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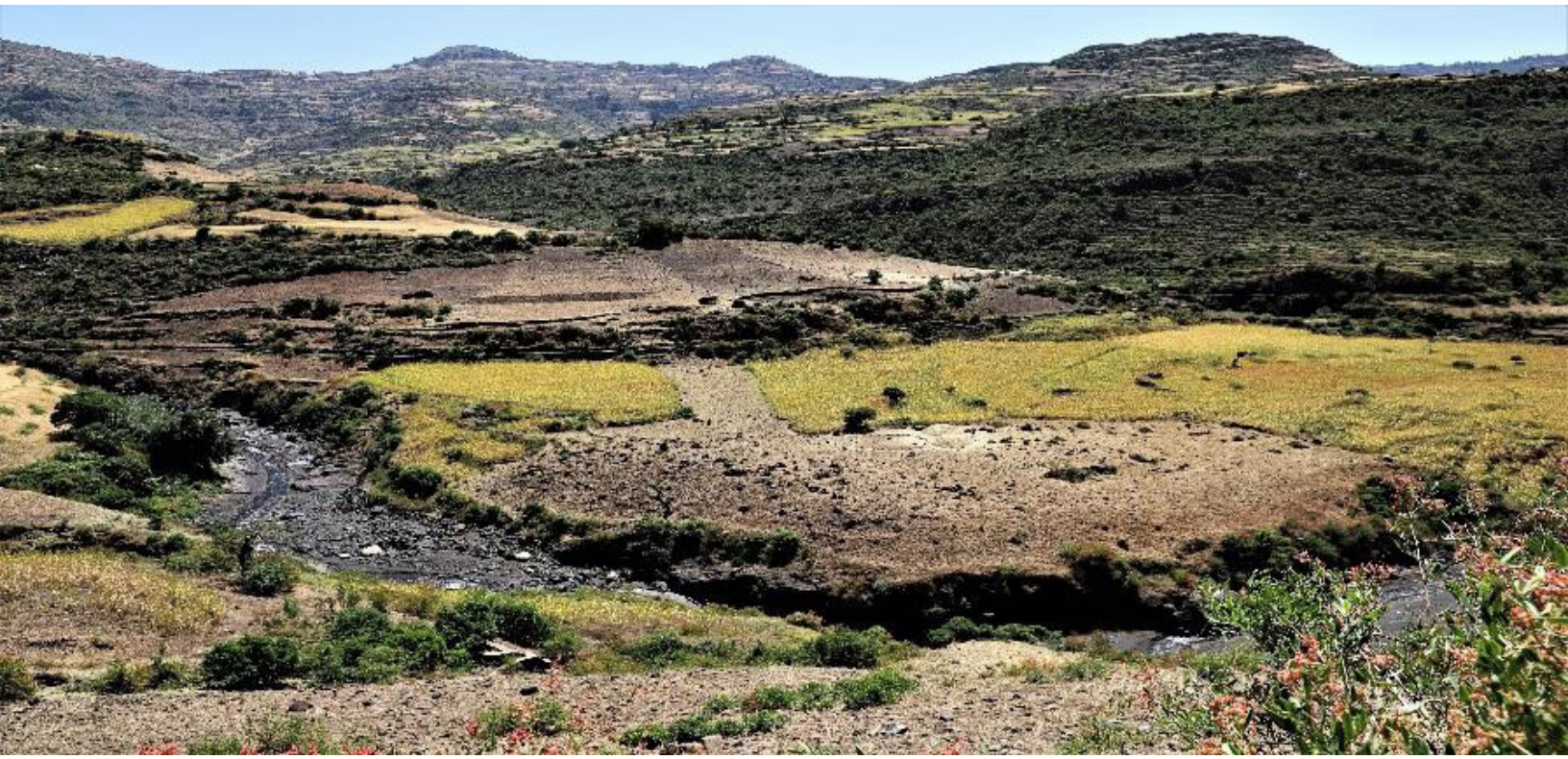

Technical report

Strengthening livelihoods through public works and watershed restoration

Lessons from World Vision-led SPIR in Ethiopia (2015–2026)

World Vision U.S.
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Authors

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Contents

1. INTRODUCTION

Public works are often a core component of social safety net programs for poor households and vulnerable communities in low-income countries. While their implementation and impact differ by context, most programs provide food or cash assistance in exchange for labor directed toward community asset creation and environmental goals. Their impact beyond short-term food security, however, is underreported and not fully understood.

A World Bank publication highlighted a growing trend of countries turning to public works to address environmental threats to livelihoods, using them to protect ecosystems and build resilience.[1] Participants' perception of public works for land restoration has been increasingly positive over the last decade. Recent findings show that participants in public works under the Ethiopia's Productive Safety Net Program (PSNP) in Oromia and Amhara regions view public works as a top priority, citing their contributions to livelihoods and their environmental benefits.[2] Others have noted limitations in their impact on community asset creation and livelihood improvement.[3]

This study presents illustrative results from World Vision and partner experiences across the SPIR I and SPIR II programs in Amhara and Oromia regions of Ethiopia. Funded by USAID, the SPIR program was an integral part of the Government of Ethiopia's Productive Safety Net Program and was implemented by a consortium of NGOs including CARE and ORDA, with World Vision as the consortium lead.

The study specifically aims to:

- Highlight the diversity of public works-supported interventions and activities in integrated watershed management, demonstrating how they address community needs under SPIR I and SPIR II.
- Illustrate key interventions that have contributed to watershed restoration and improved livelihoods, and demonstrate complementary pathways to enhance food security, livelihood diversification, and income in fragile, rain-fed smallholder farming contexts.
- Identify and examine factors that facilitated the observed achievements, level of sustainability, and potential scalability of the interventions to build community resilience to shocks.

2. BACKGROUND

Following frequent droughts and chronic food insecurity in the Ethiopian highlands, numerous studies have highlighted the links between famine and natural resource degradation.[4] Significant aid resources were directed toward addressing immediate food needs in drought-affected areas through public works. Until the early 2000s, the government's primary response was based on top-down, large-scale physical and structural conservation through safety net programs, typically food-for-work or cash-for-work arrangements.[5]

This focus on physical soil and water conservation measures faced significant challenges as the approaches were costly, labor-intensive, and did not respond to farmers' and communities' immediate needs. People were reluctant to adopt conservation practices, and there was little motivation to maintain structures in the absence of organized watershed and community associations. Recognizing these challenges, the Ethiopian Government introduced the Community Based Participatory Watershed Development Guidelines in 2005. These guidelines emphasized community participation in decision-making, tangible benefits for participants, optimized productivity, flexible design and management, use of local capacity

1 Costella, C., Okamura, Y., Urteaga, E., and Shalash, N. (2025). Green public works: Leveraging public works to address climate and environmental challenges. World Bank . https://hdl.handle.net/10986/44058

2 International Food Policy Research Institute (2024) PSNP and sustainable land management in Ethiopia: Impacts on livelihoods and food security. IFPRI.

3 Levine, S., Ludi, E., McCord, A., with Agol, D., Amsalu, A., Duvendack, M., Njigua, J., and Tefera, M. (2024). Do public works programmes create valuable assets for livelihoods and resilience? A retrospective study of the impacts of assets for natural resource management in Ethiopia and Kenya. Technical report. Supporting Pastoralism and Agriculture in Recurrent and Protracted Crises (SPARC). https://www.sparc-knowledge.org/publicationsresources/do-public-works-programmes-create-valuable-assets

4 Glantz, M. (1987). Drought and hunger in Africa: Denying famine a future. Cambridge University Press. See also: Alemneh Dejene. (1990). Environment, famine, and politics in Ethiopia. Lynne Rienner Publishers.

