and low-cost handpump fitted and a basin used, as with the two other examples.

that were built under the project. Alternative gutter systems can be used, of course (for example: bamboo).

## Future work

Already masons are building these new jars for individuals in the area. A local women's group has approached Kyera Farm staff with a request to build a number of jars. The local farmers group which benefited from the initial jars has received a flood of new members specifically interested in building these jars.

Readers who would like detailed construction plans, either on paper or by e-mail, should contact the DTU (see below).

*Mr Dai Rees works in the Development Technology Unit, School of Engineering, University of Warwick, Coventry, CV4 7AL, UK. The drawings were provided by Vince Whitehead.*

Tel: +44 (0)24 7652 2339

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E-mail: [dgr@eng.warwick.ac.uk](mailto:dgr@eng.warwick.ac.uk)

Website: [www.eng.warwick.ac.uk](http://www.eng.warwick.ac.uk)

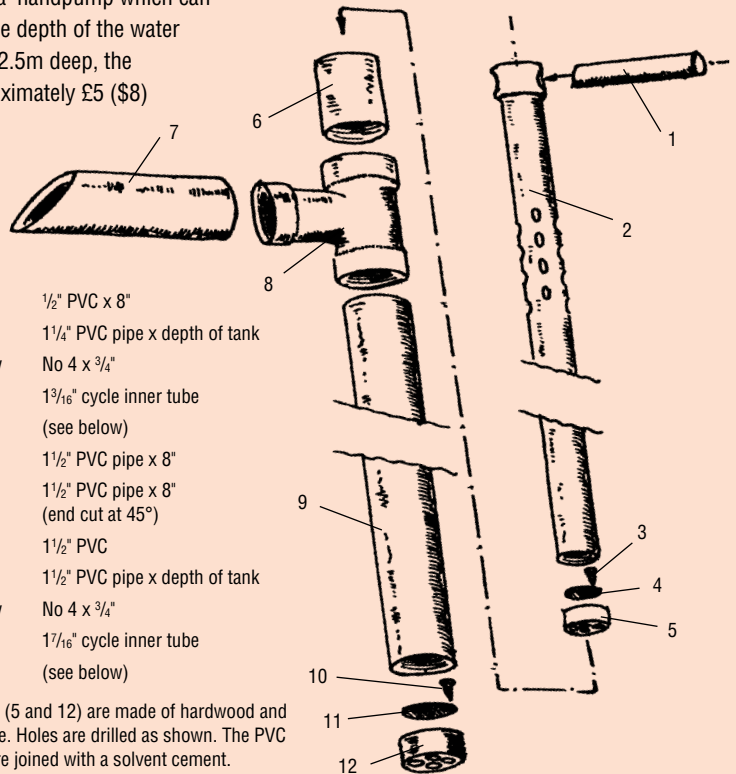
[/DTU/rainwaterharvesting/index.html](#)

## Handpumps

A number of low-cost handpump designs were also developed for pumping water from below ground tanks. Full details, including costs, can be obtained from the DTU. The sketch shows the 'enhanced inertia' handpump which can be made to fit the depth of the water tank. For a tank 2.5m deep, the parts cost approximately £5 (\$8) in Uganda.

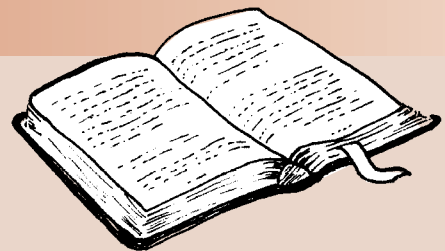
- |    |                  |                                       |
|----|------------------|---------------------------------------|
| 1  | handle           | 1/2" PVC x 8"                         |
| 2  | central tube     | 1 1/4" PVC pipe x depth of tank       |
| 3  | flap valve screw | No 4 x 3/4"                           |
| 4  | flap valve       | 1 3/16" cycle inner tube              |
| 5  | central inlet    | (see below)                           |
| 6  | top tube         | 1 1/2" PVC pipe x 8"                  |
| 7  | outlet           | 1 1/2" PVC pipe x 8" (end cut at 45°) |
| 8  | tee              | 1 1/2" PVC                            |
| 9  | rising main      | 1 1/2" PVC pipe x depth of tank       |
| 10 | flap valve screw | No 4 x 3/4"                           |
| 11 | flap valve       | 1 3/16" cycle inner tube              |
| 12 | main inlet       | (see below)                           |

The two inlet valves (5 and 12) are made of hardwood and are turned on a lathe. Holes are drilled as shown. The PVC fittings and pipes are joined with a solvent cement.



