

CIFOR-ICRAF, Addis Ababa, Ethiopia  
2023



# Gergera Watershed

**A Success Story of Restoration  
Community-based Adaptation and  
Climate-smart Practices**

**Niguse Hagazi, Mulugeta Mokria, Kiros Hadgu, Gebrehiwot Hailemariam,  
Yemane Gebru, Aklilu Negussie and Eyob Getahun**

© 2023 CIFOR-ICRAF  
All rights reserved.



The content of this publication is under license Creative Commons Attribution 4.0 International (CC BY 4.0), <http://creativecommons.org/licenses/by/4.0/>

Hagazi N, Mokria M, Hadgu K, Hailemariam G, Gebru Y, Negussie A and Getahun E. 2023. *Gegera Watershed: A Success Story of Restoration Community-based Adaptation and Climate-smart Practices*. Bogor, Indonesia: Center for International Forestry Research (CIFOR) and Nairobi: World Agroforestry (ICRAF).

CIFOR  
Jl. CIFOR, Situ Gede, Bogor Barat 16115, Indonesia  
E [cifor@cgiar.org](mailto:cifor@cgiar.org)

ICRAF  
United Nations Avenue, Gigiri, PO Box 30677, Nairobi, 00100, Kenya  
E [worldagroforestry@cgiar.org](mailto:worldagroforestry@cgiar.org)

CIFOR-ICRAF  
The Center for International Forestry Research (CIFOR) and World Agroforestry (ICRAF) envision a more equitable world where trees in all landscapes, from drylands to the humid tropics, enhance the environment and well-being for all. CIFOR and ICRAF are CGIAR Research Centers.

**[cifor-icraf.org](http://cifor-icraf.org)**

The designations employed and the presentation of material in this publication do not imply the expression of any opinion on the part of CIFOR-ICRAF, its partners and donor agencies concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

## The problem and context of Gergera watershed

Gergera watershed is located in Tabia<sup>1</sup> Hayelom, Atsbi Wonberta district of Tigray region in northern Ethiopia. The altitude of the district ranges from 1500 to 2800 m.a.s.l. The average daily temperature of the area is between 15°C and 30°C with a mean annual rainfall of about 529 mm. The area is prone to drought with erratic, unevenly distributed rainfall and high runoff. However, it has good sources of underground and seasonal water from the surrounding mountain catchments.

Gergera watershed is surrounded by hills and mountains that drain their runoff into the area. The soil in most parts of the region is deep, but easily erodible. During the rainy season, floods flowed down to tree-less farms and grazing lands in Gergera in full force and washed away the easily erodible soil under the very eyes of helpless farmers. The farmers did not know how to stop the brutal and fierce floods from gobbling up their main source of livelihood – their precious land – for years. More and more agricultural land was disappearing, swallowed up by the ever-widening gullies and severe erosion that began from the upper parts of the catchment.

A good part of the Gergera watershed not only comprises very rugged topography, but is also seriously degraded, with deep and wide gullies. As a result, the farmlands were less productive. The landscapes in Gergera, particularly the uplands, were more suitable for forestry and related activities, but were commonly used for crop production. Major parts of the watershed have either been utilized for agriculture using traditional systems or as grazing land. However, agriculture and wood production in the area has been unable to support the increasing food and energy demands of the community.



**Figure 1:** *Partial view of scale of gullies and degradation*

Left unchecked, the big and smaller gullies, soil erosion and the resulting land degradation, plus loss of water as a result of the runoff were becoming serious threats, not only to the farmers in Gergera, but to other downstream communities. The people continued to farm the land, using traditional agricultural practices, and were cutting down trees for fuelwood, further aggravating the problem. Owing to all these challenges, in the mid-1990s, the watershed became one of the most severely degraded areas in Tigray region. During this time, communities living in the region were desperate and began pressuring the government to resettle them in other productive areas where they could start and establish new lives.

---

<sup>1</sup> *The smallest administrative unit within a given district*

## Integrated watershed development program by Irish Aid at Gergera watershed: Successes and lessons

A rehabilitation program supported by Irish Aid was introduced in the Gergera watershed in 1998. This initiative followed an integrated watershed development (IWD) intervention approach which was the first rehabilitation program introduced in the area. Later, the IWD rehabilitation approach became a national development program.

Following this integrated and inclusive approach, various rehabilitation and conservation intervention activities were accomplished and positive changes noted within a short period of time. As they began appreciating the changes witnessed as a result of the project, the people's demand for resettlement faded. Instead, they began focusing on how to rebuild their livelihoods.

The Irish Aid program has resulted in many significant and positive economic, social and ecological changes in the Gergera watershed. Groundwater recharge improved, access to agricultural inputs and crop productivity increased, plus improved animal husbandry, honey production and grazing management were introduced, and the capacity of local communities and extension officers improved.

