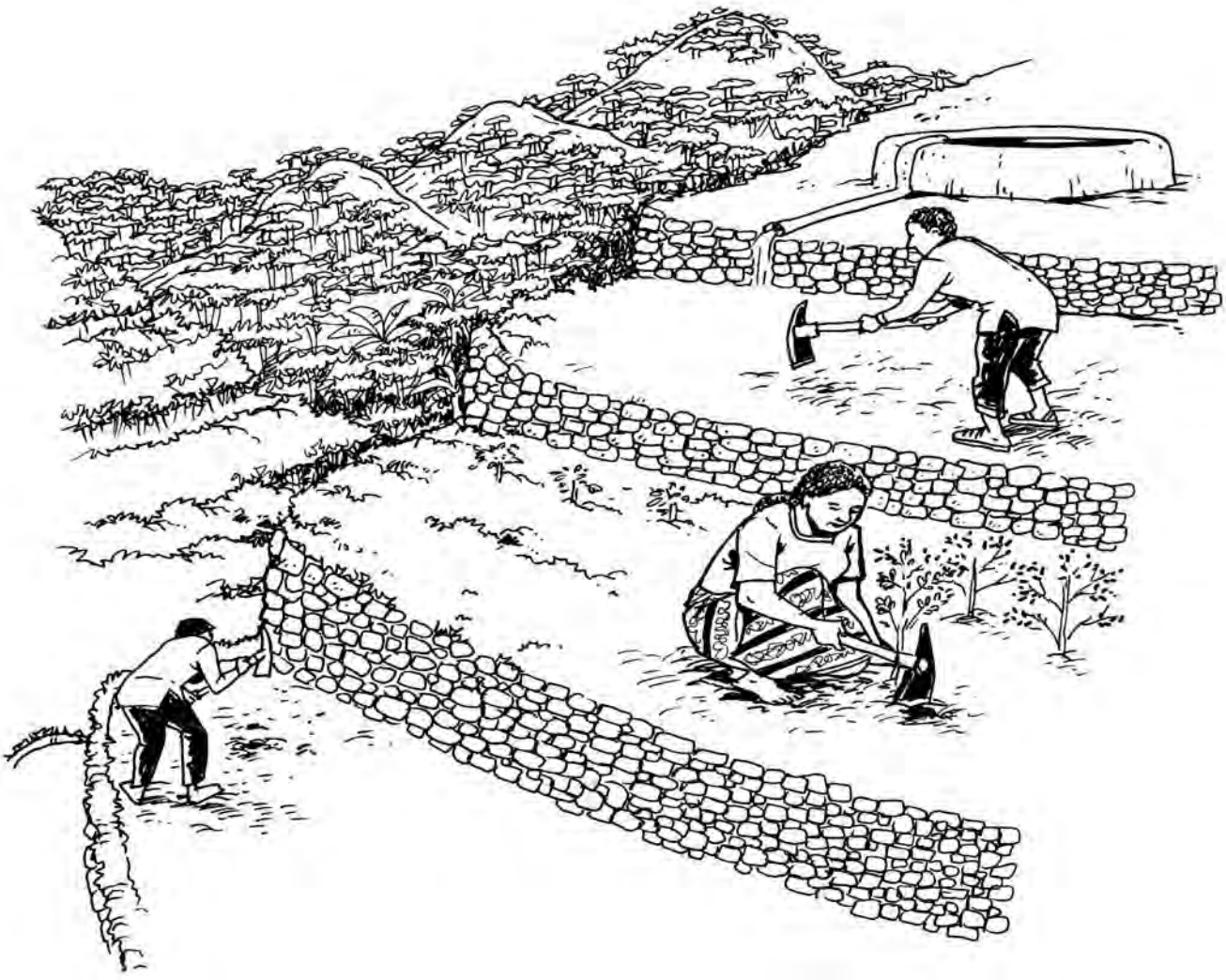
Bench Terrace Construction: Ensuring Sustainable Land Management and Creating a Source of Income for the Youth



In 2009, the Ethiopian government initiated a 5-year Sustainable Land Management (SLM) Program to rehabilitate degraded land and improve land management. Part of the program involved the introduction of improved bench terracing practices. Bench terracing is one of the oldest means of saving soil and water on the steep slopes in Ethiopia, dating back 400 years in the Southern Nations, Nationalities, and Peoples' Region in Konso special woreda in Ethiopia (Besha, 2003). A bench terrace is defined as level or nearly level steps constructed or formed on a contour and separated by an embankment known as a riser. They are typically constructed on steep sloping farmland (average of 12-58% slope) in order to reduce soil erosion and increase water infiltration.

