



### **Rainstorm Damage**

It is important to prevent the trench being damaged by heavy rains. The ground around the trench must therefore be raised so that rainwater will not enter.

### **Mosquitos**

Mosquitos must be prevented from entering the tank to breed. The open end of the "T" must therefore be covered with a small piece of mosquito net. This must then be replaced after drawing water from the tank.

### **Water Quality**

The rainwater in the tank is NOT safe to drink. But it can be treated by boiling or by using the system of solar radiation (see Gaia Booklet 5).

Water from thatched roofs is often coloured brown by organic material and fine particles. If it is not boiled it must be purified with moringa seeds (see Gaia Booklet 5) before it can be treated with solar radiation.

## **THE GAIA-MOVEMENT**

### **BOOKLET NO 10**

### **HOW TO:**

## **MAKE A ROOF WATER TANK**



## Simple Rainwater Collection Systems

Water is a precious resource. Many people in developing countries experience serious shortage of water during a large part of the year. The average amount of water available in countries like Mozambique and Malawi is under 20 litre per person per day. Water is not only scarce, but fetching water also takes up many hours for the women and girls whose task it most often is. It is therefore good to know simple systems which can reduce the work and provide water to the households.

### Some simple systems

A simple system is to collect water falling on big trees. Much of the water runs along the trunk and can be led to containers for example with banana leaves.

Another system is from India, where some people use saris (large piece of cloth up to 10 m long). Bamboo sticks are tied to the four sides to strengthen the system. Four bamboo sticks are then placed in each corner forming a big funnel which leads rainwater into a bucket or drum.

### Roof Water Harvesting

Rooftops is the most obvious place to collect water, as it is close to the house, and has a large surface nor-

It is a good idea to extend the tube over the ground level. A wall of 0.5 to 1 meter is then built around the tube. It can be built with mud bricks or with the normal system of mud on a wooden/bamboo frame.

This will prevent rainwater from entering the hole in the ground and protects against other damages. It is also easier to get water out of the tank by suction. The tube must still be covered but the area to be covered is now much smaller. The overflow system can be made as in the horizontally placed tube with a PVC "T" pipe.



*a wall should be build up on top of the vertical tank*

*straw roof cover of an underground tank*

### Covering

The plastic tube must be covered and protected against damages. A fence should be set up around it to prevent animals like dogs or goats to destroy it. It is also important to keep the tube covered. This is to protect the plastic material from being destroyed by the ultraviolet rays of the sun. It can be covered with straw mats, bamboo leaves, or be made like a traditional thatched roof. The covering must be strong enough to prevent damages from for example falling twigs

If the area is sloping then the overflow must be placed at the high end.

If the area is flat the overflow can be made in one end or in both ends.

A piece of PVC pipe is placed with half of it inside the end of the plastic tube. Pieces of car tube are tied around the plastic tube with the pipe inside to make a tight connection.

The overflowing water can then be led to the vegetable garden or a fish pond.

### **Drawing water from the tank**

This can be done with a cheap plastic pump, of the kind used for getting diesel or oil from a drum.

Or the system can just be a piece of hose where the water is sucked in. It is good to dig a small hole beside the tank where the empty water container is placed. It is then easier to get the water flowing through the hose. If the area is sloping another system can be used where a tap can be made at the bottom end of the tube. The water can then simply be tapped out of the PVC pipe.

In urban areas it is often a problem having enough space around the houses. If the soil is hard and stable the plastic tube can then be placed in a vertical hole. Either a narrow hole is made and the end of the tube is tied to prevent water from leaving the tube. Or the hole is made wider, and the tube is folded in two. This hole is easier to dig and will not need to be so deep.

mally not used for other purposes. The best roofs to collect from are the ones having sheet metal or tiles as nearly all the water will run off. The thatched roofs found in all African villages can also be used although more water is absorbed by the roof material. A gutter system has to be made for example of a PVC pipe cut in two (length wise) and tied to the roof frame. It must then be sloped to lead the water to the tank. A gutter system can also be made with waterproof shade cloth which for example is available in Zimbabwe (see front page). This is more efficient for round huts. A metal wire is stitched on the two sides of the long and 30-40 cm wide piece of cloth. This wire is then tied to the roof frame.

When the rainy season starts it is important to let the first showers flush away the dust and dirt accumulated on the roof during the dry season. This water should not be led into a closed water tank, but can be collected in drums or containers and used for the garden or for washing after filtering the dirt off. The system should therefore be made so that it is possible to divert the water from these first showers away from the rain-water tank.

A rooftop that is 50 square meters can supply an annual average of 50 litres per day with 500 millimetres annual rainfall. This supply can help reduce competi-

tion between agricultural and household demands and can free women from the chore of collecting water.

One of the main problems in harvesting rainwater from rooftops is the cost of the tank. In many Asian countries it is possible to buy cheap ferrocement tanks, but these are not available in most African countries.



*corrugated iron tank*



*ferrocement tanks*

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There are however other cheap systems which can be used. One of them uses tubular plastic to form the tank. The plastic tube is not very strong in itself, but if it is placed in a trench without roots or stones, this is no problem.

In Zimbabwe it is possible to buy plastic of 250 micron thickness. It is good to place one tube inside another to achieve a stronger tank.

A trench is made according to the tubular plastic available. 5 m of tube with a diameter of 80 cm will hold 2000 litre. One end of the trench is placed where the

roof water is to enter the tank. The tank can also be placed so that each end receives water from one side of the house.



*the trench is dug*



*a pipe is tied with rubber strings  
The picture is from a biodifester  
and this does not have a "T"*

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The rainwater is collected in a gutter system and led into the plastic tube through a PVC pipe. This connection should be made so that mosquitos cannot enter the plastic tube. But at the same time it must be possible to open the connection in order to divert the first dirty rainwater.

The PVC pipe has a "T" fitting outside the plastic tube. This is necessary in order to have an opening from where water can be drawn.

The "T" is also needed to make an overflow system so that excess water can leave the tank. The overflow system depends on how the area is where the tank is placed. The open end of the "T" is used for the overflow.