There were some pockets of forests in some of the steep landscapes, but most of the land remained bare and prone to erosion. Therefore, the catchment continued to suffer from serious land degradation and deforestation despite the massive efforts made by Irish Aid from 1998 to 2000, and then by the regional government through the Productive Safety Net Program (PSNP). That is to say, the different landscapes in the watershed: hillsides, farmlands and riverbanks all experienced severe soil erosion, gully erosion and deforestation. Some sections of the riverbank were destroyed by floods; potential farmlands were collapsing in all directions.

Generally, there were many unsustainable natural resource management indicators in the watershed that were observed by the World Agroforestry (ICRAF). The organization formed a new partnership with Irish Aid, with the aim of capitalizing on the success of previous works by maintaining damaged gully reclamation structures and introducing new and innovative technologies, practices and interventions to transform the lives and landscapes of Gergera watershed in a sustainable manner. Following discussions with the Irish Embassy in Ethiopia, in August 2014, Irish Aid decided to launch a project titled *“Enhancing Integrated Watershed Management with Climate-smart Agriculture and NRM Practices in Gergera Watershed”* in partnership with ICRAF. The first phase ended in mid-2018 and a second phase entitled *“Developing an Innovation and Learning Platform for Enhanced Economic Opportunities and Resilience in Gergera Watershed: Action Research Program”* was launched. It ended in October 2022. The University College Cork (UCC) from Ireland participated in the second phase of the project, and was mainly involved in conducting studies in the areas of nutrition, women economic empowerment, value chain and market assessment of some specific agricultural commodities, and investigating the impact of IWD activities conducted in the watershed for decades, mainly by engaging PhD students and consultants.

## ICRAF-led project interventions at Gergera watershed: Successes and lessons

The ICRAF project was launched with a goal of creating productive, sustainable and resilient communities and landscapes. Its implementation modalities comprised capitalizing on and supporting past achievements and community-based ongoing efforts, employing participatory, co-learning and inclusive planning and learning principles, and organizing and facilitating platforms. During the pre-baseline assessment, various challenges were mentioned. For example, it was confirmed that 36 ha of farmland was lost and became part of the big gully or turned into other smaller gullies. Moreover, despite its huge potential to serve as a water catchment area for the residents as well as downstream communities, about 150 farmers in Gergera watershed lost all or some of their farmland and were forced to rely on year-round food aid. One of these farmers, Gebremichael Gebretsadik, said, 'I used to have a quarter of a hectare of land. Half of my land was washed away by floods.' The severe erosion shrunk Gebremichael's already small farmland, making him more dependent on government food aid.

Taking the pre-baseline assessment observations, the ICRAF team realized that the multiple bottlenecks in NRM development endeavours required in-depth understanding of the root causes of degradation of natural resources in order to propose sustainable remedies and solutions. Thus, ICRAF with local partners, including the local communities conducted a series of consultations and field assessments to understand the key constraining factors, as well as to identify and prioritize the demands of the watershed communities to ensure short-, medium- and long-term benefits and services, while keeping the watershed healthy. To make the interventions holistic and inclusive, vision maps were developed by various community members, extension officers and decision makers. During the vision mapping exercise, the homogenous groups discussed and came up with their own vision (what they wanted to see in the watershed in the short-, medium- and long-term) and translated their vision into a map including the list and types of interventions. This approach was important to assist in setting up the intervention building blocks upon which all the groups would agree.



**Figure 2:** *Joint vision mapping – communities, experts, local decision makers*

The project had five components (building blocks) that were identified with the active participation of farmers and local government stakeholders. These comprise:

- ✓ *Rehabilitation of gullies for better ecosystem services and alternative livelihood options with a joint vision of “converting gullies from threats to opportunities”.*
- ✓ *Value-addition and development of hillsides/area closures with a vision of “degraded hillsides/exclosures availing alternative livelihood options for rural, landless and unemployed youth, while providing ecosystem services sustainably”.*
- ✓ *Improving farming and grazing systems with a vision of “creating evergreen agriculture by introducing improved agroforestry practices, thus transforming tree-less and bare farmlands and grazing areas”.*
- ✓ *Strengthening rural institutions – youth-based agribusiness training and services with a vision of “bringing quality planting materials, agricultural, forestry and agroforestry inputs and services closer to farmers and farming communities of the watershed area and beyond”.*
- ✓ *Capacity building of all actors with special emphasis on local communities, extension officers and decision makers. The aim was to fill their skill and knowledge gaps so that successful interventions would continue to be scaled up and replicated with proper guidance and efficiency during the project implementation period and after its phasing out.*

The project carried out various activities under these five building blocks and was able to significantly contribute to the livelihood improvements of the local communities while keeping the environment healthy and enhancing ecosystem services.

