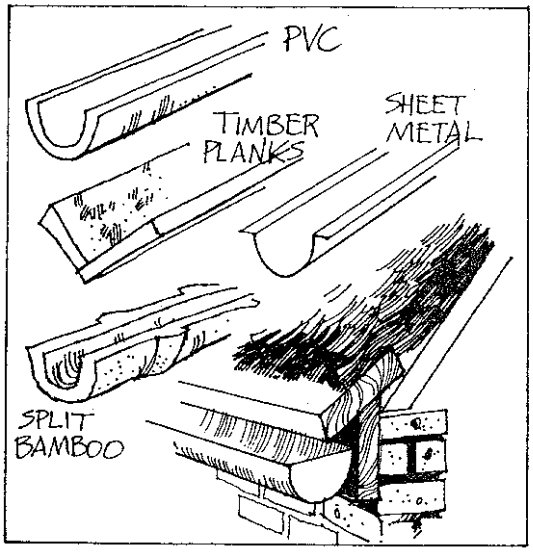
Waterlines

Technical Brief No 1-Household water storage

How much is needed

A family of six in the tropics needs about 30 litres a day of hygienically-safe water for drinking, tooth-cleaning, food preparation and cleaning cooking and eating utensils. Safe water must either be obtained from safe sources or treated.

A 30-day dry period requires about 1,000 litres of stored water. Clean water that is not necessarily bacteriologically safe can be used for other purposes such as bathing, washing clothes and latrine cleaning.