## BIBLE STUDY

# Stewardship: using the resources we are given



by Rose Robinson

### Read Matthew 25:14-30

A man is going on a journey, so he asks his servants to care for his property while he is away.

• *What guides him in how he distributes his money? (verse 15)*

The servants with five and two talents use what they have been given and double them, but the servant with one talent buries it in the ground.

• *Why does this servant not use the talent he was given?*

The master judges the servant on his own words. If he knew that his master harvests where he hasn't sown, he should have banked the money so that he could have given it back with interest. This servant was given very little. He also chose not to use what he was given. He is judged by his attitude in choosing to ignore what he is given – even though it is very little in comparison to what

the other servants receive. His master calls him a wicked, lazy servant and he is thrown out into the darkness.

The two servants who used what they'd been given well, go to be with the master and share his happiness. Because they were faithful with a few things, they are put in charge of many things.

• *To whom does the earth and everything in it belong? (Exodus 9:29; Deuteronomy 10:14; Psalm 24:1, 2)*

Everything that we have comes from God. He trusts us to care for what he gives us (Genesis 2:15; Genesis 9:3) and to use it well (1 Peter 4:10).

• *What has God given you and how are you using it?*

*Rose Robinson worked with MOPAWI in Honduras for four years as a Tearfund International Personnel Worker.*



# Theatre for disease prevention

by Abel Gousseine

'If you prescribe me medicine, you will cure me for a day. But if you teach me to prevent disease, you will cure me for life!' This is the message that our workshops display after each performance. We organise role-plays for the benefit of health workers and other development workers to encourage them not only to give medicines or prescriptions to their patients, but also to teach them how to prevent disease.

We use as our inspiration the idea that learning is made up of a circle, which is divided into four quarters. Each quarter represents a different stage of learning but all four stages or quarters are needed for effective healthcare. As an example, imagine how a consultation between a doctor and a patient might be acted out:

## First quarter

**Listening and receiving information** The patient, accompanied by a relative, visits a doctor. The patient complains of aches and fevers. The patient's relative adds that this could be caused by sorcery. As for the doctor, he thinks that it is not a matter of sorcery – that it is rather a question of malaria. But to be sure of this, he asks the patient to go to the medical laboratory to have a blood test carried out.

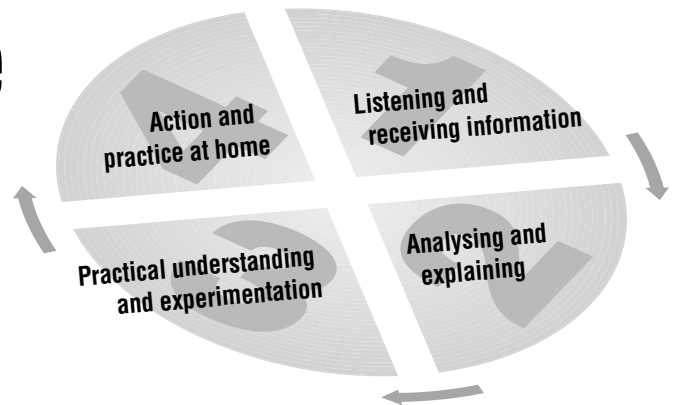
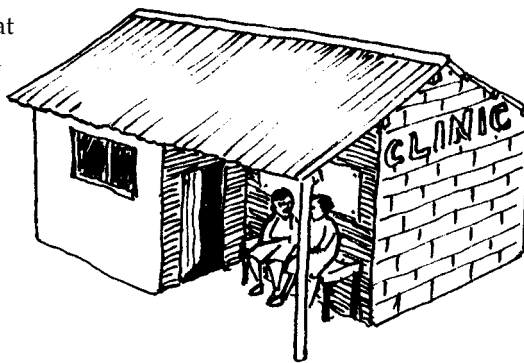
## Second quarter

**Analysing and explaining** The blood test has confirmed malaria! The doctor explains to the patient and his relative, with the support of visual aids, the causes of the disease, the symptoms, risks and how to prevent it. Only then will the doctor write a prescription.

## Third quarter

**Practical understanding and experimentation** To check the understanding of the patient, the doctor can then, in a friendly way, ask a few questions such as:

- Why do you have malaria?
- What must you do so that the people in the village do not get malaria?
- What are the common signs which suggest malaria?
- How many tablets must you take each day?



- What are the side effects of the medicine you have been prescribed?

## Fourth quarter

**Action and practice at home** Having obtained appropriate treatment for the disease, will the patient and his relative put into practice what they have learnt from the doctor?