Here below are brief activity areas accomplished and achievements as per the intervention components and/or workpackages.

## 1) Rehabilitation of gullies/riverbanks for better ecosystem services and alternative livelihood options



**Figure 3:** *Partial view of active participation of communities in the reclamation process of wide and deep gullies along the Gergera watershed*

The major work done under this component of the project was gully reclamation – converting gullies from threats to opportunities. It was estimated that 36 ha of farmland was lost following heavy floods; these had been turned into big and small gullies. About 150 farmers lost part of their land due to the floods. Gullies were a threat for both the Gergera and downstream communities.

Particularly, one of the gullies, which is also a waterway, (see figure 3) was too wide. Major action had to be taken to stop it from advancing and destroying more agricultural land. Gabion-based retention walls were constructed in the gully within a few weeks, with the active participation of the community and with significant contribution from the district's PSNP resources. As a result, a new productive area was created behind the wall on which nutritious biomass-producing fodder grasses and shrubs were planted. These were to be used as animal fodder and to reduce soil erosion. The soil from the adjacent land was cut and filled behind the retention wall at some spots. When the rains came, concentrated runoff and raging floods along the gully were effectively blocked by the wall, and thus soil erosion reduced significantly. The fodder grasses grew, and herbs and other vegetation sprouted.



**Figure 4:** *Partial view of rehabilitated gullies converted from threat to opportunities within few months*

Reclamation work was also done on the smaller gullies. As a result, farmlands were saved from flood damage; new productive land was created behind the retaining walls and the newly created land became a source of employment and livelihood for landless youth and women. Cuttings of elephant grass, local bamboo cuttings and splits of vetivar grass had been planted to stabilize the silt and soil accumulation, as well as create income opportunities for the youth and women in the newly reshaped and reclaimed gullies.



**Figure 5:** *Partial view of high biomass producing, and nutritious fodder grasses grown in reclaimed gullies and protecting heavily flooding*



Low-cost check dam ponds were constructed for irrigation. Water became available for livestock and people because of the check dams. High-value trees, fruits and grasses were planted in all rehabilitated and reclaimed gullies.

Generally speaking, the gully reclamation work has changed the mindset of the communities, extension officers, experts and decision makers in the region, as the project has demonstrated that “gullies are no longer threats. They are a means for livelihood improvement and rural employment opportunities” if properly guided and supported.

The key outputs and impacts of this work package include:

- *A series of gabion-based check dams were constructed which captured over 1000 cubic metres of silt. Three sand dams were created that stored water and made it available throughout the year for both people and livestock.*
- *Retention walls – about 2000 m long – were built. Their lengths ranged from 6 m to 120 m. The walls created over 15 ha of new productive land and over 45 ha of productive irrigable farmland was saved from flood damage. The land would have been eroded and lost in 2-5 years. In addition, over 96 farmers managed to get back some part of their lost farmland and have been able to grow vegetables and animal feeds throughout the year.*
- *Large amounts of fodder biomass (mainly elephant grasses) were harvested every year by farmers from the rehabilitated gully. This was used to feed livestock throughout the year, and the surplus sold. This, in turn, resulted in increased milk production by both local and crossbred cows in the watershed.*
- *Value addition work was carried out in the rehabilitated gullies; in addition to production of animal feeds, fruit trees and vegetables were planted. The vegetables were harvested 3-4 times a year, thus serving as an alternative source of livelihood and as learning hubs for various actors, both within and outside the region.*
- *The resource contribution, free labour from the community and the use of PSNP resources in IWD were effective and significantly contributed to sustainable land management and livelihood improvements in the Gergera watershed and among the downstream communities.*

## II) Value addition and development of hillsides/ exclosures

Gergera watershed is dominated by degraded and slopy areas where majority of the hillsides are set aside as exclosures. Accordingly, the project paid due attention to and invested in the mountainous areas, and was able to create livelihood options and learning platforms for value addition and biodiversity conservation. Lack of water was identified as one of the key barriers to the development and value addition work in hillsides and exclosures in Gergera watershed, and many other parts of Tigray and Ethiopia. To address these challenges, rainwater harvesting systems on the top of hills and conservation bench terraces along degraded hillsides were constructed to support the growing of high-value fruits, fodder and vegetables. These activities have added value to degraded hillsides while enhancing ecosystem services and creating income-generating opportunities for unemployed and landless youth and women. The hillsides, when covered with vegetation, turn into sponges that absorb water, thus preventing further erosion.



**Figure 6:** Partial view of hillsides and exclosures; experts and community representatives discuss the design of bench terraces to be constructed and, community engagement during the construction (upper), planting of high-value biomass-producing and nutritious fodder grasses and management of existing vegetation within and between bench terraces (middle) and growth performance of planted fodder grasses (lower).