Members of the Ministry of Agriculture (MoA) traveled to China to receive training on improved bench terracing methods. They then returned to Ethiopia and trained a set of experts to teach woredas in the six regions of Ethiopia, with a particular focus on southern Tigray.

Southern Tigray is mountainous with many pockets of degraded land, providing an ideal setting for the

implementation of bench terracing. In 2012, the MoA supported a pilot intervention in one watershed in the Endamehoni woreda in southern Tigray.

The intervention was so successful in the pilot area that 16 of the 18 kebeles in the Endamehoni woreda, in addition to the surrounding communities outside of the woreda, have adopted bench terracing. This study documents the woreda's successful practices in order to scale up implementation in other appropriate landscapes and communities in Ethiopia.

The Kebele Pilot

About 8 km of bench terraces were constructed and on 4.5 ha of land. This created about 2.7 ha of new land distributed among 26 landless young beneficiaries established as a user group. The group created a plan indicating short-term, medium-term, and long-term perennial crop activities on the restored land. This group managed to cultivate vegetables, mainly garlic, integrated with apple and 'gesho' plantations.

Background

The Endamehoni woreda in southern Tigray has a population of slightly more than 100,000. The woreda is located 120 km south of the regional capital Mekele and 660 km north of Addis Ababa. It is composed of forestland, agricultural areas, grassland, settled areas, and enclosures.

Originally, bench terraces were built in the region on a limited area with poor design standards and high construction and maintenance costs, resulting in limited use and benefits. However, through improved practices gained from MoA staff's visit to China, it was recognized that bench terraces have the potential to provide significant benefits. In 2011, staff from the Endamehoni woreda visited the bench terrace sites in the Ofla woreda and they were convinced to adopt bench terraces in a pilot site (Endamehoni Woreda Agricultural Office, 2013).

The pilot bench terracing intervention was supported by the MoA in one of the watersheds of the Endamehoni woreda. The intervention started in December 2012 with the Embhasty kebele as the first demonstration site. An expert was appointed to survey the selected site and determine the method of construction. Bench terraces can be constructed from the bottom of the slope to the top of the mountain (bottom-up) or it can be the other way around, from the top of the slope to the bottom of the mountain (top-down). While the farmer approach is more common, the expert chose the bottom-up approach. It would be more appropriate in this watershed, as the farmer approach produced berms or small landslides in each terrace. The latter approach necessitated that it be finished before the rainy season; otherwise, terracing will collapse.

Since work has to be completed during the dry season, a down period for farmers, government officials and community members enabled them to contribute more freely. Experts also provided training and supervision. In the pilot site, farmers brought manure from their backyards to improve soil fertility.

The bench terraces were built mainly by the youth. The woreda agreed to adopt a bylaw that includes a provision that the youth will provide the labor required to build the bench terraces. In return, they will obtain the right to cultivate the land.

After this intervention proved successful, the other kebeles in the watershed began adopting bench terracing with support from the MoA.

The key components of the intervention included the following:

Training

One of the MoA experts trained a member from the woreda on bench terracing, along with the DAs from each kebele (there are 18 kebeles in the Endamehoni woreda). The youth in the watershed were then mobilized as manual labor.

Financial support

The MoA, under the SLM project, shouldered 80% of the cost in the form of capital requirements. The youth were paid in cash for 80% of the labor required to build the terraces; the remaining 20% was provided in kind.

Water storage structure

Along with the bench terrace construction, the MoA supported the construction of a water tank that captures water from an upstream spring. The water is stored in a tank and made available to farmers engaged in bench terracing to use for canal irrigation.

Farmers were trained by the MoA on irrigation scheduling in order to operate and maintain the water tank and implement irrigation practices.

Scaling up

The project was implemented in one watershed that included five to six kebeles. The youth from each of these kebeles helped in the construction of the bench terraces beginning in one micro-watershed and then scaling throughout the watershed. After this approach was adopted in the watershed, other kebeles in the Endamehoni woreda began adopting this practice with support of the of the MoA.

Successful implementation practices

To scale up this initiative among other woredas and regions of Ethiopia, the study team has detailed a number of conditions and practices that contributed to the success of this particular intervention.

