Successful landscape restoration in Abreha We Atsbeha watershed, Tigray, Ethiopia

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The landscape in Naeder Adet District, showing terraces that support land restoration.
Photo: Dawit Gebregziabher

A village is globally recognized for becoming nutritionally self-sufficient through land restoration."

Introduction

The village of Abreha We Atsbeha in eastern Tigray is in one of the most degraded areas in the region. The short rainy season of two to three months, coupled with an increasing population, further aggravates the challenges facing the inhabitants. Water scarcity and the erosion of fertile soil have accelerated land degradation and contributed to declining agricultural productivity, meaning that the local community has been food insecure for many years. Due to this, in 1998 villagers were given two choices by the government: either be resettled to an area with more conducive climatic conditions, or implement landscape restoration with the help of the Ministry of Agriculture. The local community found it difficult to accept relocation. The only alternative was to join hands and reverse land degradation.

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It was not easy to reach an agreement among the local community members at first, although most family farmers chose to participate. With the help of strong village leadership and an ability to communicate openly, honestly and transparently, people started to invest in restoration. Aba Hawi, the village leader of Abreha We Atsbeha, once commented on the procedures used to introduce and disseminate technology. "First, the leader must be a model farmer and take the initiative to test techniques and crops, to demonstrate to other farmers that they work. This is because it is difficult to change others without changing the attitude of the leader." The major contribution he made to his community was to change their attitudes to accepting the restoration of degraded lands as the best option to become self-sufficient in food.

Many hands make light work

Restoring degraded land is one of the policy pillars of the Ethiopian government in general, and of the regional government of Tigray in particular. Decentralisation policies also enabled the community to be actively involved, and to develop ownership of and a passion in the rehabilitation process. This has greatly contributed to the successes in this watershed. The vast majority of the labour required was contributed by the community. Some organizations contributed both technical and financial support, in some cases since the start of the programme, but the local community always took the lead. Involved organizations included the German development cooperation (GIZ), the World Food Programme, the World Bank, Mekelle University, Tigray Bureau of Agriculture and Rural Development, Relief Society of Tigray and the Ministry of Agriculture. During this initiative local bylaws were also developed to guarantee equitable benefit sharing for every group in the community.

The combined efforts of the community and other organizations in this landscape restoration process have greatly contributed to its many positive impacts. One of the indicators of success is the increased production of crops for sale, using irrigation water from new hand-dug wells, one of which has the capacity to yield an average of 14,795 m^3 of water per year (Tadesse et al. 2016). This has enabled the local community to produce two or three crops per year (Biedemariam et al. 2017), including cereals such as wheat, maize and barley; vegetables such as cabbage, tomato, pepper and onion; and fruits such as avocado, mango, guava, orange and lemon (Negusse et al. 2013).

What was achieved?

The total area of the Abreha We Atsbeha watershed is 6,766 hectares (ha), of which 4,644 ha (69%) was restored using exclosures (see box), including 1,500 ha of afforestation or reforestation, and the rest using assisted natural regeneration supplemented with soil and water conservation (Haileselassie 2013). Another 899 ha is cultivated land. Crucially, following the construction of 55 check dams in the watershed and associated regreening, the increase in groundwater has allowed the irrigable portion of this cultivated area to increase to 450 hectares (Haileselassie 2013).

This integrated landscape restoration process yielded a number of benefits. These included improved soil quality, groundwater recharge and reduced soil erosion. As these benefits were apparent, this increased the motivation of the local community to further engage in restoration. In addition, the soil type in this watershed is mainly highly permeable sandy soil, and this has greatly contributed to increasing groundwater recharge (Gebregziabher et al. 2016). This groundwater has been used for irrigation through 650 hand-dug wells, allowing people to produce fruit and vegetables, which are locally consumed or sold at the market (Fenta et al. 2019). This improves nutrition and household food security and generates additional income for households, which reduces poverty (Biedemariam et al. 2017).

Exclosures as a model for dryland restoration

Used widely in Abreha We Atsbeha watershed, exclosures (or area exclosures) are community-managed areas where activities such as free grazing and tree felling are excluded. This practice is well established in Tigray, with some 1.5 million hectares in plots from 1 to 700 hectares, usually on steep and eroded areas previously used for grazing livestock. In Tigray, planning, implementation, management, monitoring and evaluation of exclosures involve local, regional and federal institutions. At the local level are tabia (local) council members and woreda (district) development agents, local and international NGOs, and community watershed teams. Community members, government agencies and NGOs jointly develop local bylaws to be accepted by the community and their social groups, enforced through social fencing and social sanctions such as pressure on "free riders" by not attending their weddings, or excluding them from safety net payments. Bylaws include criteria for rule violations and fines, membership conditions, roles and responsibilities, and benefit-sharing arrangements.

