



8 • The 'Tippy Tap'

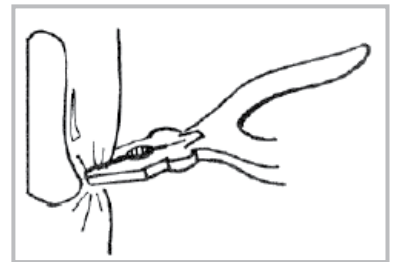
Idea

Lack of water is the principle reason for which people neglect to wash their hands regularly. Here is an idea that uses only about a tenth of the normal quantity of water per hand washing. The Tippy Tap is made of a used plastic bottle of the type with a handle and a string. It doesn't consume as much soap either because the soap is protected by a can from the rain so it doesn't get wet.

Instruction

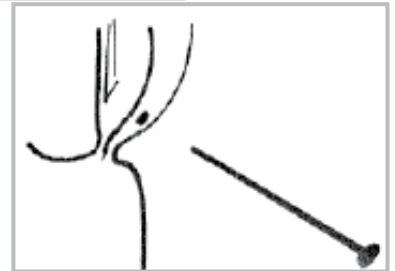
1. Heat the base of the handle of a plastic bottle slowly with a candle, turning the handle until all sides are evenly heated and have become shiny.
2. Remove the candle and pinch the base of the handle closed with a pair of pliers so that the water cannot pass through it. Hold the handle closed with the pliers until the plastic cools to ensure that the opening 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 outer side of the handle just above the place where it is sealed off.
4. Heat the nail again and make two smaller holes in the back part of the bottle. The holes should be in the middle of the bottle and about a finger width apart. A cord will be passed through these holes to hang the Tippy Tap.
5. Thread a cord through the two holes and tie the ends to a pole. Tie a bar of soap and an empty can on another piece of cord so that the can will protect the soap from the rain and sun. Connect this cord to one of the support cords.

6. Tie another piece of cord to the neck of the bottle and leave it hanging down. This cord is used to pull the bottle down so that the water comes out the hole in the handle.
7. Fill the Tippy Tap with water up to the holes in the back of the bottle. Tie the system to a pole or a branch and the Tippy Tap is ready to use.

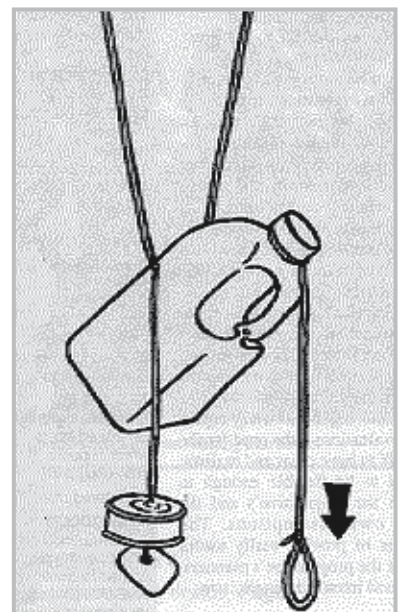


How to use the Tippy Tap:

- Let the water flow over your hands.
- Use the soap.
- Rinse your hands to remove the soap.
- Dry them with a clean cloth.
- Ensure that the Tippy Tap is tilted back so the water does not run out.



The Tippy Tap was originally made of a pivoting gourd and was designed by Dr. Jim Watt and Mr. Jackson Masawi at the Rural Centre of the University of Zimbabwe. The plastic version was designed by Mr. Ralph Gamet and Dr. Jim Watt in Canada.





9 • Drip Irrigation

Introduction

An efficient way of using water for crop production is drip irrigation. Trials have shown that, depending on the crop, drip irrigation uses 10 times less water than flood irrigation. Another advantage of drip irrigation is that nutrients can be added to the water which then enters directly into the soil around the plants.

A manure “tea” can be made from animal manure or green plants. This liquid should be thinned in order not to burn the plants. Correct irrigation avoids that nutrients are washed away by rains or transformed by microorganisms.

A simple drip irrigation system can be connected directly to the outlet of a pump (the outlet should be at least 0.7 m above the drip outlets). Or the system can consist of a storage tank.

A main hose is connected to lateral hoses with small holes or inserted micro tubes. The two systems described here are:

1. the Nica drip,
2. the Micro-tube drip.