An innovative and low-cost roof water harvesting reservoir with a capacity to store 72 m<sup>3</sup> of water was constructed on the top of a mountain to provide water for high-value trees, fruits and grasses through gravity irrigation systems. It was the first of its kind in the region and beyond, and was being piloted for wider scaling up. Moreover, to support the development and value-addition activities in the hillsides and exclosures, affordable and cost-effective roadside water harvesting reservoirs were constructed with significant resource contribution from watershed communities.



**Figure 7:** Partial view of piloted low-cost and innovative rainwater harvesting reservoir constructed at the top of a hill. It aims to store rainwater for irrigation of high-value trees and grasses.



**Figure 8:** Partial view of road water harvesting structure. It aims to supplement rainfed agriculture and reduce runoff.

Conservation-based bench terraces (50-1000 m long and 4-7 m wide) were constructed on hillsides owned by 17 landless youth. Today, they are earning a livelihood from the bench terraces through beekeeping enterprises and biomass (grasses, branches from trees and shrubs by pruning and thinning). They harvest both honey and biomass for their own use and sell the surplus without interfering with the restoration process. Following the bench terrace construction, Assisted Natural Regeneration/Farmer Managed Natural Regeneration (ANR/FMNR) were implemented on degraded hillsides to support the growth of indigenous trees and enrichment planting using multipurpose and high-value trees, fruits and fodder grasses. The aim was to enjoy optimum benefits while maintaining the restoration process and environmental services.



**Figure 9:** *Partial view of hillside conservation-based bench terraces and exclosure areas supported with ANR and enrichment planting activities with the inclusive and active participation of communities.*

In conclusion, innovative and cost-effective techniques and practices successfully introduced in the degraded hillsides (bench terraces, ANR/FMNR, alternative rainwater harvesting) have resulted in a planning and implementation revision/shift in the region including:

- *Construction of terraces from the traditional series based to conservation-based bench terracing which is considered cost effective and sustainable.*
- *Application of ANR/FMNR as a very simple and cost-effective tool/method of restoring degraded lands were piloted in Gegera watershed and have been adopted in the region. These were implemented in 25,000 ha of degraded hillsides in 2019/2020 alone.*
- *Construction of innovative and cost-effective road and roof water harvesting systems to improve productivity of hillsides and to serve as employment opportunities for the rural youth.*
- *Development of hillsides contributed to reducing unemployment and migration while creating/improving livelihood options.*

- Climate-smart and contextually-appropriate enrichment planting and conservation measures were applied in the hillsides and exclosures. These became livelihood options and contributed to biodiversity conservation. A few examples:
  - ✓ *A considerable number of youth are engaged in hillside and exclosure management as an income source. They are involved in beekeeping enterprises and collection of wood and non-wood products.*
  - ✓ *Multipurpose fodder, fertilizer, timber and wood fuel trees planted mainly on hillsides and upper parts of the watershed as enrichment planting.*
  - ✓ *The youth have produced about 150 fresh weight tons per ha of Desho grass on the bench terraces as an additional income source.*
  - ✓ *The site has become a learning hub for various stakeholders including farmers, governments, NGOs and development practitioners.*

### III) Transforming farming and grazing systems through integrating high-value and multipurpose trees

The farm and grazing lands found mainly in the downstream areas of the watershed/catchment have been bare and tree-less for decades. Resistance by the farming communities to integrate trees in their small farmlands has slowly decreased. They have begun integrating high-value and multipurpose trees and shrubs. The aim of introducing an evergreen agriculture model is mainly to transform the farm and grazing lands so that farmers can boost their production and productivity per unit area, while creating climate-resilient, productive and sustainable systems. Specifically, the objective of integrating trees, both in farms and grazing lands, was to make food crop yields stable, regenerate soil fertility, improve the microclimate, buffer crops against rainfall variability, enhance availability of dry season fodder, increase carbon accumulation in food crop systems, enhance biodiversity in annual crop systems and reduce deforestation.

During the project period, high-value fruit trees like avocado and guava, plus high biomass-producing and nutritious shrubs and grasses planted by farmers and farmer groups on cluster bases aimed to achieve a multi-storey type of farming/agroforestry system in the Gergera watershed. For example, within two years:

- *Over 7500 improved fruit trees (mainly avocado) have been planted by about 200 households on cluster bases along the watershed in farmlands and homesteads. Some farmers have begun harvesting and the interest is growing.*
- *Above 350,000 improved fodder grass splits and cuttings have been planted along farm borders and rehabilitated gullies/riverbanks. Consequently, year-round animal fodder is secured, and the impact of erosion and flooding significantly reduced.*
- *More than 50,000 multipurpose fodder, fertilizer, timber and wood fuel trees have been planted mainly on hillsides.*



**Figure 10:** *Partial view of avocado trees on farmlands and fodder grasses planted along farm borders.*



**Figure 11:** *Farmers receiving avocado seedlings produced by the rural resource centre.*

A study on the existing grazing systems along with the implementation of bylaws and grass species diversity were conducted. The findings were used to guide and improve the bylaws and carry out enrichment planting. The grazing lands were enriched with high-value, nutritive grasses and forage species to improve livestock productivity.