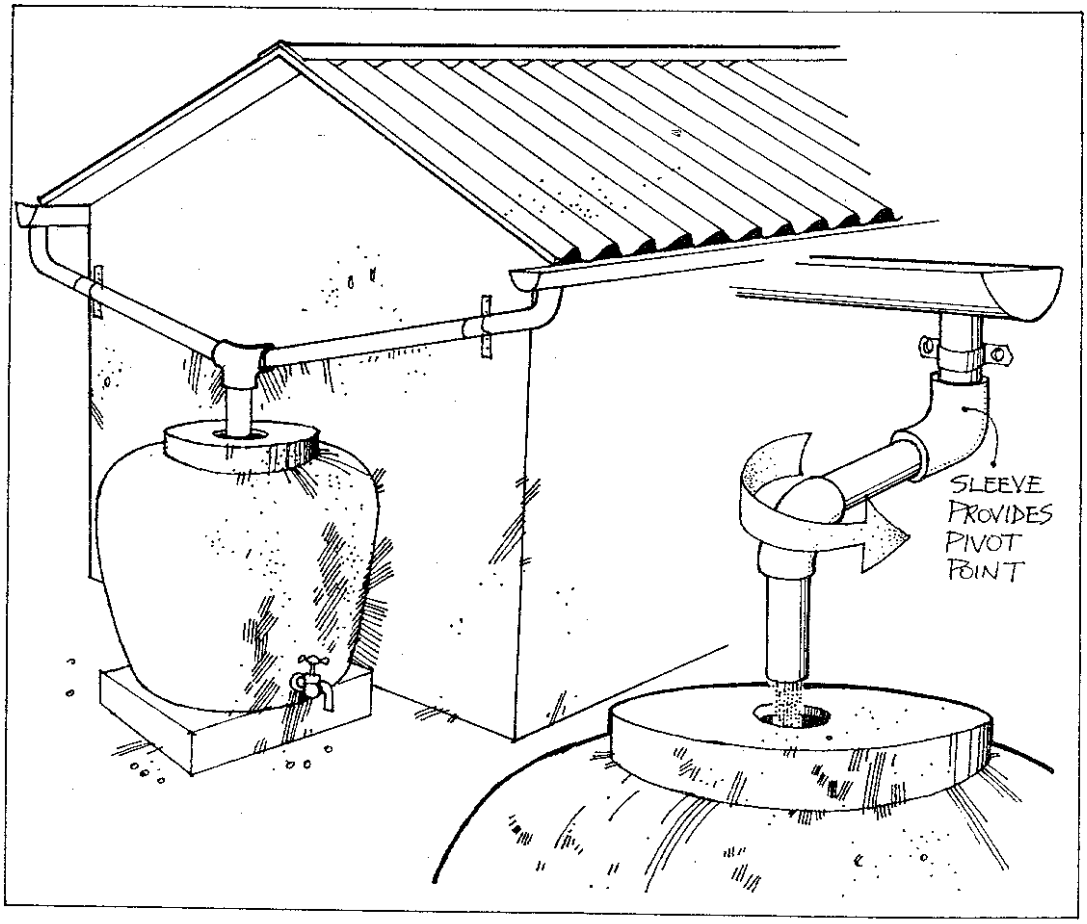


Rain is the safest source

Rainwater can be collected from roofs in gutters made from wood or metal. Divert the first few minutes of flow to a drain, as it will carry the dust and debris that have accumulated on the roof since the last rain. Allow the main flow to pass through a cloth or wire screen.

Store water in clean vessels fitted with covers.

Take water from the storage vessels with a tap if possible. If a dipper is used, keep the dipper clean. Store it inside the vessel if possible.



Technical Brief No 1-Household water storage

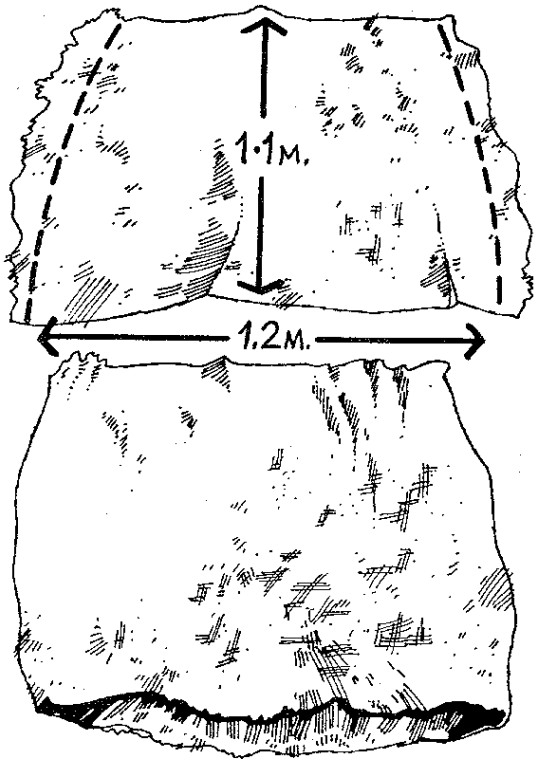
Building un-reinforced mortar jars

1. For a 250 litre jar obtain 1 bag (50kg) sharp sand, ½ a bag (25kg) cement, and water.

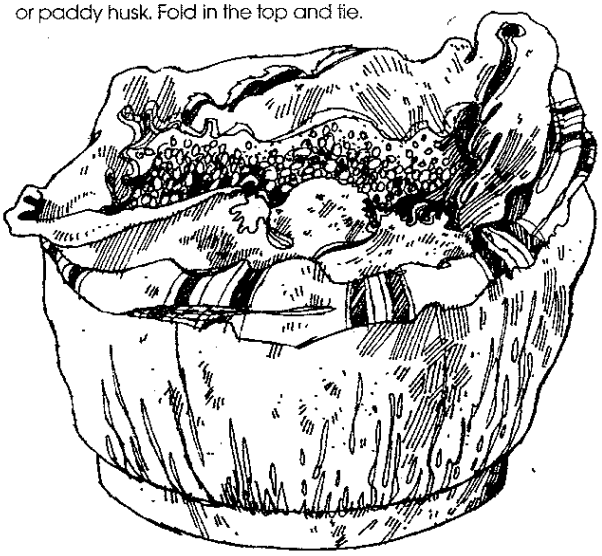
When mixing the plaster use as little water as possible, but enough to allow the mixture to hold together. If a lump of the mixture retains its shape when thrown to the ground and does not spread with the impact, it is about the right consistency.