Drip irrigation system in Nicaragua



Micro-tubes are cheap and easy to clean

How to design the lay-out

The lay-out of the system depends on several factors, such as:

- availability of manpower to pump and work on the land,
- the type of products to be grown,
- the soil and climate conditions,
- the slopes and differences in height of the soil surface.

If possible, then ask advice from local agricultural experts to design the optimal lay-out.

Ask them also how much water the various crops require and how often they need that amount.

The area that can be irrigated with a drip systems and a hand rope pump is between 1/8 to 1/2 ha.

Nica Drip

Materials and tools needed to set up a Nica drip:

- a filter (inside the tank), an outlet tube and a valve,
- a main hose of 30 to 50 mm (depending on size of plot),
- “T” pieces and extra valve in case 2 sections are desired,
- connectors to connect the laterals to the main hose,
- laterals (polypropylene hose, strong black plastic, of 14-19 mm diameter),
- a nail or piece of strong wire of 1.5 mm diameter,
- pliers to hold the nail and scissors or a knife.

How to install

1. Connect the laterals to the main, fold the other end and fix it with a stick in the ground.



2. Make holes (1.5 mm) with the nail on the topside of the pipe (distance between the holes depends on the plants to be irrigated, e.g. tomatoes 70 cm).
3. Make drippers of the lateral hose. Each dripper requires 2 "sleeves" of 5 cm. Cut the sleeves lengthwise and mount one sleeve over the lateral without covering the hole. Place the other "sleeve" over the first one, but the second one covering the hole.
4. Fill up the tank, test if equal water amounts come out from every dripper
5. Plant 4 plants around each dripper.
6. In case the area is sloping, differences in water flow from the drippers can be compensated by partly closing the laterals or main hose on the lowest sections.

"Micro-tube Drip"

Complete systems are distributed as Drum Kits by the organisation IDE (International Development Enterprise). They use so-called "lay flat" hose for mains and laterals which reduce cost and transport volume compared to the Nica drip.

The complete systems require water pressure of about one metre. This means that there must be one metre difference between the outlet of the tank and where the water comes out of the micro-tubes. The micro-tube drippers inserted in the lay-flat hoses are in this system about 0.6 m long. It is possible to use the system with less water height (0.5 to 0.9 metre). The length of the drippers is then reduced to 0.3 to 0.5 metre.

This makes it possible to make a cheaper system connected to a tank made of bricks (see section 11), even though the water from a tank on the ground will have less pressure than if the water comes from a container placed one metre above the ground.

Water flow from the drippers can be altered by making the micro-tube longer or shorter.

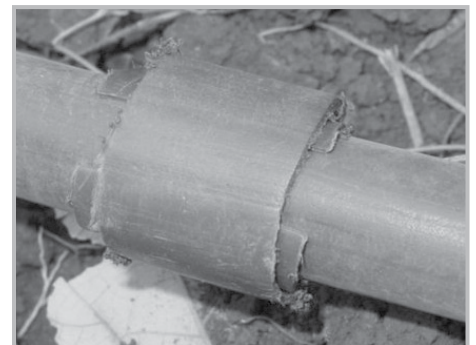
The micro-tubes of the lowest placed laterals should be longer than those of the laterals placed higher up. To have an equal amount of water from the dripper, you will need to experiment with the tube lengths. If the land is sloping it is best to let the laterals run along the contours, so that the pressure is the same within the lateral.



Troubleshooting

No water comes out of the dripper:

This can be due to dirt in the water or an air bubble. Take out the air bubble by sucking on the micro-tube. To remove dirt, take out the dripper and blow or suck it.



Weekly maintenance

- Control regularly that equal amounts of water come out of all the micro-tubes
- Open the end of the laterals to flush out any dirt
- Check /clean the filter

Making a hole, cutting a sleeve and the finished Nica drip

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10 • Maintenance of Water Posts

Clean water is important for a good health

Clean drinking water is very important for the family to remain healthy. Many diseases are caused by unclean water. Safe water comes from a protected hand dug well or from a borehole with a hand pump. If the hygienic rules for the water points are well kept - all these systems are good. The safest are boreholes with hand pumps. However, boreholes cannot be installed everywhere because they are much more expensive. One borehole costs as much as 10 wells.

