



ing manure (from animals or composted plants) in a bag to make a “tea”. This should then be diluted so the plants are not harmed.

By giving the nutrients directly at the roots through irrigation much less is wasted by leaching or bacterial transformation. Compared to normal modern applications one third less fertiliser is needed.



Drum drip irrigation feeding three lines



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THE GAIA-MOVEMENT

BOOKLET NO 7

HOW TO:

- 1. HARVEST RAINWATER BY GROWING VETIVER HEDGES**
- 2. SAVE WATER USING DRIP IRRIGATION**



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How to harvest rainwater growing vetiver hedges

Idea

The idea is to improve your crops by getting more rainwater to stay in the soil in stead of running off. This is done by growing vetiver hedges which at the same time reduce soil erosion.

Introduction

Many farmers in the developing World are totally dependent on rainwater. Most areas have one rainy season where it is possible to grow crops, and a dry season where only the few with irrigation can produce. Vetiver hedges are a way of harvesting rainwater so you can grow vegetables/crops for a longer period. This works two ways:

- rainwater running **on** the ground is stopped or slowed down
- the big root system acts like an underground barrier and keeps the water **in** the ground

The vetiver hedges must be planted in contour (same level) with 10 meters between hedges. They will efficiently stop soil erosion which in a country like Zim-



Save water by using drip irrigation

Availability of water is often what determines the amount of vegetables grown in the gardens. You can make a simple drip irrigation system so the same amount of water can greatly increase the harvest.

- cut out the bottom of a fuel drum
- hammer where you cut to avoid any sharp edges
- buy a T-fitting and insert in the small hole on the lid. If possible also a valve to close
- connect 2 hoses (30 mm) - each about 20 m long - with fittings or tyre rubber
- Make small holes with a needle for every 30 cm
- double and tie the end of the hose to close it
- come a piece of sponge or cotton in the fitting at the outlet of the drum to remove dirt so the small holes do not get blocked
- turn the drum and place on some bricks
- cover the open end of the drum to avoid dirt

This drip irrigation system uses much less water pr produced kilo of food. 15 - 25 times less than flood irrigation depending on crop was measured in South African.

Another advantage is that nutrients can be added to the drum and applied directly to the soil around the plants. This can be made in another container by us-



When planting the hedge in dry areas

- plant in the beginning of the rainy season
- prepare the lines for the hedges - at the same level
- if possible do not plant them in shade
- make a small ditch 10-20 cm deep - this will give more moisture to the plants
- if you do not use polybags dip the roots in mud slurry (mud mixed with water) so they do not dry out. Cover with wet sacks. And **plant same day**
- planting distance no more than 15 cm
- plant 3 tillers in each hole
- plant so the pale greenish area at the bottom of the leaf base is just covered
- if there is no rain, water every second day until the plants are growing well
- water at least 2 times pr month during the first dry season or if the rains fail
- When they grow well it is good to trim the plants to 50 cm height - this makes them grow new shoots and close the hedge



*Plant with 15 cm between the vetiver
Follow the contour lines so water is stopped*



babwe has been calculated to annually remove 50 Ton of soil pr hectare pr year. This not only creates problems in neighbouring Mozambique (floods) but with this soil many nutrients are lost which could have been used by the crops.

The extra water in the soil will extend the growing season or make it possible to grow crops needing more water.

The system can even be used in very dry areas by planting the same hedges in the dry river beds. After the short period of rains when water is running in the river, it will be possible to grow crops behind the hedges.

Start making the system in a small area, so you find out the best ways of growing vetiver in your area. And so you can see that it works.



*Vetiver is widely used against soil erosion -
it is very efficient in stopping water flow*



Instruction

How to make a vetiver nursery

Your nursery can start small scale by growing vetiver in wastewater from kitchen, bath etc (see other booklet about waste water cleaning). If you are in area with very little water you can grow the vetiver directly in a small stream or pond.

Vetiver is very easy to grow and can grow under nearly all conditions.

If you have little water for watering it is best to grow the plants first in plastic bags. If there is enough water for watering bags are not needed and they can be planted directly in the ground.

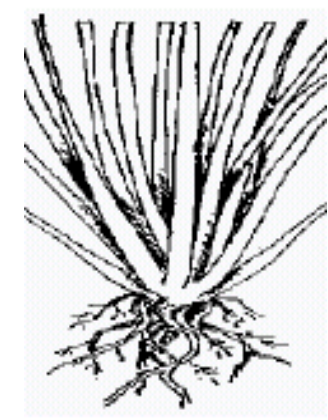
If you do not know anyone who has vetiver plants find suppliers at “The Vetiver Network” www.vetiver.org. Or contact us.



A vetiver nursery



- start by getting some vetiver plants. If you have to transport them, keep them out of the sun and with the roots in water
- cut the leaves at 20 cm and the roots at 10 - 15 cm
- mix cow dung (or compost) into a bucket of water
- place the vetiver with the roots in the bucket
- after 4-5 days in shade small new roots are seen
- separate the tillers and plant in polybags (plastic bag with small holes used in nurseries)
- the better soil or compost in the bag the better
- if available add some fertiliser
- water them daily
- after about 1 month the plant should have at least 2 new shoots and is ready to plant out
- before planting them out they must be hardened that is reducing watering



Vetiver with 4 tillers Leaves cut at 20 cm, roots at 10 cm