2. Cast the base plate. First lay wrapping paper on smooth ground. Place a 600mm diameter ring made of metal strip 20mm wide on the paper and make up enough mortar to fill it. Allow the base to dry for one day under wet hessian and then remove the ring, which can be used again.

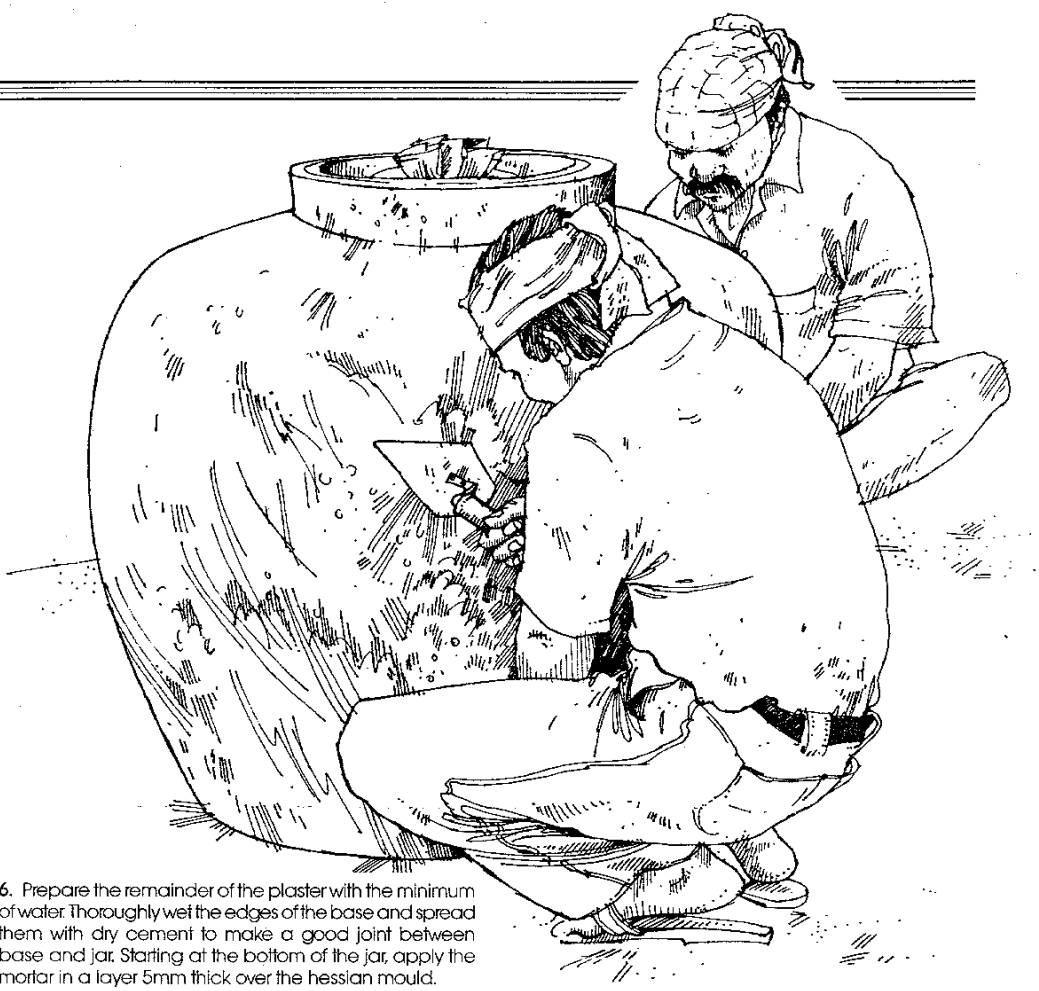
3. The mould for the jar can be made by sewing two pieces of hessian together to form a sleeve.



