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DITCHES AND ORGANIC AND INORGANIC BARRIERS

To stop wind and water from eroding soil

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Don Santos Luis Baez Espinoza from the El Rodeo community, (Municipality of Cusmapa), tells us about the transformation of his land and his life:

"I've only been living here for two years, and in those years FEDICAMP has given me these plants: plantain, orange, all the citric fruits, and chaya. You gotta understand that these lands weren't good for agriculture, but in these two years, I've been repairing them. These terrains are acid because of the pine trees. It's been hard for the plants to develop.

What I've done is build swales that retain moisture, and that really helps. During the rainy season, the ditches fill with water. That means that during the dry season the terrain stays wet. Well, moist anyway.

We've also been seeing that the organic barriers are good for stopping the wind from messing up the trees.

All of this comes down to being smart, because you have to work hard as a farmer. You want to harvest, you don't want to have a rough life, you want to help your friend out, and you want to have extra to sell, too. Whoever comes here now can buy from me at a good price. Here I'll sell you the pound of potatoes for as little as five córdobas, and it's a good pound."

Purpose of swales and organic barriers

Swales or **infiltration ditches** are a way to harvest water during the dry season and stop downpours during the rainy season from eroding the fertile topsoil. It's a channel that follows along a contour line so that the water doesn't run to one part of the channel, but rather collects and infiltrates into the ground. In addition, every 5 to 8 metres along the channel some small mounds are built in order to retain the water and help it infiltrate.

The **organic barrier**, as the name suggests, is a hedgerow using vegetation planted along a contour line to retain the soil. The plants must have a well-developed root system in order to anchor the soil, be planted very close together, and have some additional function (medicinal plants, insect repellents, food). Some good examples are lemongrass or valerian, pineapple or piñuela (Bromelia pinguin). The spacing between each organic contour barrier will depend on the percent slope of the terrain.

Step by step: Constructing swales

1. Staking

The bottom of the ditch should be about 30 centimetres wide, so place stakes some 30 centimetres above the previously laid out contour line.

2. Digging

Using a pick, dig the trench to a depth of about 30 centimetres (measured from the lower part of the ditch). Mound the dirt on the downhill side.

3. Cutting the rim

The rim is the sloping edge that needs to be cut above the ditch. The width of the rim depends on the slope, but it should be the same as the height of the ditch on the upper side.

Like with the ditch, mound the dirt on the downhill side.

4. Making check dams

Check dams are little mounds, half the height of the ditch, which are left in place very 6 to 8 metres when building the swale. They serve to better distribute rainwater along the channel since water runoff is not uniform throughout the whole plot.

Costs

- The only expense required for building the swale, aside from labour, is the set of tools (hoe, shovel, pick and digging bar) which cost about $45 USD.
- For the organic barriers, you need the seed plants of the crops you want to plant along the contour line (or next to the swale). The cost of vetiver plants sown 15 centimetres apart in staggered rows is $3.30 USD for every 10 linear metres of organic barrier.

Recommendations

- ✔ Every linear metre of the swale can hold the equivalent of a barrel of rainwater.
- ✔ If the slope is greater than 35-40%, it's better to build terraces instead of swales. If the slope is greater than 50%, the plot is not suitable for agriculture and it's more recommendable to plant fruit or lumber trees.
- ✔ Building swales takes a lot of work. For example, on a one-manzana (0.7 ha.) plot with a 30% slope, you're going to need a total of 850 metres of swales.
- ✔ Recommended plants that trap soil well are those with a strong root system such as valerian (or vetiver) and lemongrass.
- ✔ Every time a swale fills up with dirt, you have to clear it out to get it to its original depth.

Inorganic barriers

"It's not ready in a day"

Don José Santos Alvarado Vanegas of the Aserrio Viejo community, in the municipality of Cusmapa, tells us about these terrific walls he's built:

"This place didn't use to have anything, it was just pine. But since the weevil problem, the woodcutters have been taking out the infested wood so that the forest would be ok. That's when the soil conservation project came in.

Before we would always go away to work. But now because of the soil conservation, we started to prepare a plot of land.

That's when we started to get the rocks out of the ground. There were too many rocks and we couldn't plant, so we decided first to make a stone wall around the one-mza. plot and then make inorganic barriers.

My son and I have worked really hard, because this job isn't ready in a day. This job has taken us 4 years. Without these walls, we wouldn't have anything because all the soil would have gone down to the neighbour's plot.

The inorganic barrier is all about keeping the soil and not letting it get away.

The barriers have their own measurements. You lay them out with an A-frame.

Here the barriers are six metres apart because the terrain is really steep.

If you don't have rocks in your plot, you can make a mound of earth and plant organic barriers, always following the contour lines.

Wherever there were pine trees, the ground is all acid, and if I plant beans, cassava or yams, they won't survive. The first year you might not get anything to eat out of this land, but it'll get better over time.

To start we would bring dirt from a kilometre away to make some mounds and plant onions or peppers. We would bring manure and mix it in.

This thing isn't ready in a day. Sometimes, it's easy to get discouraged because you know it's really hard. But we know very well that we're giving nutrients to the plant, the soil and our own health. It's worth it because we're going to have a completely improved and uncontaminated land."

Purpose of inorganic barriers

- In very rocky terrains with more than a 30% slope, inorganic stone barriers are a good option to keep rainwater from eroding the soil and at the same time clear the ground of all the rocks that prevent planting.

Building an inorganic barrier, step by step

- Once the contour line is laid out, gather up the rocks scattered throughout the plot.
- Make a trench about 30 centimetres wide by 20 centimetres deep as a foundation, to ensure the stone wall has a firm base.
- Build the inorganic barrier just as you would any other stone wall, placing the larger, flatter rocks on the bottom.
- The height of the wall depends on the slope and the number of stones available.

Costs

Basically, the cost is buying the set of tools (digging bar, hoe, shovel, pick and wheelbarrow), which is valued at around $100 USD. And lots of labour.

Recommendations

- If you don't have rocks in your plot, it's better to think of using stumps or planting organic barriers.
- You must avoid leaving empty spaces between the rocks where water could flow through and demolish the wall.
- It's very heavy, time-consuming work. In the case of Don José Santos, he and his son would spend a whole day for every linear metre of stone barriers.
- As to maintenance, fallen rocks must be replaced. Also, when the barrier fills with dirt, you have to make it higher by placing more stones.
- Don't let animals pasture in the plot because they could destroy the inorganic barriers.

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www.sciaf.org.uk
Scottish Catholic International Aid Fund
19 Park Circus
Glasgow G3 6BE
T: 0141 354 5555
E: sciaf@sciaf.org.uk

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