Moreover, to boost production and productivity of farmlands, supported with enforced bylaws, a strong water use association was established. The group is actively working on efficient irrigation water use and management. Some of the key achievements include the following:

- *Over 200 m of irrigation canals were maintained and are being used by more than 200 households.*
- *Farmers' cooperatives were established (142 members, where 38 of them are female) on cluster bases. They were able to integrate trees on their farms to diversify, intensify and transform the farming practices using agroforestry systems.*
- *Vulnerable women groups got access to clean water from alternative water harvesting technologies constructed in their homesteads using cost-effective and innovative roof water harvesting systems.*



**Figure 12:** Partial view of roof water harvesting structure constructed by women-headed households (left) to promote home garden agroforestry. Women receiving high-value, quality fruit seedlings to plant in their homesteads (middle and right)

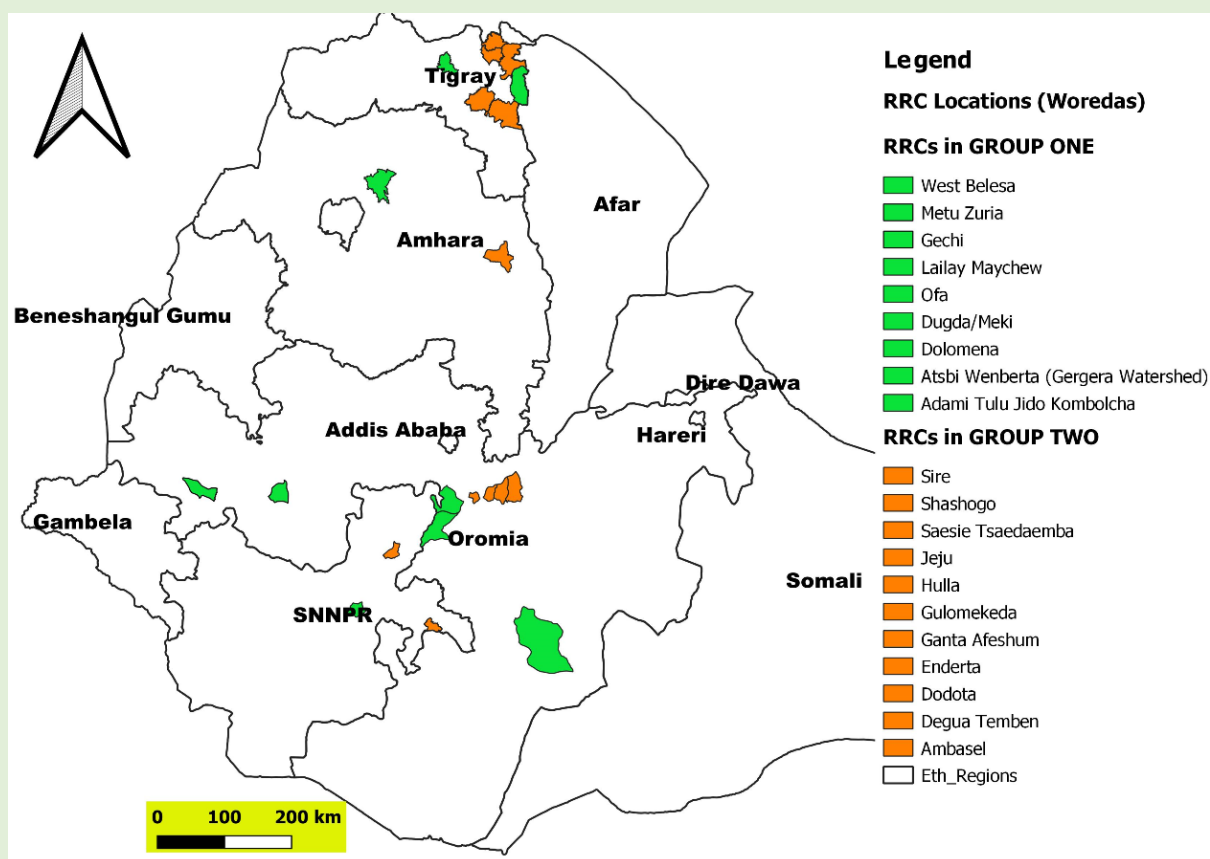
**Box 1:** Case study from a farmer who benefitted from the project