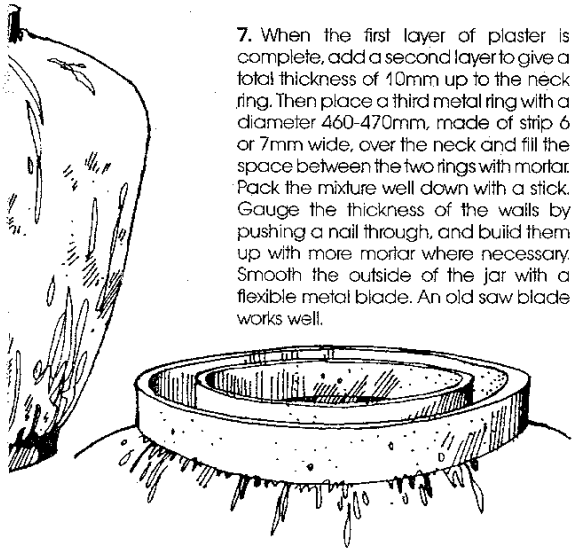
4. Set up the sleeve on the prepared base, tucking the hessian well in at the bottom, and fill it with sand, sawdust, or paddy husk. Fold in the top and tie.



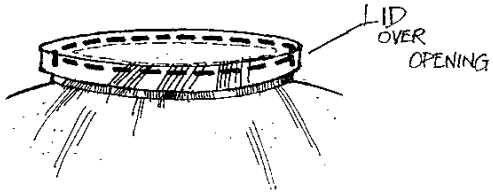
5. Place a second metal ring of 400mm diameter, made of 70-80mm wide strip on the top of the bag. This will form the neck. Spray the bag with plenty of water and make it into a smooth rounded shape with a piece of wood.



6. Prepare the remainder of the plaster with the minimum of water. Thoroughly wet the edges of the base and spread them with dry cement to make a good joint between base and jar. Starting at the bottom of the jar, apply the mortar in a layer 5mm thick over the hessian mould.



7. When the first layer of plaster is complete, add a second layer to give a total thickness of 10mm up to the neck ring. Then place a third metal ring with a diameter 460-470mm, made of strip 6 or 7mm wide, over the neck and fill the space between the two rings with mortar. Pack the mixture well down with a stick. Gauge the thickness of the walls by pushing a nail through, and build them up with more mortar where necessary. Smooth the outside of the jar with a flexible metal blade. An old saw blade works well.



8. Cover the finished jar with wet hessian. This prevents it drying too fast and cracking. After two days the rings at the the neck can be removed. After two days the rings at the neck can be removed, followed by the bag and its filling, which can all be used again. After two more days the jar can be used. Only fill it half full of water on the first day of use and ¾ full on the second day. It can be filled completely on the third.

9. Fit a cover to the jar to prevent contamination of the water from outside.

• This method of building jars can be used for capacities of up to 1,000 litres. For larger sizes, the structure will need to be reinforced with barbed wire or chicken wire.

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Improving water quality by filtration

River water may be the only source available at times, but it is often dirty and not hygienically safe. A simple treatment system to supply up to eight families can be built using four covered jars, four valves, plastic tubing, sand (0.5-3mm and 0.5mm grade) and gravel, as follows.

The tubes can be fitted to jars either by making holes in the walls when the mortar is still soft or by cutting holes with a small hammer and a chisel (made from a sharpened screwdriver). Tubes can then be sealed in with cement mortar.

Jar 1 is for the storage and settlement of the untreated water and should be as large as possible. Valve A is fitted at the bottom and is used for cleaning out the jar. Valve B is fitted about 100mm above A and controls the flow of water to jar 2. Jar 1 is raised above the other jars in the system to provide pressure to push water through.

Jar 2 is an upward flow filter which will remove much of the coarse dirt. A 250 litre jar can treat 20 litres of water an hour. Back-wash the filter weekly by closing valve B and opening valve C to drain the jar. Clean, but not hygienically safe, water can be drawn from valve D.

