

How to gain from erosion: catch the soil

Hagos Woldu and Asfaha Zigta

This is the story about how the Irob people picked up 'a crazy idea' and are constructing check dams to create fertile farmland in the stony valley's of Eastern Tigray, Ethiopia. It shows that a long-term 'cash for work' programme can be successful if it leads to for farmers tangible results and strengthens local institutions, local control and the traditional ethic for mutual help.

The Irob people, now about 20,000 in number, live in the far north of Eastern Tigray, on the escarpment which goes down from the high plateau to the Red Sea. The Irob area covers 340 square kilometres. Rainfall is less than 400 mm per year, mainly in one short wet season, sometimes in two seasons. Most people live between 1500 and 2500 m above sea level. The mountain tops are much higher than this, the river bottoms much lower. The terrain is very rugged and stony, with steep slopes and deep canyons carved out by flash floods. Natural patches of level land are rare.

The Irob used to be pastoralists, trying to survive from their herds of goats and cattle, but they often suffered hunger. The prickly-pear cactus (*Opuntia ficus indica*), locally called balasa, was introduced around 1900 by French Catholic priests, who had come to Irob in 1846 and set up a church and school in Alitena, near to what is now the border between Ethiopia and Eritrea. The Irob began to plant balasa gardens close to their houses. They fed the balasa "paddles" to livestock during the dry season; the people ate the fruits in the wet season. For both humans and animals, balasa became the key to survival and still plays this role today.

Now the Irob also grow cereals, mainly maize, sorghum and barley. They have been doing rainfed cropping for only the last 2–3 generations, and are still experimenting with different techniques and crops. In recent years some people have made gardens beside the watercourses and have planted hot peppers, onions, tomatoes and fruit (mainly orange) trees. The Irob have a long tradition of beekeeping. The white honey from Alitena is praised throughout Ethiopia.

A crazy idea

About 50 years ago, Ato Ghebray Hawku, an Irob man from Dayavillage, tried to rob the river of water and soil. He dragged down rocks and earth into a steep-sided valley to make a field where he sowed cereal. Everyone smiled with pity at his hand work and thought he was crazy. But he told them: "Tomorrow you will all be as crazy as I am." All laughed, but an idea was planted in their minds.

A short time later, Ato Kahsay Woldu returned home from being a soldier. He had seen traditional soil harvesting by farmers near Tripoli, Libya. In a valley beside his house, he built a small dam. He was observed by a third man, Ato Zigta Gebremedhin, from Awo village, who had also teased Ato Ghebray

but was attracted by his idea. Ato Zigta began experimenting with a series of check dams, starting at the bottom of the watercourse and gradually building additional dams further up the valley and raising the height of the stonewalls over the years. Other farmers started to adopt this technique. They had recognised, they said, that one can also learn from crazy people.

In the past 40 years, the Irob have indeed "gone crazy" about dam building. In numerous watercourses, they have built check dams to catch the soil flowing down from the eroding highlands before it disappears into the Red Sea. They have created stretches of level land to use as crop fields and pastures. Some of the dams are now over 10 m high, filled to the top with soil and growing in width over the years. Ato Zigta, who at the age of 78 is still actively enlarging and improving his soil-harvesting system, regrets only that the Irob did not think of this idea earlier, before so much soil had already flowed past them.

In addition to the check dams in the tributary valleys, Irob farmers began to divert water from the main riverbed to fields built behind walls along the edge. They developed a technique of placing stones vertically in what they call the "devil's tie", to resist the force of the floodwater. They also dug channels to lead run-off water from the rocky slopes into the fields behind the check dams and beside the river courses.

A Swiss geographer, Bruno Strebel, came to Alitena in the mid-1970s. He saw how the Irob were drawing benefit from erosion by creating farmland, without any manufactured tools, using stone to break stone. He recognised the skills and innovativeness of the Irob and sought ways of supporting their efforts and building on their expertise. That was the beginning of what is now called Adigrat Diocese Development Action (ADDA), with funds from CARITAS (Switzerland) and MISEREOR (Germany).

Projects of the community

ADDA and the villagers in the Diocese agreed that the funds would be used for public works such as check dams, footpaths, wells, spring protection, gravity-irrigation works and community tree nurseries. Everything is done by hand, often in a step-wise manner over several dry seasons, such as extending or improving the footpaths, or gradually raising the height of dams to catch still more water and soil, just as Ato Zigta had first done. The difference is that the structures and newly-created resources belong to the community rather than private individuals. The external support provided by the ADDA project consists of:

- tools to work stone (crowbars, hammers, chisels) and other equipment and materials not available locally, such as wheelbarrows, buckets and wire;
- technical advice and training of peasant technicians;
- cash-for-work.