5 Hurni, H. (1993). Land degradation, famine, and land resource scenarios in Ethiopia. In D. Pimentel (Ed.), World soil erosion and conservation (pp. 27–62). Cambridge University Press. https://doi.org/10.1017/CBO9780511735394.004

and knowledge, gender sensitivity, and ownership—all essential for sustainability.[6]

In 2005, the Government of Ethiopia, in collaboration with bilateral donors, the World Bank, and NGOs, initiated one of the largest national social protection initiatives in Africa, the PSNP, as part of the core National Food Security Program for chronically food-insecure households affected by recurrent drought and shocks. The PSNP has two interconnected objectives. The safety net component provides food or cash for those in need, while the productive component creates community assets.[7]The social safety net framework integrates public works under watershed management, where households contribute labor to environmental rehabilitation—such as tree planting, terracing, constructing check dams—and asset creation, such as developing water harvesting structures, for sustained livelihood and resilience.[8]

World Vision has been one of the key partners in PSNP implementation. Leading a consortium that includes CARE, ORDA Ethiopia, and IFPRI, and with funding from the U.S. Government, World Vision has implemented the Strengthen PSNP Institutions and Resilience program across two phases: SPIR I (2016-2021) supporting 497,525 participants, and SPIR II (2021-2026), supporting 824,161 participants. World Vision's work under SPIR I and SPIR II focused on enhancing food security and nutrition, strengthening livelihoods, and improving natural resources management and community asset creation to build resilience to shocks in Amhara and Oromia regions.

3. METHODOLOGY

This study draws on elements of case study methodology, relying on multiple data sources including qualitative data, field observations, and quantitative data from program documents, alongside a synthesis of relevant literature. This study focuses on a selection of watershed success stories from among several hundred community watersheds implementing diverse interventions across the program areas, chosen to address the study's objectives as outlined in Table 1 (see next page).

Case selection was guided by the informed perspectives of local field staff, national and local natural resource management (NRM) advisors, and other program staff most familiar with program activities and participant stories. This approach considers a range of contexts and observations, enabling an in-depth understanding of impacts, achievements, challenges, lessons learned, sustainability, and potential for upscaling.

Qualitative data addressing environmental and livelihood benefits, the application of improved practices, and sustainability was collected through informant interviews with local field staff, NRM advisors, selected participants, community members, watershed management teams, and government development agents, as well as on-site field observations and focus group discussions.

The study has several important limitations. In addition to time and resource constraints, ongoing conflict in SPIR II operating woredas in Amhara region made travel difficult and prevented reliable assessment of current watershed conditions and livelihood benefits in those areas; as a result, case studies and activities in Amhara focus primarily on SPIR I. Additionally, due to significant fluctuations in the local currency against the U.S. dollar, income figures are reported in Ethiopian Birr and should be interpreted with caution.

6 Community Based Participatory Watershed Development: A guideline. (2005). Ministry of Agriculture and Rural Development, Ethiopia.

7 Ministry of Agriculture, Ethiopia. (2021). Productive Safety Net Program: Program implementation manual. Ministry of Agriculture.

8 World Bank. (2019). Ethiopia Productive Safety Net Project: Program implementation and resilience outcomes. World Bank.

Table 1: Examples of watershed interventions and livelihood benefits

Watershed site	Kebele	Woreda/ region	Key activities	Key livelihood benefits
Setegn	Oda Anani	Habro, Oromia	Physical and biological soil and water conservation (SWC), compost production, and area closure	Increased availability of food, water, fodder, and fuelwood; income from the sale of wood and grasses
Huree	Mulata	Kurfa Chele, Oromia	SWC for erosion control; natural regeneration, area closure, grass seeding, and reforestation	Increased availability of grasses and forage for livestock and sale; diversified livelihoods through goat fattening and beekeeping
Oda Sara	Gadisa	Habro, Oromia	Spring development and water harvesting	Improved food and water security, particularly during the dry season
Habro nursery	Gadisa	Habro, Oromia	Fruit tree seedling production and management	Income for youth from the sale of grafted fruit seedlings
Mandera	Wachu Yaya	Boka, Oromia	Farmer-Managed Natural Regeneration, regeneration of indigenous species, and increased grass and fodder production	Income for youth groups through livestock fattening
Doba irrigation	Dire Negeya	Doba, Oromia	Small-scale irrigation	Irrigated production of diverse food and cash crops (i.e., garlic, onions, and maize); increased income from crop sales
Albereket nursery	Arbarakate	Girwa, Oromia	Multipurpose tree seedling production	Income for youth from the sale of tree and fruit seedlings
Haras	Arele Tika	Kurfa Chele, Oromia	SWC, tree planting, and forage and multipurpose tree production	Income from beekeeping and livestock fattening
Arele Tika	Arele Tika	Kurfa Chele, Oromia	SWC, tree planting, and forage and multipurpose tree production	Income from beekeeping and livestock fattening
Babu	Debrewoyala	Gazgilba, Amhara	Bench terracing on upper slopes; multipurpose tree and forage production; and water diversion for traditional micro-irrigation schemes managed by youth groups	Increased cereal yield on upper slopes; diversified livelihoods through vegetable and cash crop production; increased income for youth groups
Sora	Ayna-Ketema	Bugana, Amhara	Check dam and bench terrace construction; land husbandry through composting; agroforestry; and nursery management	Creation of green jobs for youth groups; increased income from beekeeping and sale of fruit trees and seedlings
Ifa Jegna	Efa Jeyna	Doba, Oromia	Small-scale irrigation through canal systems; planting grasses and other vegetation along canals for multiple uses	Increased crop yields for household consumption and sale; diversified livelihoods through livestock fattening and other income-generating activities
Chefie Sibate	Woranso Defo	Gemechis, Oromia	Bench terracing with biological stabilizers; compost production, reforestation with indigenous trees; and fodder tree and grass establishment	Increased income from crop production; increased income from grass sales and livestock fattening
Ayena Mikael	Ayena Mikael	Bugna, Amhara	Protection of biodiversity-rich indigenous forest through FMNR, combined with bench terracing in the upper watershed	Income from sale of wood and forage and improved food security

4. WATERSHED RESTORATION AND ASSET BUILDING FOR IMPROVED LIVELIHOODS AND RESILIENCE

The study focuses on one of the major pillars of SPIR I and SPIR II: integrated watershed management supported through public works. Within this framework, targeted interventions, determined by community needs, reinforce one another to achieve the rehabilitation of the degraded watershed and the revitalization of the natural resource base for long-term productivity and improved livelihoods. The most significant intervention areas include:

- Soil and water conservation measures and natural resource management practices
- Farmer Managed Natural Regeneration (FMNR)
- Forestry, tree planting, and nursery establishment and management
- Water harvesting and small-scale irrigation schemes
- Forage and pasture improvement and fodder bank establishment

Selected case studies are presented for each of these intervention areas to illustrate their positive impact in addressing the widespread challenges of land degradation and water insecurity in an integrated way. Collectively, these activities have contributed to restoring the productive capacity of degraded landscapes, increasing water availability, improving livelihoods, and strengthening resilience to climate and weather-related shocks.