Two complementary approaches are used. The biological strategy simply protects an exclosure from livestock and human interference, with no additional management and natural regeneration from seeds and stumps. The more common assisted strategy involves planting seedlings produced in community nurseries, and constructing soil and water conservation structures such as bench terraces, stone bunds, infiltration galleries and micro-basins. To restore the soil seed bank, grass harvesting is normally restricted to once a year, and doesn't start until in the second or third year after planting, once grass has regenerated sufficiently. Honey production and the collection of medicinal plants are also allowed. Management and protection are effective when local communities and local government take an active part. Many different research studies in Tigray have shown that exclosures effectively reverse land degradation, reduce soil erosion and siltation of micro-dams, increase soil fertility, sequester carbon, and improve ecosystem services and livelihoods. However, communities commonly found that they could not harvest wood fuel or other materials from exclosures as they had hoped, and meeting their desire to extract economic benefits from these exclosures has been challenging. To address this, there is a need to balance economic and environmental benefits; otherwise, communities resort to illegal practices to meet basic household requirements.

As part of the African Forest Landscape Restoration Initiative (AFR100), the Ethiopian government has pledged to restore 15 million hectares nationwide by 2030, with half of this to be achieved through new exclosures. To scale up the successes seen in Tigray, enhanced local governance is needed that must offer communities autonomy over exclosure management, and that exclosures must provide local people with tangible economic as well as environmental benefits.

This landscape restoration initiative in the watershed of Abreha We Atsbeha has improved the resilience of the community. It has enabled the community to better absorb economic and environmental shocks. Furthermore, it has also enabled community members to adapt to and mitigate the ever-changing climate. For instance, as mentioned above, landscape restoration has increased groundwater recharge in the area. Before the restoration work, groundwater was found at a depth of 50 metres, but now it is found only 5 metres below the surface (Gebregziabher et al. 2016).

A simple hand-dug well in Abreha We Atsbeha watershed. Photo: E. Ludi

The combined impacts of the landscape intervention have contributed to reducing poverty and improving livelihoods. This is evident in the 80% reduction in soil loss, the 20–50% increase in cultivated area, the 300% increase in crop production and the 100% improvement in fodder availability (Evans et al. 2012). Farmers were also able to modernize their houses; 79% of sampled households in the village have invested in improving their roofs with corrugated iron (Haileselassie 2013), and have also been able to invest in improved furniture and furnishings (Hagazi et al. 2019).

Benefits for women and youth

Women and girls have benefitted greatly from restoration activities. Before 1998 they had to walk long distances to fetch water and collect firewood, but now they are able to get these resources close to their homesteads. Women are not only beneficiaries; they also contributed their labour to terracing and other restoration activities. This contribution was possible because specific mechanisms were developed to involve women in planning, implementing and monitoring the initiative. Equally important, youth also benefitted from restoration in a number of ways. This ranged from getting more food and more nutritious food each day, and improved access to education, as their parents could pay their school-related costs with income generated from the sale of fruit and vegetables produced through irrigation. Youth groups were also allowed to use the rehabilitated landscape for income-generating activities such as beekeeping. Recently graduated youth groups in the village have formed a cooperative and were given a government nursery to generate income by producing and selling seedlings of species that are preferred by the local community.

The village leader Aba Hawi was once asked if the landscape restoration could create new land and productive lives for youth. He confidently responded that it would. The justification he gave was that

A young boy collecting guava from his family farm in Abreha We Atsbeha. Photo: The community

the youth in Abreha We Atsbeha village, compared to those in the nearby villages without interventions, now have several income-generating activities, such as irrigation of commercial commodities, livestock fattening, dairy production and beekeeping. These are major sources of income for youth; as a result, individuals from this village witnessed that "no one is willing to migrate to other areas," noting that 90% of youth from Abreha We Atsbeha were staying in their village. Restoration also contributes to improved fodder availability for livestock using the cut-and-carry system. Moreover, it has also increased fuelwood availability through the establishment of woodlots and agroforestry in the surrounding area. In addition, the community was able to reduce the consumption of firewood through the use of fuel-efficient cooking stoves (Fenta et al. 2019). Finally — but very importantly — the landscape restoration has its own local bylaws and this has greatly reduced conflicts between villagers.