*“I own 0.25 ha, but 50% of my land was washed away. However, after the gully reclamation, I was able to get back my plot. I have planted high-value fruit trees namely avocado seedlings (50), guava (50), over 100 hops as well as animal forage such as elephant grass, desho grass and local grasses. I started selling grasses and hops from the reclaimed land. The reclaimed plot was more productive than the farmland, because I earn income from the reclaimed land throughout the year, unlike the farmland which brings in an income twice a year”.*

Farmer Gebremichael Gebretsadik

#### **IV) Strengthening rural institutions: Making quality germplasm, bringing services closer to farmers, whilst creating green job opportunities for rural youth and women**

A sustainable production and supply of quality planting materials to restore and rehabilitate degraded hillsides/exclosures and gullies/riverbanks and integrating trees in farms and grazing areas were identified as key activities in the watershed. Moreover, empowering rural institutions and creating green jobs for rural youth and women was one of the main interventions of the project. Thus, to address these demands, ICRAF in consultation with the local administrative and agricultural and natural resource offices, established a rural resource centre (RRC) by converting a public nursery into a private entity. The RRC was established with a goal of producing quality planting materials and inputs, and to bring services closer to farmers whilst creating green job opportunities for rural youth and women. This RRC is owned by 15 landless and jobless youth and women. Five of them were returnees from Arab countries. The RRC became a source of livelihood for them, the whole group and their families. It also availed quality planting materials, services and inputs for farmers living in the watershed. The RRC was the first of its kind in the region and has become a lesson for the government on how to make public/government nurseries effective and how it can be used as a business model for the ever-growing population of landless and unemployed rural youth and women. The RRC was a showcase in the region and many other areas in Ethiopia (*see RRCs distribution map*) on how to privatize public nurseries by handing them over to jobless youth and women and/or establish new ones.



**Figure 13:** RRC locations across Ethiopia. The RRCs in Group One were established by ICRAF in collaboration with relevant government offices, while those in Group Two were established by other ICRAF partner NGOs like CRS and WVE through ICRAF's guidance and technical support.

For example, the annual income of RRC members increased on average by 38.6% in 2016 as compared to their income in 2015, one and a half years after establishment. In addition to the selling of quality seedlings like grafted avocados, RRC members supplied agricultural, forestry and agroforestry inputs like farm equipment and quality vegetable seed/seedlings (salad, onion, pepper, tomato, cabbage, cauliflower) to farmers. The centres have also become a training hub for farmers in the region and beyond, and also support the 22 million ha national restoration pledge by supplying quality planting materials. For example, the Gergera RRC members have provided training for more than 150 farmers on management and protection of fruits and vegetables. The training filled some of the gaps seen in the public farmer training centres such as production and supply of compost and materials for compost preparation.

In general, to diversify livelihood options and income-generating schemes in the small plots owned by the RRC group, members could diversify their business opportunities by engaging in activities such as animal fattening, growing of coffee and other high-value fodder crops and vegetables, training farmers, preparation and sale of compost, poultry and even fish farming by constructing small ponds.





**Figure 14:** RRC members produce grafted avocado seedlings and other multipurpose trees for sale.



**Figure 15:** Fodder grass and vegetable seed multiplication for sale.

## V) Capacity building, documentation, knowledge management and policy influence

The project has built the capacity of watershed communities, extension officers and rural institutions, shared learnings, and documented knowledge and lessons. The major achievements and success attained in this work package include:

- *The mindset/attitudinal change-oriented capacity building activities (theoretical and practical training, experience-sharing/exposure visits, peer-to-peer learning) provided on various occasions for over 1000 households on various topics including sustainable watershed/land management (farmland, grazing areas, gullies, hillsides, exclosures), fruit management, agroforestry practices, grazing and irrigation water management, entrepreneurship, rural business planning and management, rural youth employment and women economic empowerment opportunities. These and other related types of capacity-oriented activities have created awareness and helped change the mindset of a range of actors involved in various land management and watershed development issues.*
- *Three MSc and three PhD students from partner institutions in the region got a chance to work with the project.*
- *The project achievements and lessons shared with various stakeholders in different local, national and international events, conferences and consultative meetings to influence policies and to scale up the successes.*
- *Comprehensive and detailed studies were conducted and documentation produced. Some of these include:*
  1. *A book on Climate-Smart Agriculture: Enhancing Resilient Agricultural Systems, Landscapes and Livelihoods in Ethiopia and Beyond published by ICRAF with chapters from Lessons and learnings of the Gergera watershed*