4.1 Soil and water conservation measures and natural resource management

Restoring degraded landscapes as means of achieving food security and livelihood improvement has been a long-standing strategy of the Ethiopian government, with significant resources committed to watershed management and protection.[9] Soil erosion is the primary environmental and livelihood threat in the highlands of Amhara and Oromia regions, where most of the population depends on rain-fed agriculture. Much of the program's operating area has steep slopes, intense and erratic rainfall, and intensive cultivation—conditions that make it highly vulnerable to soil erosion. A review of numerous sources on soil loss in the Ethiopian highland showed approximately 30 to 45 tons of soil per hectare (1 ha ≈ 2.5 acres) per year is lost, with some high-risk areas reaching 200 tons per hectare per year.[10] The main driver of soil erosion in both regions is land use change driven by agricultural expansion at the expense of forest and grazing land.[11]

Soil and water conservation (SWC) encompass both physical and biological measures and integrating the two is essential to meeting short-term needs while ensuring long-term sustainability. Physical SWC measures include soil and stone-faced bunds along the contours of cultivated land to reduce runoff and trap soil; bench terraces to reshape steep slopes into level fields; check dams to control gully erosion; cut-off drains to divert excess runoff; and micro-basins and infiltration ditches to enhance water absorption. Biological measures include grass strips and multipurpose trees to stabilize bunds, increase vegetative cover, and build biomass, as well as natural regeneration.

Numerous studies have reported that SWC measures reduce soil erosion by 40 to 70% in the Ethiopian highlands, depending on the type of intervention, slope, rainfall pattern, and maintenance level.[12] Empirical studies have also demonstrated a strong relationship between

9 Food and Agriculture Organization of the United Nations. (2005). Towards sustainable agriculture and rural development in the Ethiopian highlands: Proceedings of the technical workshop on improving the natural resources base and rural well-being. FAO.

10 Teku, D., & Derbib, T. (2025). Uncovering the drivers, impacts, and urgent solutions to soil erosion in the Ethiopian Highlands: A global perspective on local challenges. Frontiers in Environmental Science, Volume 12.

11 Hurni, H., et al. (2010). Land degradation and sustainable land management in the highlands of Ethiopia. Global Change and Sustainable Development, 318(6). See also: Biru, M., Gadisa, C., Dirbaba, N., and Marcio, R. N. (2025). Impacts of land use and land cover change on soil erosion in fragile ecosystems of Ethiopia. Land, 14(7).

12 Herweg, K., and Ludi, E. (1999). The performance of selected soil and water conservation measures: Case studies from Ethiopia and Eritrea. Catena, 36(1–2). https://www.sciencedirect.com/science/article/abs/pii/S0341816299000041; Adimassu, Z., Mekonnen, K., Yirga, C., and Kessler, A. (2014).Effect of soil bunds on runoff, soil loss and crop yield in the central highlands of Ethiopia. Land Degradation & Development, 25(6), 554–564. https://onlinelibrary.wiley.com/doi/abs/10.1002/ldr.2182; Belayneh, M., Yirgu, T., and Tsegaye, D. (2020). Runoff and soil loss responses of cultivated land managed with graded soil bunds in the Upper Blue Nile basin, Ethiopia.

SWC measures and soil fertility, resulting in production stability and increased crop yields over time.[13] One study with direct relevance to SPIR, given comparable agro-ecological conditions and SWC practices, found that land managed with combined physical and biological SWC practices yielded approximately 30% more than land without them.[14]

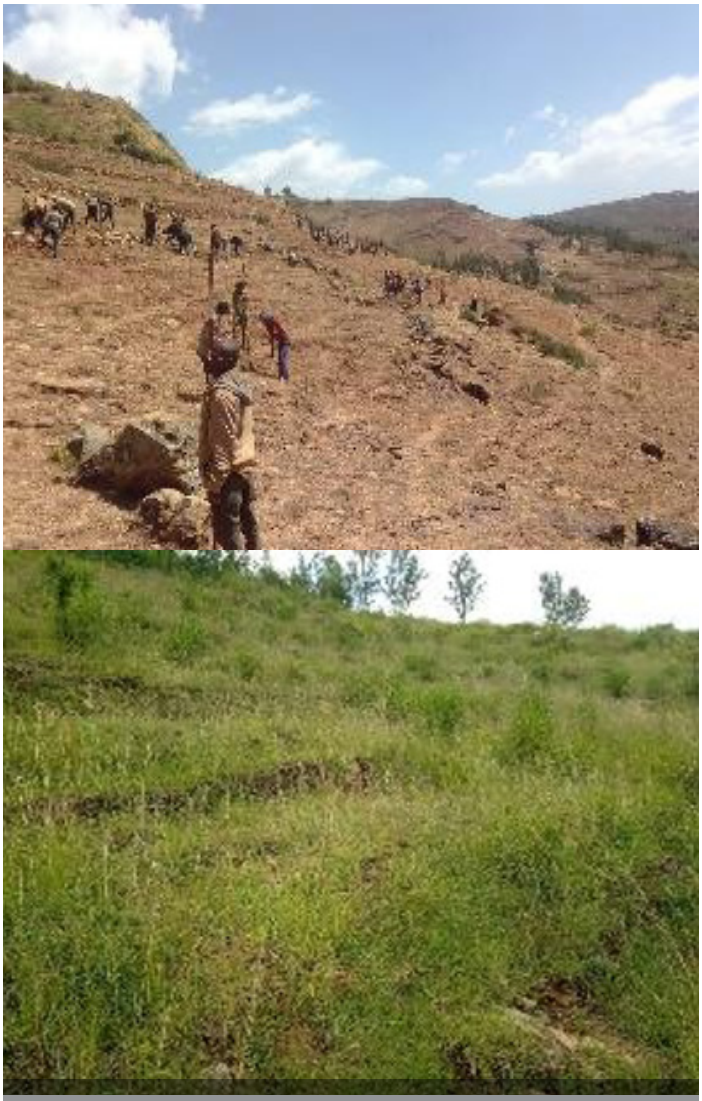
While it is not within the scope of SPIR to systematically isolate and quantify the yield effects of SWC, program reports and field observations from both SPIR I and SPIR II have shown that SWC measures supported through public works have contributed to increased crop and livestock productivity and enabled farm and off-farm livelihood diversification. The following case studies highlight achievements in soil and water conservation measures from Oromia and Amhara regions under SPIR I and SPIR II.

Case study: Setegn Watershed (Oda Anani Kebele, Habro Woreda, Oromia Region)

The Setegn Watershed encompasses 500 hectares. Prior to SPIR II, the watershed suffered from severe degradation and was a barren landscape due to overgrazing, deforestation, and improper agricultural practices. The 546 households in this watershed faced direct threats from uncontrolled flash floods from the upper catchment, and families downstream were forced to abandon their homes for temporary shelter every rainy season.

Since 2022, collaborative efforts between World Vision and the PSNP have targeted 30 hectares of the most critically degraded land for intensive rehabilitation, focusing on reclaiming unproductive terrain to secure the safety and livelihoods of the local community. Community members received training through the local watershed team on both physical and vegetative SWC techniques, including the construction of stone-faced soil bunds across the 30-hectare site to reduce runoff and trap sediment, as well as compost production to restore soil fertility.

The program also introduced vegetative measures through natural regeneration establishing the "Ayo area closure"—a protected zone that restricted severely degraded communal land from human and livestock interference. These combined physical and biological measures enhanced biomass cover and soil health, supporting the vigorous return of indigenous vegetation and biodiversity across the treated landscape.