At community meetings in each hamlet, the people decide what construction activities are most needed. The meetings are open for all adults, but always more men than women come. Community members bring their project proposals to ADDA technicians, who are local people with primary or secondary school education and some on-the-job training. They assess the feasibility of the projects, draw up technical plans and calculate the materials and payment needed.

The local council (baito) assigns people to supervise work at each site. ADDA trains selected farmers as "peasant technicians". The baito decides who will work on the sites. All households are given a chance in turn, one person per family. In the case of male-headed households, it is usually the husband or grown son; in the case of a female-headed household, it is usually the woman, unless she has a son or daughter who is old and strong enough to do the heavy work.

The community decides how the newly-created land behind ADDA-supported dams will be used. In some areas, every household has the right to cultivate part of it in rotation with other households; the land behind some dams is used as pasture, with grazing rights regulated in different ways in different communities.

During the 15-year civil war up to 1991, the communities created their own forms of organisation not only to survive but also to continue the development work. Now villagers appointed by the baito assume responsibilities for the community projects. The distribution of tools, materials and payments was organised at first through the parish priests. The use of tools provided by ADDA for public works is increasingly decided by the baito instead of the project. In some cases, tools are now also used by private individuals to build their own structures. However, the problem of broken tools and responsibility for replacement must still be solved.

Cash for work

It would have been impossible for ADDA to pay the community food-for-work. ADDA does not have the transport and storage capacities for this. Besides, the hamlets are in remote areas, several hours' or days' walk from a road passable with a vehicle. Families are used to organising transport of food and materials by donkey, mule, camel or people. Cash-for-work gives them the means to buy the food or anything else they need or, in better times, to invest in land improvement, crops or livestock. The choice is theirs. The cash wage (now 6 Birr/day) is much lower than the 40 or more Birr per day that skilled masons (which many Irob now are) can earn in towns in Tigray and Eritrea. For the people who choose to stay in Irob, the cash-for-work programme is a much needed source of off-farm income.

Only a very small part of the Irob area (3-4%) can be cultivated; depending on the year, the Irob produce only 10%-30% of the grain they need to eat. The rest has to be bought, with money sent back by family members who have gone elsewhere in Ethiopia or abroad to work or with earnings from selling animals. In times of drought, such as in the mid-1980s, the Irob could survive only with food aid. The cash-for-work available in Irob enables many people to remain in their home area, rather than migrating to beg or work for food. This means that, in addition to making physical structures as community assets, they can pay more attention to their own land and livestock and can better maintain their community's social structure.

Always learning

The technologies used by the farmers, particularly in soil and water conservation (SWC), have changed over the years. The farmers observe how the rushing water behaves when it faces new barriers, discuss reasons for damage to structures or to surrounding land, and consider what to do about it. They are constantly trying to improve their work: to maintain and improve existing structures and to make new ones that are better designed. In the words of Ato Zigta: "If you look closely at our dams, you can read the story of our learning."

In some areas the farmers scrape and carry down soil from the slopes to fill areas behind the stone walls, in order to concentrate the soil in places where something can actually be grown. Some farmers are experimenting with more effective ways of using animal manure and plant matter to fertilise the small plots of land. Behind the dams, some farmers transplant sods of a wiry local grass that grows through the stones, holding them together and also providing animal feed.

Some farmers are planting trees and shrubs (or letting them grow spontaneously and then protecting them) to strengthen the dry-masonry structures, to make use of new niches to produce timber, fodder and fuel, and for beekeeping. To irrigate their gardens, channels have been cut by chisel into rock to

guide water into holding reservoirs.

In their efforts to catch soil and water behind dams and to irrigate fields, the farmers are running into problems of salt accumulation and waterlogging which is killing some trees in the river valleys. Large old trees are now almost buried in the captured soil. The farmers are seeking more suitable trees and shrubs to plant behind the dams.

Building roads to the markets

Another problem the farmers face is transport. Parts of Irob land have a good climate for growing oranges, which could be sold at highland markets, but it is difficult to carry the fruits up there. This is one reason why some hamlets give priority to creating or improving paths for transporting loads by pack animals. The Irob even built a stone road from Alitena up to the government road on the plateau at Salembessa, using only handtools and muscle power.