2. *A Review: A Guide to Landscape Restoration Initiatives - Planning, Implementation, Monitoring and Evaluation with Evidence and Lessons from Tigray, Ethiopia*
3. *Training Manual for Rural Resource Centres: Making quality germplasm and inputs, and bringing services closer to farmers while creating green job opportunities for rural youth and women*
4. *A Brief Guideline on Integrated and Sustainable Management of Degraded Areas and Exclosures*
5. *Climate-smart Agroforestry in Ethiopia: Technical Information Kit with Special Emphasis on Faidherbia albida using the FMNR Method*
6. *Tree Biomass Carbon Stock Estimation Models for Agroforestry Trees*
7. *Growth Responses of Agroforestry Trees under Different Management Practices*
8. *Gergera Watershed Lessons-based Review Paper on CSA, Agroforestry and Forestry Practices*
9. *A Study Report on Gergera Watershed Development and its Effectiveness*
10. *Modelling of Future Scenarios for Sustainable and Resilient Livelihoods*
11. *Assessment Report on Value Chain Studies and Value Chain Analysis*
12. *Assessment Report on the Status of Women's Economic, Food and Nutritional Status and Linkages to Economic Empowerment*
13. *Synthesis Report on Best Lessons and Experiences Related to Value Chain, Household Income and Rural Jobs for Economically Empowering Women*
14. *Tree Cover, Land Use and Biomass Carbon Changes on Time Series Basis*
15. *Analysis of the Level of Women's Economic Empowerment in the Watershed including Opportunities for Women in Market-Oriented Production and Ex-Post Assessment of Watershed Development*
16. *Effect of Moisture Conservation and Composting on Survival and Growth Rates of Agroforestry Trees*
17. *Adaptation Trials of Various Accessions of Fruit, Fodder Grasses and Fertiliser Trees*
18. *Gergera watershed rehabilitation successes and lessons (Eight-minute video presented during the 11<sup>th</sup> International Conference on Community-Based Adaptation in Uganda organized by the International Institute for Environment and Development (IIED) and Irish Aid)*
19. *Various policy briefs, book chapters, news and blogs*
20. *MSc and PhD study theses and articles*
21. *Biannual and annual project reports*
22. *Restoration Success Stories, Community-based Adaptation and Climate-smart Practices Storytelling through Photography in the Gergera Watershed, Tigray, Ethiopia*
23. *Project impact assessment report*

The Gergera watershed initiative has been a learning hub for local, national and international communities, and will continue to serve its purpose for years and decades. The following are some of the major experience-sharing and exchange visits hosted by Gergera watershed communities between 2015 and 2019. The visitors comprised decision makers, donors, media, research and academia, farmers, CBOs, religious leaders, development practitioners and NGOs.

1. *Article published in The Guardian titled "No one leaves any more: Ethiopia's restored drylands offer new hope" (<https://www.theguardian.com/global-development-professionals-network/2016/aug/03/ethiopia-restored-drylands-migration-eroded-deforested>)*
2. *Article published in The Guardian titled "Landscape restoration in Ethiopia brings watershed to life" discussing the Gergera watershed & Abreha We Atsbeha as cases*

[\(https://www.foreststreesagroforestry.org/news-article/landscape-restoration-in-ethiopia-brings-watershed-to-life/\)](https://www.foreststreesagroforestry.org/news-article/landscape-restoration-in-ethiopia-brings-watershed-to-life/)

3. Was used as part of the evidence for the World Future Council's 2017 Future Policy Award to Tigray for its restoration policy and achievements, held in China
4. Successful visit in Gergera watershed by the President of Ireland, HE Michael D Higgins, former President of Tigray region, HE Abay Woldu, the Irish Ambassador to Ethiopia, Aidan O'Hara and his successor, the Minister of Finance & Development and other high-level officials of the Irish and Ethiopian governments
5. Visit by the African Restoration Initiative team (AFR100) from 19 nationalities in October 2016 to share experiences from the Gergera watershed
6. Visit by the Regreening Africa Program Steering Committee from eight African countries, including delegates from the EU and Australian embassies in Ethiopia in November 2018
7. Visit by the co-chair of the Global Restoration Forum and former prime minister of Sweden, Dr Persson and his wife, accompanied by Dr Chris Reij, Senior Fellow at World Resources Institute and Prof Kindeya Gebrehiwot, President of Mekelle University on 18 January 2016
8. Visits by various NGOs (NRC & NCA in 2019; CRS & WV in 2018, One Acre Fund in 2017)
9. Visit by Mary Robinson (special UN Climate Change Envoy and former President of Ireland) accompanied by HE Mr Aidan O'Hara, the Irish Ambassador to Ethiopia, Cathy Watson of ICRAF HQ, international NGOs including GOAL, Concern Worldwide & Tigray regional officials, watershed communities and local administrators, plus the ICRAF Ethiopia project team on 6 July 2016
10. Visit by Ethiopian Minister, and State Ministers of Agriculture, ICRAF senior leadership including the Director General, Dr Tony Simons and other officials from Tigray BoANRs in May 2017 <https://www.foreststreesagroforestry.org/news-article/landscape-restoration-in-ethiopia-brings-watershed-to-life/>
11. Visit by religious leaders from Afar and Tigray, SLM program II and PASDIP II program teams, experts and department heads of 36 district from Tigray including BOA
12. Transmission and coverage through mainstream media, both television and radio, broadcasting during different visits and events
13. The Gergera watershed has become a learning hub for agroforestry and integrated watershed development, and for the establishment of the National Watershed and Agroforestry Multi-stakeholders' platform which has been functional and is used as a driving force or tool for the scaling up of good agroforestry and watershed practices across the country.  [\(https://www.worldagroforestry.org/blog/2021/06/28/cascading-national-watershed-and-agroforestry-multi-stakeholder-platform-regions\)](https://www.worldagroforestry.org/blog/2021/06/28/cascading-national-watershed-and-agroforestry-multi-stakeholder-platform-regions)
14. Based on the lessons and learning from the RRC established in Gergera watershed which is the first of its kind piloted by ICRAF through the Irish Aid-supported project, about 20 RRCs have been established across the country. These have made a significant contribution to the National Green Legacy Initiative through the continuous production and supply of quality planting materials. <https://worldagroforestry.org/blog/2022/09/15/beyond-green-legacy-initiative-ethiopia>