Ayo area closure, Setegn Watershed (top 2022; bottom 2025)

The results have been significant. The watershed has been rehabilitated and key ecosystem services restored. Groundwater recharge capacity, water availability, and vegetative cover have all improved markedly. A previously

Ecological Processes, 9, 66. https://link.springer.com/article/10.1186/s13717-020-00270-5

13 Hishe, S., Lyimo, J., and Bewket, W. (2022). Effects of soil and water conservation on crop yield and soil properties in Ethiopia: A meta-analysis. Ecological Processes, 11, 1–18. See also: Tanto, T., and Laekemariam, F. (2019). Impacts of soil and water conservation practices on soil physicochemical properties and wheat yield in southern Ethiopia. Environmental Systems Research, 8(1). https://link.springer.com/article/10.1186/s40068-019-0142-4

14 Fantahun, A., Lemma, T. M., Tesfay, F., and Getahun, Y. S. (2024). Impact of soil and water conservation measures on soil physicochemical characteristics and crop productivity: Evidence from Korekore watershed in the central highlands of Ethiopia. The Scientific World Journal, 2024, Article 2679180. https://doi.org/10.1155/tswj/2679180

lost stream has reappeared with a steady increase in water discharge, and endangered indigenous tree species—such as *Brucea antidysenterica* and *Ehretia cymosa*—have begun to naturally regenerate within the enclosed area. Grass, vegetative cover, and wood have transformed the watershed landscape.

Most significantly, recurrent flash floods have been mitigated and displaced families have returned to their homes. Community members now have reliable access to fodder for their livestock, fuelwood, and water. The Setegn Watershed now serves as a model for reducing potential conflict between upstream and downstream users: upstream communities no longer face severe soil erosion, and downstream communities no longer suffer the impacts of flooding and waterlogging.

Case study: Huree Watershed (Gudina Mul'ata Kebele, Kurfa Challe Woreda, Oromia Region)

The Huree Watershed encompasses 130 hectares of previously degraded land, with steep slopes. Delineated and enclosed in 2023, this restoration effort employed multiple complementary physical and vegetative measures, combining physical engineering with moisture-harvesting techniques—including check dams for gully control, stone-fenced bunds, and micro-basin structures. These structural measures slow water flow, trap soil from the hilly steep-slope areas, and allow water to infiltrate into the ground.

These interventions have successfully catalyzed the natural regeneration of indigenous shrubs and grasses (*Poaceae*) while providing a stable environment for the establishment of vigorous silk oak (*Grevillea robusta*) and African pencil cedar (*Juniperus procera*) seedlings. The area closure, restricting human and livestock interference, has reduced overgrazing, resulting in the regeneration of a diverse range of plant species, restoring biodiversity and serving as an ecological buffer area.

The environmental recovery of the watershed has generated tangible livelihood benefits for the community, demonstrating an alternative pathway to livelihood diversification. Community members have transitioned to a "cut-and-carry" forage harvesting and fodder bank establishment, enabling some farmers to engage in goat fattening as a business and source of livelihood. Working in collaboration with local government, the program facilitated the formation of youth groups to take advantage of the increased vegetation and the recovery

Beekeeping shade, Huree Watershed (2025)

of indigenous tree species well suited to beekeeping (apiculture). This has diversified their livelihoods and generated income through the sale of honey.

Downstream settlers and participants living in the lower part of the watershed have reported a marked decrease in flooding which had previously posed a hazard to their lives and livelihood. They attribute the reduced risk from floods to the training and coaching they have received through the program, which improved their knowledge and adoption of improved conservation practices. The tangible benefits they have experienced have also motivated them to maintain the structures and assets established through the intervention.

Case study: Babu Watershed (Debrewoyala Kebele, Gazgibla Woreda, Amhara Region)

The Babu watershed covers 462 hectares, spanning from a highly eroded and largely barren upper catchment down to a valley. Like many watersheds in the region, the area faces a severe shortage of arable land, with farmers cultivating steep upper slopes for limited returns and frequent flooding in the rainy season.

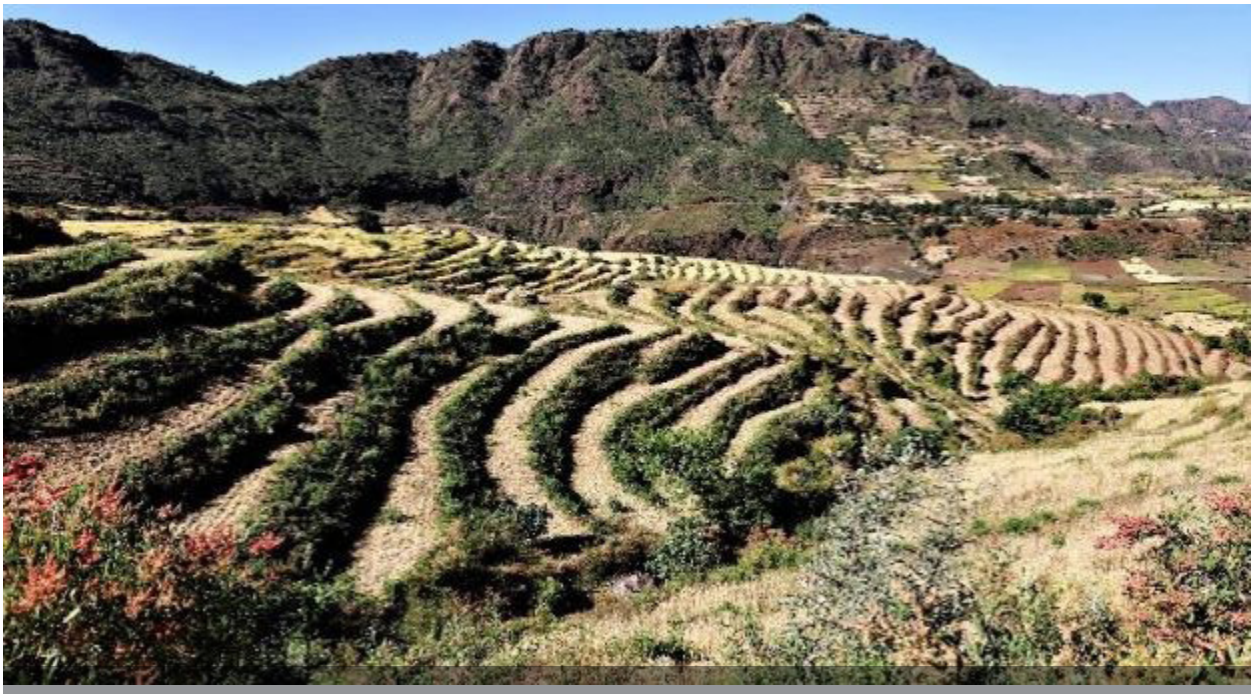
At the start of the project in 2016, a 12-member watershed management committee, including four women, developed a community watershed plan in consultation with local development agents. The plan included the development of bylaws for the management of natural resources. Based on this plan, the community designated the steep upper catchment slopes for natural regeneration through FMNR and area closure, complemented by enrichment planting of grasses. The bylaws established a cut-and-carry system for the use of rejuvenated grass and wood used for fodder and fuelwood.

The plan also introduced bench terraces, combining structural engineering measures with vegetative and biological conservation measures. Despite the labor involved, bench terraces have been widely adopted by farmers because they increase arable land by creating additional flat areas to cultivate cereals on slopes that were previously too steep for cultivation. They also reduce erosion and runoff (see photo for example of bench terrace). Farmers expressed their appreciation, with one noting that he now cultivates barley on a flat space between terraces near the top of the hill and has adequate harvest to feed his family during the lean periods. He also plants fodder trees and herbs as hedges and sells them in local markets to earn additional income.

After two years of activities, about 47.5 hectares had been treated with soil and water conservation measures, 12.5 kilometers with bench terraces, 16.75 kilometers with hillside terraces, and 210 cubic meters of check dams constructed—all maintaining a high degree of stability and functionality. These physical structures were reinforced by the planting of more than 42,500 trees, including silky oak (*Grevillea robusta*) and eucalyptus, with survival rates boosted to 90% through effective follow-up by participants and the watershed management committee.