In order to avoid misunderstandings, we recommend that health workers communicate using the local language. Our role plays discourage people from treating themselves without medical advice. You might like to discuss which stages or quarters are often ignored in the present health care system. We are convinced that if all doctors and health staff took the time to respect all four stages of learning, great steps would be made in disease control.

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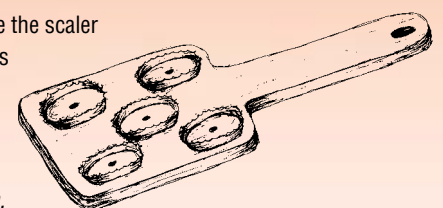
## Bottle top fish scaler

This fish scaler made from bottle tops, works better than the back of a knife. You need a clean wooden base shaped like a paddle. The square part should be about 7cm wide – large enough to fit five soda bottle tops. Strip the bottle caps of any plastic or rubber seal. Nail them to the paddle with the serrated edges facing outward. Make sure they are loose enough to turn easily.

To use the scaler, hold the fish by the tail and move the scaler gently over the fish. The same technique also works for removing small feathers from poultry.

Make sure you wash the scaler very well in hot soapy water after use to prevent food poisoning.

*An idea from Daniel Oloo Otieno, Inades Formation, Nairobi, Kenya*



## Medical waste management

by Illiassou Sabi Dera

In Benin, medical waste from most of our health centres is often managed in the same way as ordinary waste. Health employees are often unaware of the risks linked with their poor handling of medical waste.

The Basic Hygiene and Sanitation Department (Direction de l'Hygiene et l'Assainissement de Base – DHAB) is providing training to improve the management of waste in healthcare establishments. This training includes five parts:

- learning about the various types of medical waste
- risks for health and the environment from current practices
- good management practices and techniques, including the preparation of a plan for the management of waste within the clinic or hospital

- safety measures for health personnel
- the use of incinerators (we recommend our own DHAB type).

The waste produced in hospital environments includes biomedical waste such as dirty needles and syringes, chemicals, pharmaceutical waste, radioactive materials (from x-rays etc) and general waste. The risk from infectious medical waste is considerable – for example from the HIV virus and hepatitis B and from re-emerging diseases such as yellow fever, tuberculosis and typhoid fever – and deserves to be given particular attention.



Photo: DJ Picken

Incineration is the safest method of disposal for most medical waste. After incineration, the waste should be buried carefully. More information about the DHAB incinerator (in French only) can be obtained from

*Dr Moussa Yarou  
Médecin de Santé Publique, Cotonou  
CSSP/Nikki  
Borgou-Benin  
BP 10  
Nikki  
Republic of Benin*

**EDITOR'S NOTE:**

*Details for non-French speakers of another useful incinerator (illustrated above) can be obtained from:  
The Innovative Technology Centre, De Montfort University, The Gateway, Leicester, LE1 9BH, UK  
E-mail: djp@picken98.freemove.co.uk*

## Dried moringa leaves

Previous issues of *Footsteps* have mentioned the value of the moringa tree as a fast-growing tree for agroforestry, a good source of nutritious green leaves and beans and, in particular, the ability of moringa oil from the seeds to purify water. Researchers have now found another use for this tree. If the leaves are first dried (see drier on page 16) then powdered using a pestle and mortar, they can be stored in plastic bags or glass jars for several months.

The powdered leaves are high in vitamins, minerals and protein. Just one teaspoon contains all the vitamins and minerals required each day, together with much of the daily requirements of protein, iron and calcium. In Senegal, dried moringa leaves have been used with great success to combat malnutrition among children and babies. One teaspoon of the powder is added to their porridge or cereal three times a day. They rapidly regain their health and begin to put on weight. The powder has also been found to improve ulcers, eye problems and skin troubles.

For healthy families, it is recommended that a couple of teaspoons of the powder are added just before serving stews and sauces each day. This will help keep people healthy and ensure that children and old people are getting plenty of vitamins and minerals.

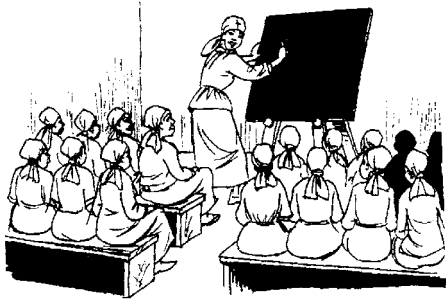
Be careful not to use more than these recommended amounts. Moringa leaves contain small quantities of oxalic acid and if too much is eaten, this could cause problems.