This was the first building project supported by ADDA 20 years ago, and the villages along the way have organised themselves to maintain the road ever since. Although the Irob know what they are capable of doing themselves, they also know that the Government has equipment to do this extremely heavy work. They stress that this is one of the main ways that Government could support the farmers' efforts: by building and improving roads for better market links. This year, a government road is finally being built to Alitena.

Exchange of experiences

It is becoming increasingly important that we help the farmers gain more information and advice from various sources: government agencies, other projects and farmers living under similar conditions. We have already experienced ourselves the value that this can have for both sides.

Farmers at Sero in neighbouring Central Tigray were alarmed at how quickly gully erosion was threatening their irrigation system. The project that supports them sought the advice of our technicians and farmers, who had many years of practical experience in SWC. This was a challenge to our project: an urgent problem to which the skills of our local experts could be applied and from which we could also learn.

But our local experts also have their limitations. ADDA therefore welcomes the support of researchers and formally-trained engineers and agronomists who understand what the farmers are already trying to do in Irob and the other areas into which our project has now expanded, and who can help to speed up the learning process. If these outside experts are willing to treat the local experts as equals and to share the hardships of life and work on the escarpment of Eastern Tigray, the farmers, too, will welcome their contribution.

Why is SWC working?

There are many reasons why this community development work has been relatively successful:

- *Productive SWC.* The SWC activities that the farmers choose to do are not only conserving resources. They create farmland and increase crop and animal production, already in the short term. The larger dams built with ADDA support to catch soil and water also provide naturally-filtered water close to the villages, saving women many hours' of walking in the mountainous terrain to fetch water from distant springs.

- *Ethic of mutual help and community service.* People in such remote areas depend greatly on each other for survival in times of emergency. Mutual help is more necessary than in areas where life is easier. The people regard it as their responsibility to serve the community in helping to improve living conditions for all. They invest time and energy not only in construction for low payment, but also in planning, managing, organising and maintenance, for no payment at all.
Also many Irob who have migrated to other countries continue to support their home communities. Likewise, the project staff are local people who are prepared to live and work under the difficult conditions, going from hamlet to hamlet by foot to give support. They are motivated by more than just their salaries.
- *Local institutional structure for initial support.* The church network of parish priests living in the hamlets provided a structure for co-ordinating and supervising activities, storing tools and materials, and handling funds, until lay people gained the skills to do this themselves. Also because schooling has been offered by priests since the middle of the last century and continued during the civil war, there were local people with formal education who could take over tasks requiring literary skills.
- *Long-term external support and trust.* For over 20 years, the funders in Switzerland and later also Germany have given support in terms of tools, materials, cash-for-work and advice, and have entrusted the organisation to the parish priests and the local people.
- *Local control.* The baito (councils) guarantee the rights of all inhabitants to use the land resources they create, so the people find it worthwhile to invest in maintaining their resources. The villagers plan and implement the activities themselves: they select what activity has priority, choose the sites, organise how to do the work, monitor the condition of the structures and maintain them. Each hamlet makes its own decisions about these things. They are proud of their independence and their accomplishments.
ADDA has heard that there has been criticism of cash-for-work programmes, because the local people reportedly do not regard the results as their own. ADDA's experience with cash-for-work shows that it can support learning, innovation and community-led development, if it is used to accomplish what the community wants to do but cannot manage without outside support. The key question that makes all the difference is: Who decides on the activities, some distant planning agency or the local people who do the work?

And our own role?

It may seem odd to some people that I (the first author of this article), as co-ordinator of ADDA, have no training in agronomy or SWC. My education is in philosophy. My role is not to be a technical expert, but rather to help organise things so that the farmers get the support they need to do what is important to them.

In the early years of the project, a source of inspiration for farmers and project staff was Father (Abba) Yohannes, who travelled frequently on foot through the mountains and ravines to even the most remote hamlets in the Diocese. He encouraged the people to plan work that would ensure a future for themselves and their children, and he worked together with them. At that time, I was a boy in one of the mountain hamlets, and Abba Yohannes became a role model for me. I am happy that the church has given me the honour to follow in his footsteps, accompanying the farmers in my home area to improve their lives.

My co-author is one of Ato Zigta's sons. He hopes that if the soil- and water-harvesting techniques of the Irob become more widely known, other farmers living under similarly difficult conditions can gain new ideas to try out for themselves. He also hopes that the children of the Irob – many of whom have gained further education in modern technology, as he has himself – can be reminded by this article of

the knowledge and achievements of their parents.

Abba Hagos Woldu and *Asfaha Zigta*, ADDA, PO Box 8, Adigrat, Tigray, Ethiopia

[Back to Top](#)