Method

The study team held discussions with members of the woreda leadership and responsible technical staff from the woreda on how they can convince communities to implement bench terraces successfully and on how monitoring and evaluation can be done. The team held similar discussions with zonal level implementers. Field visits were conducted in five kebeles where bench terraces were being constructed along with an assessment of the activities under implementation at the micro-watershed level to gather information on implementation processes and approaches. At each kebele, the study team facilitated a group discussion with development agents, kebele leaders, and farmers.

Conditions for adoption

Severals important factors contributed to the acceptance of bench terracing at the woreda level:

- **Appropriateness of the technology.** Bench terraces are suitable for the mountainous areas. This is regarded one of the best technology choices for the mountainous woreda.
- **Demand for arable land.** Due to growing population pressure on existing farmland, community members are interested in rehabilitating degraded land to increase the amount of arable land available.
- **Employment opportunities for the youth.** Currently there are around 15,000 unemployed youth with little access to arable land in the woreda. As a result, many young people migrate to find jobs. The woreda has considered developing and redistributing rehabilitated mountain land to unemployed youth. So far, 12,000 young people (often landless) have been given rehabilitated degraded land. Bench terracing can be undertaken by the youth as a tool to rehabilitate the land for economic benefit.
- **Technical and financial support.** Technical support from the GIZ-SLM project experts and financial support from the World Bank were critical in the success of the pilot project.
- **Feedback.** Encouraging feedback was given by high MoA officials who visited the woreda's pilot site and encouraged the communities to continue bench terracing over the woreda.

Lessons from the pilot case

- **Critical support from woreda leadership and experts.** Both the woreda leadership and technical experts were highly committed to implement sustainable natural resource management activities, especially bench terracing, which greatly contributed to positive adoption rates and implementation.
- **Labor availability.** The woreda previously assumed that bench terrace construction would require a large amounts of labor and therefore chose not to implement terracing. However, through the pilot study, the woreda realized that there is enough available labor either through community contributions or paid labor, when funds are available.
- **Quick economic and environmental returns.** If designed and implemented properly, bench terracing can have immediate environmental and economic benefits.
- **Social acceptance.** The majority of communities within the woreda developed positive attitudes toward bench terracing and became interested in adopting this practice.

- **Return on investment.** Through a cost-benefit analysis, the study found that, after 3 years, investment will be recovered, but only if perennial crops are grown, such as fruits. In this case, bench terraces began producing financial gains during the second year, after establishing apple and gesho.

Challenges

- Initially, farmers were reluctant to adopt bench terracing because they were currently using this land for free grazing. Since land is communal, the community initially preferred to keep the land for grazing. However, after understanding the benefits, the community agreed to support the terraces for the youth to grow perennial crops. They may also grow fodder and forage on the terraces to provide feed for the animals that no longer have this grazing land.
- A water tank structure must be built with the bench terraces in order to secure a water source for crop cultivation. While many additional kebeles and communities have adopted the bench terracing practice, they have not been able to secure sufficient funds to build water tanks. This is a challenge that must be addressed to maximize the benefits of bench terrace farming.
- The youth would like to receive compensation for the manual labor they provide to build the bench terraces, as the government has mandated that the youth in the woreda will give 40 days of free labor each to implement this technology. The woredas should reconsider the work norm or wage rate of the young workers.
- Building the bench terraces requires a significant amount of manual labor, which the youth are able to undertake. But they would like to receive monetary compensation for it.
- Fertility management requires farmers to bring manure to the terraces. The supply of manure should be secured.
- It is recommended that the terrace is constructed from the bottom-up. However, the construction must be completed before the rainy season starts.

Conclusion and recommendations

Based on the successful implementation and adoption of bench terracing in the Endamehoni woreda in southern Tigray, the MoA recommends that this practice be scaled up throughout the region and in other similar landscapes in Ethiopia. Bench terracing may continue to be promoted by; the government in phase II of the SLM Project that started in 2014.

It is advised that communities that implement bench terracing follow the best practices implemented in the Endamehoni woreda. Communities should ensure the following: sufficient support from woreda leaders and experts, a willing labor force, appropriate land and soil on which to construct the bench terraces, agreement over the transformation of communal land into bench-terraced agricultural land, and sufficient funds to support the installation of the bench terraces and water-harvesting structures.

But there is little scientific research in Ethiopia to support bench terrace interventions, it is recommended that additional research be undertaken.

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