

**Short Manual
On
Drip Irrigation,
Nica drip & Micro-tube drip**



*Micro-tube drip irrigation system installed with a wind rope pump plus tank at
"Formigas de Futuro" school in Chimoio Mozambique, April 2007*

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Introduction

Irrigation by means of drip irrigation is an efficient way of using water.

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 enter 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 irrigation system can consist of a storage tank, a main hose and lateral hoses with small holes or inserted micro tubes. The technologies described here are

1. The Nica drip
2. The Micro tube drip

How to design the lay-out

The lay-out of the system depends on a number of variables, such as:

1. The available manpower to pump and work on the land;
2. The type of products that are grown;
3. The soil and climate conditions.
4. The slopes and height differences of the ground surface

It is best to ask assistance of agricultural experts from the region for designing the optimal lay-out.

Typical range of plots that can be irrigated by these drip systems with help of a hand pump are between 1/8 to 1/4 ha.



Filling the tank with the hand rope pump in Chimoio



The pump, tank and main flat hose

Materials and tools needed for the 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)
- Tee pieces and extra valve in case 2 sections are desired
- Connectors to connect the laterals to the main hose
- Laterals (polypropylene hose of 14-19 mm diameter).
- A nail or piece of strong wire of 1.5 mm diameter.
- Pliers to hold the nail and a scissors or 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 long
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 sloped differences in water flow (liters/sec) from drippers can be compensated by (partly) closing the laterals or main hose.

Rule of thumb is that the total cross cut surface of drippers should not exceed **50%** of the cross cut surface of the outlet pipe

How to use the system

It is best to ask assistance of agricultural experts from the region for effective use of the system. The most important parameter to know is how much water particular plants need and how often they need that amount.

"Micro-tube Drip"

Complete systems as Drum kit or Baffle drip are distributed 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.

These systems require an operating head of 1 and 2 meter.

The "Micro-tube Drip" system uses parts of the Drum kit system like the connectors, the laterals and micro tubes used to make the drippers.

The length of the drippers is 0.3 to 0.5 meter which is shorter than in the Drum kit and therefore easier to clean and less water height is required (0.5 to 0.9 meter).

Water output 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. You will have to experiment with the lengths, so that you get the same amount of water out of all the drippers.

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.



First trial system in Chimoio



Close up of the flow from the microtube dripper

Brick cement tank

Nica drip and Micro tube drip can be connected directly with the outlet of a pump (minimum height of pump outlet approx. 0.7m above drip system level) or be combined with a water storage tank of around 0.9 m high that can be filled up directly with, for instance, a rope pump. Brick cement tanks consist of bricks placed in a circle, reinforced outside with steel wire, and plastered in and outside with cement. (See also manual on Tanks) To achieve maximum pressure, it is advised to install the well and water storage tank at the highest possible place.

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 an equal amount of water comes out of all the micro-tubes
- Open the end of the laterals to flush out any dirt
- Check /clean the filter