

10,000 gardens in Africa project

Water management



Why irrigate?

First of all, it is important to identify the more drought-resistant crops and apply good management techniques, such as mulching, which help to reduce evaporation and loss of water.

In many situations, it is necessary however to have a minimum availability of water to irrigate the plants throughout their growth period. Horticultural crops do, in fact, need to be tender and rich in water, but they generally have a superficial rooting system, and, in the higher layers of soil, water is usually scarce, both because of filtering and the effect of evaporation.

In order to grow roots in optimal conditions, drainage is also essential. There are smaller spaces in the structure of the soil that retain water particles, and larger spaces that filter excess water, letting in air. It is imperative that air can circulate and water is always available.

How do we irrigate?

For every country and/or climate zone, some proposals related to irrigation will need to be drawn up during the training sessions together with the local technicians and communities that take into account: local traditions, the possibility of finding/multiplying seeds, and the suitability of the environment.

We suggest you involve the community in the creation of drawings that make it possible to visualize methods that are simple and easy to copy.

It is necessary to identify systems that:

- keep the soil moist, but not soaked;
- do not favor the proliferation of pests;
- distribute water at root level, avoiding runoff and the dispersal of fertilizers;
- are water-saving.

It is important to water the crops in the evening or early morning, avoiding the hotter hours.

Watering should be done at closer intervals in soils that tend to be sandy and at more spaced intervals for soil that tends to be clayey. In fact, water filters easily in sand and ends in the deeper layers, for which the roots soon remain dry; clays, on the other hand, retain more water on the surface. Even the regularity of distribution is important: water surges aren't good for crop development.

How to collect and store water

A tank – which can be made of plastic (lighter and easier to clean) or other material – allows us to accumulate rainwater (perhaps channelized from gutters) and to distribute it at different times. Moreover, water can decant, leaving any impurity on the bottom. If the tank is at ground level or higher up, it is necessary to position the outlet pipe at a height of ten centimeters from the bottom, to avoid collecting impurities and sediments. If the tank is underground, it is necessary to place the recovery pump at twenty inches from the bottom to recuperate clean water.



Water can be stored even with a settling reservoir which fills easily, channelizing rainwater. The banks of the reservoir should be such as to guarantee access and safety, even more so if there are young children in the surrounding areas! The banks can be made stable with canes. In the reservoir water hyacinths (*Eichhornia crassipes*), for example, can be grown, which, in addition to being ornamental, contribute to purifying the water. The water hyacinths grow rapidly, and if harvested regularly, can also be used to make compost. Other plants that can be planted in water are elephant ears, papyrus reeds, and water lilies. The water can also be used for breeding freshwater fish (such as tilapia).

How to distribute the water



Irrigation can be **lateral** – in this case furrows are filled with water alongside the vegetable plants – or **underground**, through a perforated plastic pipe (hose) positioned on the ground, under the mulch.



As an alternative to the hose, you can use the jars, or rather ceramic cruets, often of terracotta, which are buried close to the plants (at 10-30 cm), filled with water and sealed with a stopper. The porous material releases moisture in the soil in the right quantity. The plants absorb the water they need and the soil remains loose and aerated, not compacted by frequent watering. The cruets can be filled every 5-7 days, according to need. This system has many advantages. By watering the soil at the right depth, root depth, water loss and evaporation can be avoided, and allows the plants to receive the necessary supply of water. What's more, using cruets inhibits the development of weeds which proliferate in moist surface soil, and reduces the use of fertilizers because less water runs off, fewer soluble nutrients are lost. The terracotta cruet can replace plastic bottles or other porous tools or small lateral holes, always dug partially in the soil.



Lastly, still referring to plastic bottles, a **drip irrigation** system can be created. Make a hole in the bottom of a bottle and in its cap. After unscrewing the cap, fill the bottle with water and place it on top of the plants (at 20, 30 cm from the ground) upside down, hanging from trellises or supports by means of hooks or simple wire. The drops mustn't fall on the plants, but to the ground, between one plant and another, where the roots are.



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