Spillover benefits for neighbouring villages

Neighbouring villages also benefitted from groundwater recharge, which they use for irrigation. Besides this they could learn from the restoration experience of Abreha We Atsbeha. Furthermore, the check dams and percolation ponds that were constructed greatly contributed to reducing soil erosion and thereby prevented sedimentation problems in downstream areas. Also, a pipeline 14 km long was constructed in 2015 between Abreha We Atsbeha and the town of Wukro; that town now receives a supply of drinking water as a result of restoration and increased infiltration.

Is this kind of landscape restoration sustainable?

Many landscape restoration projects perform well when there is external financial support, but find it difficult to continue in post-project phases with only the resources of the local community. However,

Abreha We Atsbeha was able to sustain the landscape restoration initiative at the watershed level with internal resources, through developing ownership among the local community and community members continuously investing their free labour. This was possible because the local community clearly perceived the multiple benefits of the landscape restoration initiative. However, this initiative also has problems that can hinder its sustainability: some of the structures can be damaged or even destroyed by heavy rainfall.

Global recognition, awards and documentaries

The local community tirelessly implemented landscape restoration, but at the start it was not easy to convince the whole community of the potential success of the restoration techniques. However, the majority of people committed themselves to restoration in order to be able to stay in the village and create better livelihoods. It did not take long to see the benefits of their efforts. Quite soon, the village of Abreha We Atsbeha had a reputation as one of the most successful examples of restoration in Tigray Region. Thousands of farmers from the region and from other parts of Ethiopia have visited the village to learn from its experience. In addition, many middle and top government officials from Ethiopia, as well as representatives of many donor agencies and research institutions, have visited the village, which has always been ready to share its experience. The community has won regional and national awards, and in 2012 was awarded the United Nations Development Programme Equator Prize, given in recognition of its efforts to achieve "sustainable development solutions for people, nature and resilient communities." The restoration experience of the village has also been shown in several documentaries made by independent documentary makers on international TV channels such as the BBC.

Key success factors

There were several reasons for the success of the restoration initiative.

- Implementation had the active participation of the local community; i.e., it was community-led restoration.
- Restoration produced short- and long-term economic and environmental benefits.
- It systematically included women, girls and youth in restoration activities.
- The former village leader had the leadership capacity to mobilize the local community.
- The area has steep slopes producing runoff and sandy soils in the valleys with high rates of infiltration.
- The local people had the ability to change their attitudes/mind-sets from one of dependence to self-help.
- There was participatory development of locally agreed bylaws that support landscape restoration.

Conclusions

Abreha We Atsbeha watershed was one of the most degraded in Tigray. Soil erosion and water scarcity reduced agricultural production, and the community faced food shortages for many years. The government gave them two alternatives: resettle in another faraway region with higher production potential or restore the productive capacity of the degraded watershed. The local community thoroughly discussed the two options, and the village leader, Aba Hawi, managed to convince the local community to choose the second option.

A hillside area exclosure in Abreha We Atsbeha . Photo: Dawit Gebregziabher

Once the local community opted to rehabilitate their degraded land they continuously invested their labour. As a result of this ongoing effort they succeeded in reversing land degradation. The restored productive capacity of the land — coupled with increased groundwater recharge — has significantly increased and diversified agricultural production. As a result, the local community has become food secure and also less poor, as the villagers don't have to sell assets to generate money to buy cereals; instead they generate income from selling cash crops grown in the newly irrigated area. The youth in the village are also now able to generate income from the sale of vegetables from new irrigated plots, livestock fattening, dairy production, and beekeeping. Crucially, the participation of the youth in these income-generating activities has enabled most of them to remain in their village, rather than migrating to cities or abroad, as used to be so common.

The keys to successful landscape restoration from this example are the active participation and ownership of the local community in restoring degraded landscapes, leading to a change in their attitudes; and the leadership quality and communication skills of the village leader. The landscape restoration process must be inclusive in scope and practice, and must consider marginalized groups such as women, girls and youth. The current international attention being paid to drylands landscape restoration can be translated into further success when it better combines economic and environmental benefits for sustainability.

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