*Information provided by Lowell Fuglie, Church World Service, BP 3822, Dakar, Senegal*



## Books Newsletters Training materials



### Reaching out to the Women of Africa: Holistic teaching through Church Women's Fellowships

by Rosalia Oyweka

REAP (Rural Extension with Africa's Poor) have just produced a new publication focusing on the potential of women's fellowships for holistic teaching. There are women's fellowships in almost every church and they are perhaps the area of greatest potential for reaching out to the women in the rural areas. The book includes material on the position of women in the Church and society, women's particular needs, women and ministry, how to incorporate practical training and the training of trainers.

The book has 103 pages and costs £3 (KSh 250/=) including postage, from:

REAP  
PO Box 76584, Nairobi  
Kenya  
E-mail: REAP@maf.org

### HIV and safe motherhood

*HIV and safe motherhood* is a 24-page briefing paper aimed primarily at local health and community workers in Sub-Saharan Africa.

It is written in clear, easy-to-understand language. It will also be useful for health planners and managers at district level. Drawing on the latest research, the paper provides information and suggests action on various issues concerning safe motherhood and HIV. It also gives information on how to reduce the risk of mother-to-child transmission for women who know they are HIV positive.

Healthlink Worldwide is seeking to make this publication widely available to individuals and organisations working with mothers and families.

Single copies are available free to readers in developing countries. For others the cost is £5/\$10 including postage. Bulk copies are also available free to organisations that are able to distribute the publication through their own channels and we would be very keen to hear from you if you are able to do this. Please contact:

Toyin Ikotun, Healthlink Worldwide,  
Cityside, 40 Adler Street,  
London, E1 1EE, UK

Fax: +44 20 7539 1580

E-mail: [info@healthlink.org.uk](mailto:info@healthlink.org.uk)

Website: [www.healthlink.org.uk](http://www.healthlink.org.uk)

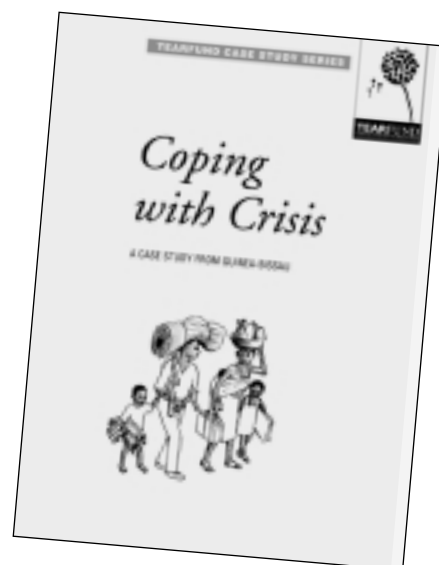
### Coping with Crisis

When civil war broke out in Guinea-Bissau, the Igreja Evangelica da Guine-Bissau were suddenly faced with a crisis. Everything was in chaos: no phones, no headquarters for their development work. This short pamphlet describes how they coped, and how we can learn useful lessons from their experience.

Available free of charge in English, French, Spanish and Portuguese from:

Case Studies  
PO Box 200  
Bridgnorth  
Shropshire  
WV16 4WQ

E-mail: [footsteps@tearfund.org](mailto:footsteps@tearfund.org)



### Learning Together:

#### The Agricultural Worker's Participatory Sourcebook

by Susan Stewart

This is a sourcebook for agricultural workers involved with training farmers. It is packed full of useful and stimulating information, exercises and practical tips. It contains sections on effective training methods for adults with understanding of how adults learn, methods of training and ideas for workshops including facilitation and evaluation, important agricultural issues to focus on and a large reference section with ideas for producing training materials. The sourcebook offers an extensive range of participatory techniques to help community trainers develop their own creative ideas. With 342 pages, hundreds of illustrations and a wide range of practical ideas from around the world, it is an excellent resource material for trainers.

The book costs US \$30 including postage (large reduction in price for bulk orders) and can be ordered from:

Heifer Project International  
PO Box 808, Little Rock, AR 72202  
USA



### Computer Aid International

Computer Aid International is a UK-based registered charity that recycles and repairs donated computers for re-use in schools and community organisations in developing countries. They usually supply computers in co-operation with northern NGOs for their overseas partners and their existing projects. All machines are Windows-capable 486 PCs. There is a small administrative cost and UK-based charities must make all the arrangements for transport, customs and shipping costs from the UK. If you are already in an existing partnership with a UK charity, then you may be able to let them know and benefit from this scheme.

For more information please contact Angela Anyiam.

