

Chain of innovations

Hailu Araya and Sue Edwards

In 1996, the Institute for Sustainable Development (ISD) and the Bureau of Agriculture started working with 45 farming families in Adi Nifas – a highly degraded semi-arid area in Tigray, in northern Ethiopia. The aim was to find out if rehabilitating the environment and introducing compost could increase the productivity of the land and improve the livelihoods of the farmers. However, before the farmers were prepared to try making compost, they asked for help to stop two gullies that were eating away their fields. The community built check dams and planted the gullies with trees and grasses. In two years, the gullies were stopped and standing water appeared.

This success stimulated a farmer living next to the project community, Woldu GebreWahid, to rehabilitate his land. Woldu inherited a quarter of a hectare of land near to his house, and lives there with his wife, Hawariya and three children. It was poor land for farming: very steep, infertile and cut by a gully over 2m deep and wide.

How he started

In 1998, Woldu saw the improvements in Adi Nifas and started to build check-dams and plant trees in the gully cutting his land. He also dug pits to catch both soil and water to rebuild his fields. Many of his neighbours thought he was crazy. But the change he made is unbelievable. By 2001, he had rebuilt his fields. "I learned two things from the project in Adi Nefas: that gullies and erosion can be stopped by check-dams and vegetation cover; and that compost can increase agricultural yield and soil fertility. Previously, I could not plough my land with my oxen because it was in two slices (i.e. divided by the gully), so I was digging my land by hand. I was annoyed I could not work with my oxen like others. But after catching the soil, I rebuilt my fields and could plough with my oxen. I was called 'an innovator' by the local agriculture experts."

Finding permanent water

His second plan was to find a permanent source of water. He said: "I remember *Qeshi* (Priest) Malede, a local innovator, saying that there is water in this land but the question is where to find it. I chose a place where the flood passes through; I thought it may be a place where water is retained. I dug for two metres and saw there was moist soil. When I got deeper I got better moist soil. At last I found water at around six metres. I remember I cried because I was excited."

After he found water, he built a well and planted fruit trees. He pulled water directly from his well, but "it was not good for my wife and children because they could fall into the well. So I started to search for new techniques. ISD helped me and my wife to visit *Qeshi* Malede." This was in 2003. *Qeshi* Malede had designed and built a lifting device using a long pole with a weight at one end, so that his wife could lift the water container easily. In the week after the visit, Woldu built his own device for lifting water from his well. He took a piece of heavy metal from a military tank destroyed in the fighting of 1990-91 to use as the weight on the end of a long eucalyptus pole. But watering was still tedious. Therefore, he bought a barrel for holding water and took the water to the plants through a plastic tube. He then replaced the barrel by a one-metre cube cemented tank. His wife and children now do most of the watering.



Photo: Sue Edwards

Woldu's neighbours were interested to see his experiments with water-lifting devices.

From carrying by hand to a modified drip system

He and his wife then experimented to find the best way of watering. He brought orange trees from a nearby nursery and planted them at the same time. He tried a different treatment on each orange tree:

1. *Direct pouring of water*: many farmers build 50 to 100 cm diameter basins around their trees and water them in the morning or in the evening. Woldu found that the water was gone in half an hour and the soil dried up in two hours. The orange trees were also affected by ants and termites.
2. *Traditional drip irrigation*: a gourd is hung on each orange tree. It has a hole at the base plugged with cotton cloth so the water leaks out slowly. It is filled with water in the morning or in the evening. Woldu found that the volume of water reduced fast and it became warm, particularly during the day. The advantage of the gourd drip system is that it can be prepared easily and it protects the trees from ants and termites - when water drops on the tree stem and leaves, ants and termites are deterred from visiting the plants.
3. The "*buried pot system*": an old clay pot that has cracked or has a hole made in it is buried under each tree. The hole is plugged with cotton cloth, and filled with water. The water stays longer than in the other treatments, stays cool and reaches the root parts continuously. This method also protects the trees from termites.

Where is Woldu and his family now?

Woldu comments: "My family and neighbours now respect me. Now I am often the first to be visited and invited by officials and experts to meetings. Farmers come and share their ideas in my place. Moreover, I see fruits and vegetables in my garden; my wife sells in the market and the family, especially my children, eat well. Now we have five cattle and three goats. We feed them at home. They are fat and better looking than other peoples' animals."

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