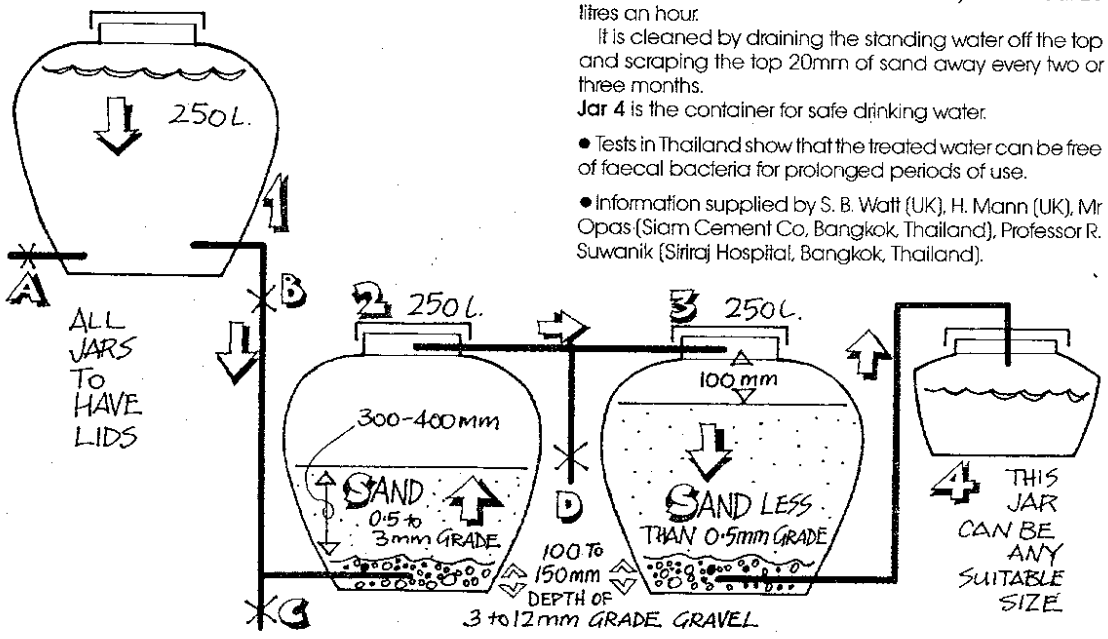
Jar 3 is a downward flow filter. A 250 litre jar can treat 20 litres an hour.

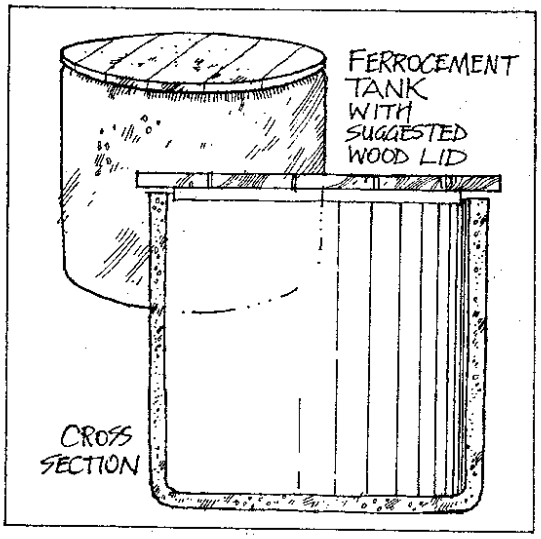
It is cleaned by draining the standing water off the top and scraping the top 20mm of sand away every two or three months.

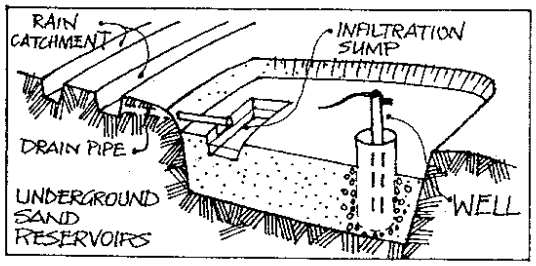
Jar 4 is the container for safe drinking water.

- Tests in Thailand show that the treated water can be free of faecal bacteria for prolonged periods of use.

- Information supplied by S. B. Watt (UK), H. Mann (UK), Mr Opas (Siam Cement Co, Bangkok, Thailand), Professor R. Suwanik (Siriraj Hospital, Bangkok, Thailand).







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5. Mann, H.T. and Williamson, D. *Water treatment and sanitation.* IT Publications, London, third revised edition 1982, 96pp.

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