As a result of rehabilitating the upper catchment, runoff has been significantly reduced, topsoil conserved, and water absorption and groundwater recharge capacity improved—reducing seasonal floods and runoff into the valley. With increased water availability, approximately 37.3 hectares have been developed under irrigation. Farmers with irrigated plots have planted grafted fruits trees—including mango, avocado, orange, papaya, and lemon—and are growing vegetables such as onion, garlic, cabbage, lettuce, tomato, pepper, and potato year-round. This year-round water availability has significantly changed the cropping pattern, which was once dominated by teff and cereals, toward horticulture and vegetable production as complementary livelihood and income sources.

One farmer who has benefited significantly from an irrigated plot is Miheret Demissie, who has farmed a 0.25-hectare plot in the lower part of the watershed for the last 30 years. Previously, he harvested 1.5 quintals (1 quintal = 100 kg) of wheat or barley per year. With increased water flowing downstream, he now uses traditional irrigation to produce approximately four quintals of cereals, four quintals of potato, two quintals of onion, and 50 kilograms of garlic annually. He has also planted more than 30 different fruit trees and expects to begin harvesting from them soon. He said his harvest has increased and diversified and he is now receiving more income, thanking the program staff for introducing this practice.



Rehabilitated watershed led by youth groups using bench terraces (2019)

Two youth groups have been established in Babu, supported by increased vegetation, tree cover, and water availability. One group focuses on beekeeping; the other on vegetable production—including potato, tomato, garlic, and onion—under irrigation and seedling production. Together, the groups earned 72,838 birr in 2018 and 75,550 birr in 2019,[15] considered strong income at that time and a source of hope for young people building livelihoods in rural areas.

Babu watershed, where a youth group used traditional water diversion irrigation from a rehabilitated upper watershed (2019)

The link between improved SWC and NRM measures and agricultural productivity was not limited to Babu watershed. Findings from SPIR I in Amhara region, conducted by ORDA (implementing partner), showed considerable differences in agricultural productivity between the program baseline in 2015 and subsequent years. In Lasta Woreda, Maurie Watershed, barley production increased from eight quintals per hectare at baseline to 20 quintals per hectare in 2018. In Bugna Woreda, Ayena Mikael Watershed, wheat production rose from 16 to 32.8 quintals per hectare over the same period. In Dhana Woreda, Merazit Bargiba Watershed, wheat production increased from 11 to 24 quintals per hectare.[16]

4.2. Farmer Managed Natural Regeneration (FMNR)

FMNR is a low-cost land restoration technique that involves the systematic regrowth and management of trees and shrubs from felled tree stumps, sprouting root systems, or seeds already in the soil—rather than planting trees.[17] Recognized by Food and Agricultural Organization of the United Nations (FAO) as a good agricultural practice, FMNR supports communities in restoring degraded lands through interventions like improved soil fertility, water retention, and biodiversity, while generating livelihood benefits such as improved crop yields, livestock fodder, and timber.[18] World Vision is actively contributing to scaling FMNR, which is now practiced in 40 countries.[19]

Case study: Mandera Watershed (Wachu Yaya Kebele, Boka Woreda, Oromia Region)

Since 2022, FMNR has been effectively implemented on 55 hectares of degraded communal land in the Mandera Watershed, of which 48 hectares have been rehabilitated. This has triggered the recovery of many indigenous tree species from dormant soil seed banks and live stumps, effectively restoring the local ecosystem. Beyond environmental recovery, the project has created economic opportunities for the community: 13 young people have formed a user group focused on sustainable livestock production. After successfully fattening and selling 21 goats, the group reinvested their earnings to scale up operations, recently purchasing oxen to expand their fattening enterprise within the rehabilitated areas.

Case Study: Ayena Mikael Watershed (Ayena Mikael Kebele, Buigna Woreda, Amhara Region

FMNR can also complement other conservation measures as observed in Ayena Mikael Watershed, Ayena Mikael Kebele, Buigna Woreda, Amhara region. Ayena Mikael's scenic landscape of mountains and valleys contains

15 Income figure reported by youth group leader during a field visit to the watershed conducted by World Vision Environment and NRM Advisor along with SPIR I and ORDA NRM advisors and local development agents.

16 Reported by ORDA and verified during an on-site field visit by World Vision Environment and NRM Advisor and SPIR NRM Advisor, November 2019.

17 Rinaudo, T., Muller, A., and Morris, M. (2019). Farmer Managed Natural Regeneration manual. World Vision Australia.

18 Food and Agriculture Organization of the United Nations. (2021). Farmer Managed Natural Regeneration. Technologies and Practices for Small Agricultural Producers (TECA). https://teca.apps.fao.org/en/technologies/10049/

19 FFMNR Hub. (n.d.). FMNR Hub. https://fmnrhub.com.au/

Ayena Mikael Watershed: FMNR and bench terraces restored degraded land and created productive areas for wheat, teff, and fodder production (2019)

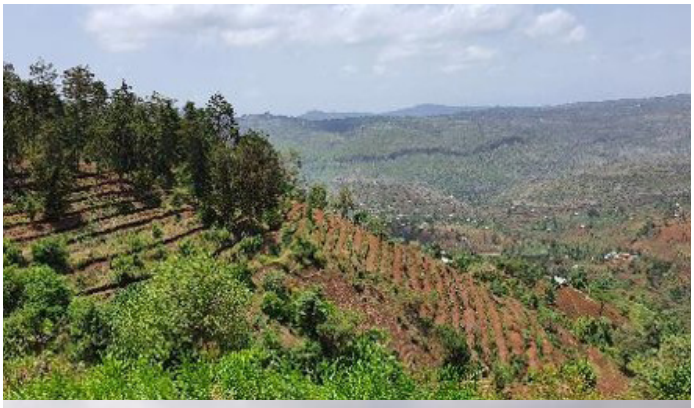
indigenous forest rich in biodiversity, but it faced constant threats from poor farming practices on hilltops and overgrazing. Through SPIR I, the effective implementation of FMNR combined with the development and enforcement of community bylaws for the protection of indigenous forest resources restored vegetation in approximately three years.

Given the serious shortage of arable land and food insecurity during the dry season, the program also introduced bench terraces with vegetative measures in the upper watershed. This has resulted in additional flat fields for cultivating food staples, medicinal plants, and gesho (*Rhamnus prinoides*) as hedges. The combination of FMNR and bench terraces was widely appreciated by the community as it delivered benefits both for food security and livelihood diversification—demonstrating that FMNR is complementary to other conservation and natural resource management practices.

4.3. Tree planting and nursery management

Deforestation is a major problem in the Ethiopian Highlands, most notably in PSNP woredas, driven by agricultural expansion, heavy dependence on fuelwood, and population pressure. This has contributed to severe land degradation, declining agricultural productivity, and increased vulnerability among rural households.

Tree planting is a core component of the Ethiopian government's climate-resilient green economy strategy. The Ministry of Agriculture's Community Watershed Development Guidelines and the PSNP implementation manual on public works identify tree planting as one of the core interventions under watershed management—reducing erosion, restoring degraded watersheds, and providing fuelwood, fodder, and income-generating opportunities. It is also considered cost-effective, as it draws on local labor and integrates the immediate livelihood needs of households with long-term watershed



Chefie Watershed (Top: 2022, Bottom: 2025)

rehabilitation and resilience building.[20] Accordingly, it is one of the core activities of World Vision's work in both SPIR I and SPIR II.