## Conclusion

The situational analysis conducted in Gergera watershed before 1998 or before the start of the Irish Aid-supported IWD and rehabilitation program indicated that communities were desperate, dependent on food aid, and predominantly engaged in crop and livestock production although most of the land was unproductive. Moreover, the land was highly degraded with wide and big gullies; farmers and livestock even had difficulty crossing them. In addition, deforestation, overgrazing, severe soil erosion and shortage of water were problems that were prevalent in the watershed and many other parts of the Tigray region.

The Irish Aid-supported rehabilitation program ran from 1998 to 2000, while the ICRAF-led project financed by Irish Aid (phase 2) registered significant impact and contributed to reversing land degradation, improving food security and livelihoods, and creating job opportunities, while enhancing resilience of ecosystems in the Gergera watershed.

The major successes achieved in the last six years of the ICRAF-led project include the introduction of innovative, cost-effective, sustainable and integrated climate-smart and best-fit technologies, practices and approaches. This initiative has been able to generate evidence important for making informed decisions in the watershed and beyond. The positive contribution of the project comprise the following:

- *Ensuring community-based adaptation for improved livelihoods, resilience and ecosystem services.*
- *Empowering women economically and making them resilient to climate-induced shocks and risks.*
- *Creating green job opportunities for rural landless and unemployed youth.*
- *Restoring and rehabilitating degraded hillsides and creating new productive land by introducing new and improved rehabilitation techniques such as conservation-based bench-terracing.*
- *Reclaiming gullies/riverbanks and converting them from threats to opportunities.*
- *Protecting productive farmland from floods, soil erosion and gully formation.*
- *Restoring and enriching degraded grasslands with splits of improved and nutritious grass species.*
- *Increasing vegetation cover and diversity and density of different plant species.*
- *Improving water retention capacity and construction of cost-effective rainwater harvesting systems to create year-round availability and access to water for irrigation, livestock and home consumption.*
- *Integrating high-value and multipurpose tree and shrub species to increase productivity, profitability and resilience of farm and grazing lands.*

## Acknowledgments

The authors and the Center for International Forestry Research (CIFOR) and World Agroforestry (ICRAF) – CIFOR-ICRAF – would like to thank the Irish Embassy (Irish Aid) in Ethiopia and the people and government of the Republic of Ireland for the financial support availed in preparation of this publication on the success stories on the restoration of Gergera Watershed as part of the Irish Aid-supported project titled “Developing an Innovative and Learning Platform for Enhanced Economic Opportunities and Resilience in Gergera watershed: An Action Research Program” located in the Eastern Zone of Tigray region, Ethiopia. This project was a continuation of the first phase of the Irish Aid-funded project titled “Enhancing Integrated Watershed Management with Climate-smart Agriculture” which ran from 2014 to 2018 in the Gergera Watershed.

*“The contents and views of this brief success story of Gergera watershed are the sole responsibility of the authors and neither represent nor reflect the views of Irish Aid and CIFOR-ICRAF”*



#### CIFOR-ICRAF

The Center for International Forestry Research (CIFOR) and World Agroforestry (ICRAF) envision a more equitable world where trees in all landscapes, from drylands to the humid tropics, enhance the environment and well-being for all. CIFOR and ICRAF are CGIAR Research Centers.