Water committees



Building a pole fence to protect the water point

In order to construct and maintain a water point - any of the above mentioned - it is important that the community forms a Water Committee. This

committee consists of a chairman, a secretary, a treasurer and a few active members. The responsibility of the committee is to organise the community to assist with construction of the water points and hereafter maintain and safeguard them.

They must also protect them against vandalism and theft and keep the areas clean. Every year after harvest the committee must receive contributions from the families, in order to be able to buy spare parts, cement and so on for the maintenance and repair.

Main rules of well maintenance

- Slash grass around the well.
- Keep the drainage clear and sweep the area clean.
- Keep animals away from the well: construct a fence.
- Keep the bucket and rope/chain clean - they should never be on the ground.
- Put the lid on after use.
- Take in the windlass, chain and bucket at night or secure them.

Main rules of borehole maintenance

- Slash grass around the borehole
- Maintain the drain systems and keep the area clean by sweeping
- Fence the borehole - this is important, because cattle can destroy the pump
- Make sure children never play with the pump
- The handle must be operated smoothly
- The pump should be greased and bolts tightened monthly

The Water Committee shall call for professional assistance if the pump breaks down. Buy the spares and pay the technician for the work done. The government might have a system for the repair of hand pumps, but the community members must know that if it takes a long time to repair the pump they are the ones who will suffer. There are pumps in Zambia which have been in disrepair for 3 years. Therefore it is better for the welfare of the community to solve the problem locally.



Create a good environment around the water point

The community should make a nice environment around the water point. This can include:

- Live fencing - for example with finger euphorbia, jatropha or moringa. A live fence looks beautiful - and at the same time the community does not regularly need to renew a pole fence.
- Plant shade trees.
- Plant flowers.

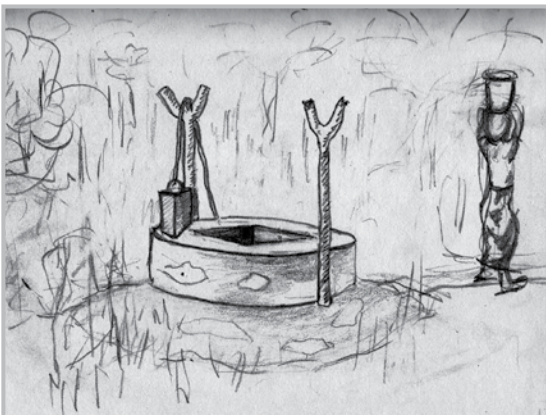
User fee

The committee should collect a small user fee annually of each member of the community (after the harvest).

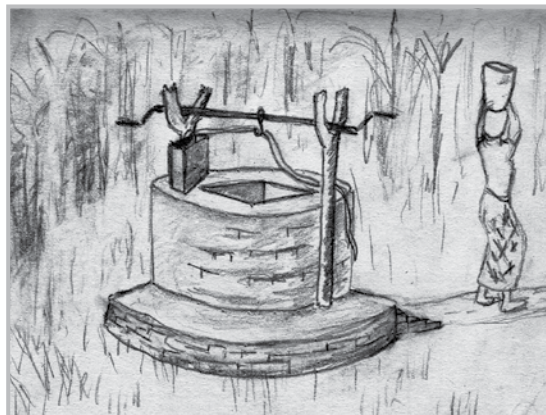
Information and drawings courtesy of DAPP (Development Aid from People for People) Child Aid and Environment, Monze, Zambia.

The “water ladder”

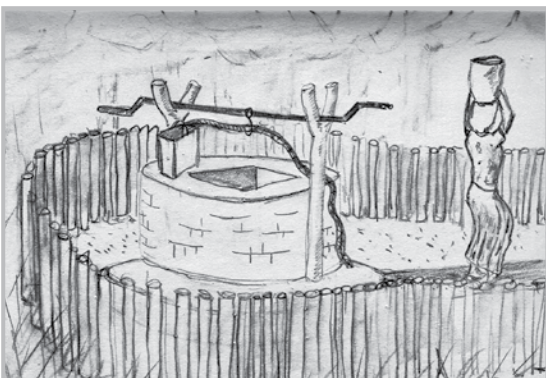
1. Open well with a bucket



2. Open well with a windlass



3. Protected well, but open



4. Protected well with a rope pump