The government's approach to tree planting has historically relied on large-scale mobilization campaigns focused on fast-growing exotic species, with success measured by the number of seedlings planted rather than survival rates.[21] While reliable data on survival rates prior to 2015 is limited, a synthesis of field and government reports shows a wide regional variation, ranging from 20 to 55% in the Ethiopian highlands.

Tree planting under SPIR is not a standalone activity but an integral part of broader watershed and landscape restoration, contributing to erosion reduction, groundwater recharge, fuelwood and fodder supply, microclimate improvement, and a resilience to climate and weather-related shocks. World Vision has used a combination of regreening practices, including enrichment plantings with indigenous trees, area closure, agroforestry, and multipurpose tree nursery management.

Nursery establishment is an essential component of tree planting supported by public works, supplying millions of seedlings used in watershed rehabilitation. While SPIR does not directly establish nurseries, it supports local government-run nursery sites in the selection and distribution of indigenous and multipurpose species, and provides training in seedbed preparation, sowing, watering, shading, transplanting, compost and soil preparation, and pest and disease management.

Case study: Habro Nursery (Gadisa Kebele, Habro Woreda, Oromia Region)

The Habro Nursery is located in the West Hararghe zone in Oromia, on government-owned land near the Oda Sara Watershed. Before SPIR II support, the nursery was small and underutilized. The program organized 12 youth (five of them female) selected from PSNP households and provided training in grafting and soft skills. In one year, the nursery produced 2,300 mango seedlings and 2,300 avocado seedlings. Both indigenous tree species (*Olea africana* and *Juniperus procera*) and exotic species (*Cupressus lusitanica*, *Grevillea robusta,* and *Casuarina)* are produced. All seedlings are raised in plastic pots, which improves survival rates when transplanted. A large vermicompost project implemented by the government at the nursery site supplies organic fertilizer, reducing the need for chemical pesticides.

Habro mini youth nursery (2024)

With the increased income from the sale of fruit and wood products, youth groups have also engaged in small livestock fattening—primarily goats—as a reliable income source, diversifying the livelihoods beyond crop production. The nursery has become a learning site for promoting good practices, including timely input supply (scion, polyethylene tubes, seeds), vermicompost

20 International Food Policy Research Institute. (2024). PSNP and sustainable land management in Ethiopia: Impacts on livelihoods and food security. IFPRI. See also: World Bank. (2023). Ethiopia Productive Safety Net Programme (PSNP): Watershed rehabilitation and resilience building report. World Bank.

21 Alemneh Dejene. (2003). Integrated natural resources management to enhance food security. Food and Agriculture Organization of the United Nations.

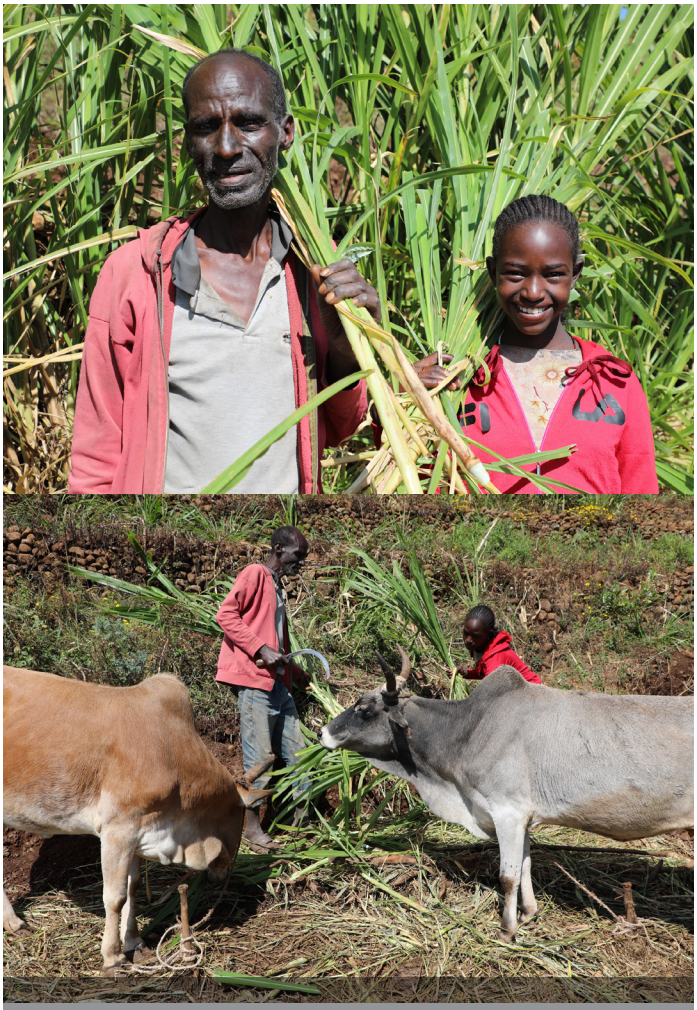
production (combining organic manure and earthworms in growing seedlings), and the promotion of indigenous seedlings to reduce the dependence on exotic species.

4.4 Forage and pasture improvement

Livestock is an integral part of the farming system in the Ethiopian highlands and in the targeted woredas under SPIR I and II, serving as a core component of household livelihoods and a key asset in times of crisis. Overgrazing and soil compaction, driven by feed shortages and limited grazing areas, are major contributors to land degradation and limit livestock productivity.[22] Forage and pasture improvement is therefore one of the key interventions supported through public works under watershed management in both SPIR I and SPIR II, providing immediate benefits in terms of feed supply while contributing to long-term ecosystem rehabilitation and resilience.

Practices promoted through SPIR include area closure, rotational grazing, cut-and-carry feeding systems, reseeding, planting of improved forage species, grass strips and shrubs integrated into SWC structures, and multipurpose trees. These measures contribute to environmental rehabilitation by reducing runoff, improving water infiltration, and increasing soil organic content, while also providing reliable feed that supports increased livestock productivity, income, and livelihood diversification.

SPIR experience has shown that fodder trees and grasses planted in degraded hillsides, alongside pasture improvement interventions, have played an important role in improving livestock condition and enabling households to generate income from the sales of grasses, hays, and livestock products.[23] Improved forage has generated higher income through the sale of livestock products, grasses, and hays, as well as through small livestock fattening. In some cases, as observed in the case study, increased fodder production has supported small livestock fattening as a viable business and contributed to livelihood diversification as a complementary pathway.



A farmer and his daughter demonstrating the benefits of integrating forage grasses with physical soil and water conservation measures

Case study: Chefie Watershed (Woranso Defo Kebele, Gemechis Woreda, Oromia Region)

The Chefie watershed covers 318 hectares and serves approximately 500 households. Historically, the area faced severe environmental degradation, characterized by extensive soil erosion and gully formation that devastated upper catchment farmlands. Downstream, the community struggled with flash floods that led to siltation, farmland inundation, and persistent waterlogging, threatening the local agricultural foundation.

The watershed development plan focused on restoring 28 hectares of degraded communal land through reforestation with local indigenous trees—notably *Juniperus procera* and *Grevillia robusta*—along with

22 Food and Agriculture Organization of the United Nations. (2018). Livestock and rangeland development in Ethiopia: Challenges and opportunities. FAO. See also: World Bank. (2015). Enhancing resilience in Ethiopia's rural landscapes through watershed management. World Bank Technical Report.

23 Tefera, M., Gilligan, D., Leight, J., and Tambet, H. (2024). PSNP and sustainable land management in Ethiopia. International Food Policy Research Institute.