E-mail: [angela@computeraid.org](mailto:angela@computeraid.org)

# Solar drier

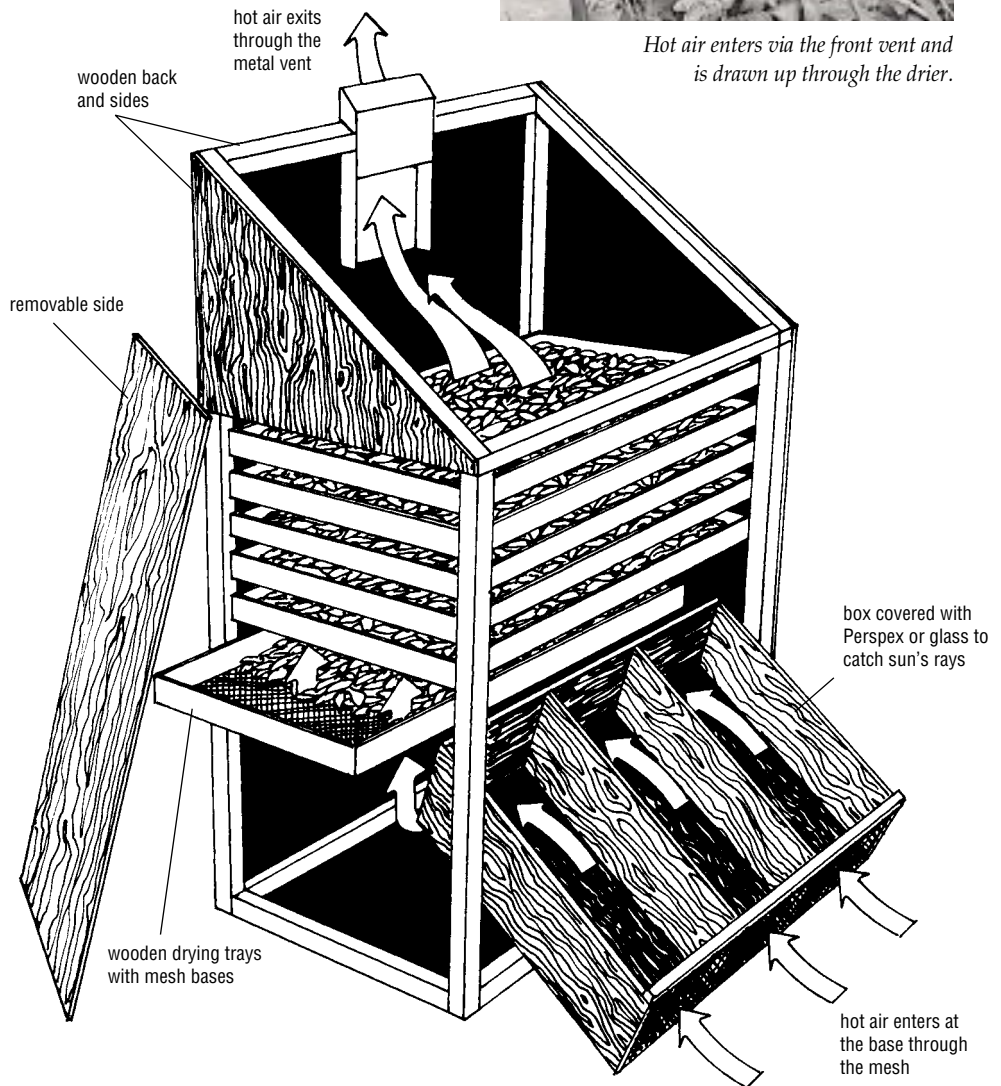
This drier is very effective for drying large quantities of fruit, leaves or herbs. Unlike other driers there is no need to remove the contents when it rains. It also allows fresh material to dry in the shade, thus maintaining high vitamin content.

The back and two sides are made out of wood. One side can be removed. Six wooden trays with mesh bases will fit inside the drier and can be pulled in and out. The top and front of the drier are made of thick, clear plastic. At the base is a wooden box with an open top and wire mesh at the base. This is painted black and should have clear plastic (such as Perspex) or glass fitted tightly. It is laid at an angle to catch the sun's rays and allow hot air to enter at the base and be drawn through the drier and out through a metal vent at the top.

Add fresh material to trays at the top of the drier. Each day, stir the drying fruit or vegetables several times to ensure effective drying.



Hot air enters via the front vent and is drawn up through the drier.



View of the drier with side removed, showing arrangement of inlet and trays.



The metal vent at the back allows hot air to exit the drier.

*This drier is another example of the practical technologies developed at ECHO, 17391 Durrance Road, North Fort Myers, FL 33917-2200, USA.*

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