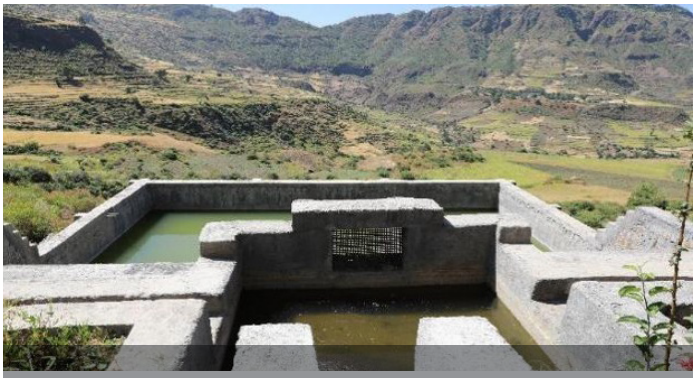
grass planting and pasture recovery through natural regeneration and protection. Bench terraces with biological stabilizers were also introduced. These interventions successfully revitalized the ecosystem, resulting in reduced flood hazards, improved water recharge, higher crop yields, and improved fodder availability, significantly enhancing the livelihoods of both upstream and downstream communities.

One individual whose experience illustrates the program's impact is Ahmed Nure Mohammed, who once struggled with food insecurity on just 0.25 hectares of land. Ahmed received training in soil and water conservation, compost making to enhance soil fertility, and forage development at a SPIR II demonstration site. He applied these practices to his own farm, planting elephant grass and desho grass and adding compost to his small plot, transforming it into a highly productive asset. At harvest time, Ahmed produced 52 quintals of onions, earning more than 260,000 ETB. This income enabled him to buy a dairy cow and invest in livestock fattening, diversifying his livelihoods. Today, Ahmed is a role model in Defo Kebele; his family graduated from the safety net program after just one harvest, demonstrating how improved practices can provide a complementary pathway to livelihood diversification.

4.5 Small-scale irrigation schemes and water harvesting

Small-scale irrigation schemes and water harvesting structures are among the most impactful community assets created through public works under watershed management. They directly address the critical constraints posed by rainfall variability, drought, and chronic food insecurity in rain-fed smallholder agriculture. A study of Bureau of Humanitarian Assistance/USAID-supported public works in watershed management areas found that households that adopted small-scale irrigation and water harvesting techniques on their own plots have significantly smaller food gaps and better nutritional outcomes than those that did not.[24] By enabling year-round production, these schemes support improved nutrition, allowing farmers to cultivate high-value crops, and engage in market-oriented agriculture—increasing income and reducing poverty.[25]

SPIR I and SPIR II have supported communities in developing water harvesting structures and micro and small-scale irrigation schemes as community assets to build long-term resilience, given that these are among the key interventions identified for public works support under PSNP 5 for disaster risk reduction, food security, livelihoods, and income diversification. Within the watershed management framework, World Vision has supported community asset creation through micro and small-scale irrigation, spring development and protection, construction of canals for stream diversion, rainwater harvesting for multiple uses, and night storage structures.



Merazit Bargiba Watershed, night storage of rainwater used for small-scale irrigation and livestock (2019)

As a result, farmers are accessing these schemes to grow high-value crops and vegetables and diversify their livelihoods through agricultural and natural resource-based income-generating activities, as illustrated below. One example is the night water storage constructed as a result of improved water flows from Merazit Bargiba Watershed, Dhana Woreda. This structure now supports year-round small-scale irrigation by organized user groups in the valley below.

Case study: Ifa Jegna Small-Scale Irrigation Scheme (Efa Jeyna Kebele, Doba Woreda, Oromia Region)

The Ifa Jegna Small-Scale Irrigation Scheme, initiated in 2023 with continued expansion through 2024, is a technically robust project supported by a comprehensive

24 IFPRI. (2025). Do public works investments in watershed rehabilitation and small-scale irrigation improve nutrition and resilience? Evidence from Bureau for Humanitarian Assistance interventions in support of Ethiopia's Productive Safety Net Program. https://cgspace.cgiar.org/items/66b31d81-7a7f-4283-9bc8-5443054ebc24

25 World Bank. (2019). Ethiopia Productive Safety Net Program (PSNP): Project performance and results. World Bank. See also: International Fund for Agricultural Development. (2019). Impact assessment of participatory small-scale irrigation development programme in Ethiopia. IFAD. https://www.ifad.org/en/w/publications/impact-assessment-participatory-small-scale-irrigation-development-programme

feasibility study and a site-specific Environmental Mitigation and Monitoring Plan (EMMP). The scheme currently features a 350-meter lined canal with the capacity to irrigate 89 hectares of farmland, providing 130 households with the infrastructure needed for year-round agricultural production. To ensure structural longevity and safety, the project incorporates key engineering components including water intake structures, mini-culverts for road crossings, and specialized control gates to manage water flow through deep-cut sections.

With technical support from SPIR and the Woreda Agriculture Department, the project has implemented gabion check dams for gully rehabilitation and planted banana (Musa) and elephant grass (Pennisetum purpureum) to stabilize the soil. Additional grass species were planted along the canal to prevent siltation. This physical infrastructure is complemented by a strong social component: irrigation water users were trained in operation and maintenance, ensuring the community is equipped to manage and protect the scheme when the program ends.

One farmer whose experience reflects the multiple benefits of this scheme is Zeko Abraye Musa, a 30-year-old head of household and father of three. In just one season, Zeko earned a profit of 125,000 birr from oxen fattening using a cut-and-carry system and forage developed on physical SWC structures. He also generated 144,000 birr from maize, 10,000 birr from vegetables, and 660,000 birr from a single garlic harvest. In addition, he has planted more than 80 grafted mango and avocado trees while maintaining diverse crops, like maize and kale, to ensure both food security for his family and a steady surplus for the local market.

Zeko's success has made him a role model, inspiring neighboring farmers to follow his lead and replace khat (used as recreational drug) cultivation with high-value fruits and vegetables. Beyond his personal farming achievements, he serves as an active member of the Water User Association committee, where he champions the sustainability of the irrigation scheme. To protect the irrigation system, he has planted elephant grass to reinforce canal banks and reduce siltation and has constructed storage facilities for his products—building a sustainable alternative livelihood enabled by irrigation.

Ifa Jegna Small-Scale Irrigation Scheme (2024)

5. KEY RESULTS AND LESSONS LEARNED

5.1 Environmental benefits

The most significant contribution of watershed management through public works under SPIR has created the ecological foundation for vulnerable rural households to achieve sustainable productivity and improved livelihoods. The key watershed management interventions—including physical and biological soil and water conservation, tree planting and nursery management, forage and pasture improvement, and small-scale irrigation—have generated demonstrable environmental and livelihood benefits, as illustrated in the case studies highlighted in this study.

Positive environmental changes—including reduced soil erosion and flooding, increased soil water retention, increased vegetation and biomass cover, and restored watersheds and landscapes—were consistently observed and reported by program participants and stakeholders at the woreda and kebele levels across both SPIR I and SPIR II.

Under SPIR I, combined physical and biological conservation measures and natural resource management approaches restored 9,841 hectares of degraded communal land. Under SPIR II, this expanded significantly to 46,539 hectares. These measures have revitalized the natural resource base, creating the conditions for long-term productivity, food security, and graduation from the safety net program, as highlighted in the case studies above.

Tree planting is a core activity of both SPIR I and SPIR II, supported through public works as an integral part of watershed management. As observed in the case studies, enrichment planting with indigenous trees and multipurpose tree nursery management have improved soil fertility, water availability, and microclimates—reducing vulnerability to climate and weather-related shocks. These activities have also brought tangible benefits to poor households by providing fuelwood, fodder, and income-generating activities. During SPIR II, over 90 million tree seedlings were planted in Oromia and Amhara regions.

SPIR made deliberate efforts to address low seedling survival rates through targeted training that improved participants' knowledge and practice in seed selection, nursery management, pit preparation, and post-transplanting care—including weeding, watering, manuring, and protection of planted areas. This improved survival rates compared to those recorded before SPIR. Under SPIR 1, the average seedling survival rate was 76% in Oromia and 61% in Amhara based on the survival counts conducted in 2021. Under SPIR II, the average survival rates improved further to 82% for Oromia and 76% for Amhara.

World Vision has also made important contributions to strengthening government nursery sites, which focused on exotic trees, to ensure the availability of multipurpose tree seedlings, including fruit trees, horticultural crops, fodder crops, bee flora, and soil fertility species. This has also supported livelihood diversification, as demonstrated in the case studies.

Small-scale irrigation and water harvesting structures are among the most impactful community assets created through public works under watershed management. They have a direct and significant effect on food security and nutrition, agricultural productivity, income generation, livelihood diversification, and resilience at both the household and landscape levels. Their sustainability depends on upstream conservation measures and the environmental benefits through integrated watershed management. As one World Bank independent evaluation noted: "Small-scale irrigation has become the game changer in creating the incentive for improved watershed management." [26]

SPIR's watershed management mobilized communities and supported the construction of small-scale irrigation and water harvesting assets—including stream diversion channels, gravity-fed canal systems, feeder canals, micro-dams and ponds, night storage structures, and small reservoirs. During SPIR I, the total area of irrigated land reached 2,546 hectares. During SPIR II, 2,498 hectares were irrigated. Over four years of SPIR II, 39 small-scale irrigation schemes were constructed or rehabilitated, serving 5,724 households: 10 schemes in Oromia benefiting 2,154 households, and 29 schemes in Amhara benefiting 3,560 households.

5.2 Livelihood benefits and livelihood diversification

The restoration of watershed productivity and the revitalization of the natural resource base have generated tangible livelihood benefits, including increased agricultural productivity, improved forage and fodder production, and expanded income-generating opportunities. As highlighted in the literature and observed across the selected case studies, the combined effects of watershed management interventions have created pathways for diversified livelihoods, including fodder production, tree seedling production, fuelwood and forest products, livestock fattening, and beekeeping.

Increased water availability has enabled households to access micro and small-scale irrigation and water harvesting schemes—a major driver of livelihood diversification among smallholders with irrigated plots across all program areas. Farmers and youth groups with access to irrigated land are now engaged in year-round production of horticultural and cash crops and vegetables, with substantial improvements in productivity, income, and food and nutrition security.

Small-scale irrigation schemes are among the most effective for supporting livelihood diversification, income generation, and poverty reduction. They also represent a practical option for scaling in areas with similar environmental and socio-economic conditions, since the technologies involved—stream diversion, water harvesting ponds and treadle pumps—are affordable for poor households. Sustainability, however, requires the protection of the natural resource base through integrated watershed management, strong community watershed teams and water user associations, and ongoing technical and extension support to ensure fair access to and use of water resources.

26 World Bank. (2020). Project performance assessment report, Ethiopia: Sustainable Land Management I and II. World Bank.

Similarly, tree planting, nursery management, and fodder production have proven to be important pathways for livelihood diversification under SPIR's integrated watershed approach. The program has enabled households to earn income from the sale of fruit, fodder, fuelwood, and honey, and through small livestock farming—diversifying their livelihood and income-generating options.

5.3 Strengthening resilience

Under SPIR, watershed management is closely linked to livelihood improvement and building the resilience of vulnerable households to climate and weather-related risks. Soil and water conservation measures, tree planting, and forage and pasture improvement have restored ecosystems—including soil health and water recharge capacity—creating the conditions for diversified livelihood activities. Diversified livelihoods reduce heavy dependence on marginal and degraded land by providing households with opportunities to engage in market-oriented income-generating activities, strengthening their absorptive and adaptive capacity to production losses. As documented in the case studies and supported by the literature, households with diverse sources of income are better able to manage food gaps during drought and dry spells than those who depend solely on rain-fed production.

SPIR has played an important role in providing institutional support to community-based institutions and governance systems, contributing to household and community resilience. The program provided technical training, coaching, and material support to strengthen the capacity of Community Watershed Teams (CWTs) to fulfill their intended roles in planning, community mobilization, coordination, implementation, monitoring, and reporting. This level of functionality is critical for the management and sustainability of assets created through public works. For example, SPIR supported the development and enforcement of bylaws governing equal access to and benefit sharing of key watershed resources—including irrigation and water use, and rehabilitated grazing, pasture, and woodlands on communal land. This has strengthened households and communities' motivation to sustain the interventions and build their capacity to prepare for and adapt to climate-related and other shocks

SPIR's training and institutional support have also promoted participatory decision-making and encouraged the involvement of women and youth in watershed committees, water user associations, livelihood diversification, and income-generating activities—further strengthening household and community resilience.

5.4 Building local capacity for climate and disaster risk management

One of SPIR's notable achievements was supporting the downscaling of climate and weather information from national meteorological centers to local level institutions. This was accomplished by establishing linkages between Ethiopia's National Meteorological Agency and regional, woreda, and kebele-level institutions.

Realizing that national climate forecasts do not always reflect local conditions adequately, SPIR supported the Multi-Stakeholder Early Warning Platform—bringing together meteorological offices and agriculture, natural resources, and water offices—to review climate information and translate national forecasts into specific, accessible advisories on rainfall outlook and hazards such as drought and flooding. These advisories are tailored to the realities of woreda and kebele communities. SPIR also facilitated the incorporation of seasonal forecasts into woreda and kebele development and disaster risk reduction plans, enabling households and communities to better prepare for and respond to climate-related shocks.

SPIR also introduced Participatory Scenario Planning (PSP), which combines scientific climate data with indigenous knowledge through a collaborative process that brings together diverse stakeholders (i.e., meteorological experts, extension agents, government sector offices, community representatives, and indigenous community forecasters). PSP is typically conducted at the woreda level and applied at the kebele and community level.

Jointly developed seasonal forecasts produced through the PSP process have increased trust in—and uptake of—climate advisories and recommended actions. Communities have used these forecasts to make practical preparations: selecting drought-tolerant crop varieties, adjusting planting dates, constructing flood protection structures, and diversifying livestock feed sources based on the projected scenarios. This experience SPIR gained in strengthening community early warning systems and climate preparedness could prove useful as communities prepare for the anticipated El Niño conditions expected in 2026.

6. CONCLUSION

Over more than a decade of implementation, SPIR reached more than 1.3 million participants in its various activities—restoring more than 56,000 hectares of degraded communal land, planting more than 90 million tree seedlings, improving access to drinking water through rehabilitated watersheds, and supporting more than 58,000 participants to engage in diversified livelihood and value chain activities. The program also strengthened the capacity and agency of woreda, kebele, and community institutions to understand climate vulnerabilities and act on early warning climate and weather information—enabling households and communities to plan and respond to weather and climate-related shocks in a timely way.

Taken together, these achievements reflect what becomes possible when integrated watershed management, supported through public works, places community ownership and participation at its center: a more productive and resilient natural resource base that translates into lasting improvements in livelihoods and food security.

SPIR's evidence in strengthening local systems and community institutions for the sustainable management of natural resources—while improving and diversifying livelihood options and building household and community resilience—makes a compelling case for continued investment in this approach.