PHOTO: ADISU D. GONFA

Strengthening Genebank–Farmer Linkages: Insights from Ethiopia's Germplasm User Groups

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Introduction

Despite Ethiopia's globally recognized agricultural biodiversity, a persistent challenge has been the underutilization of national genebank resources by smallholder farmers. The Ethiopian Biodiversity Institute (EBI) conserves germplasm (Box 1), however, limited awareness and logistical barriers often prevent farmers from engaging with these resources meaningfully.

SUMMARY

This study explores how germplasm user groups (GUGs) enhance Ethiopian smallholder farmers' awareness and use of genebank resources. Through participatory variety selection and structured engagement with the Ethiopian Biodiversity Institute, GUGs improved seed access, strengthened farmers' understanding of genebank functions, and encouraged the adoption of better farming practices. The study demonstrates that GUGs can be a practical model for connecting national genetic resource collections with local agricultural communities.

The Crop Trust's Seeds for Resilience Project (Box 2) introduced a novel participatory approach in the form of germplasm user groups (GUGs) (Box 3). This initiative sought to operationalize more dynamic pathways between the national genebank and local farming communities.

GUGs are farmer groups set up to directly engage with Ethiopia's genebank. These groups bring together men, women and youth to test and select crop varieties from the genebank that suit their needs. They also receive training and support from genebank experts or extension workers to improve their farming techniques.

Objectives and Methodology

The study examined how farmer participation in GUGs affects their perceptions of, and interactions with, the EBI genebank. It aimed to assess whether facilitated access to germplasm through participatory processes could lead to increased seed requests, enhanced understanding of the genebank's role and adoption of improved agricultural practices.

The research used a mixed-methods approach. The researchers conducted surveys with 200 farmers in Ginir and Goro, who were divided into three groups:

BOX 1 Ethiopian Biodiversity Institute (EBI)

The Ethiopian Biodiversity Institute (EBI), founded in 1976, is home to Africa's largest national genebank, conserving over 92,000 plant genetic samples. Its mandate is to include broad biodiversity conservation, sustainable use, and benefit-sharing. The genebank safeguards Ethiopia's diverse crop heritage – particularly cereals, legumes, oilseeds, vegetables, and endemic species like coffee – through both *ex situ* methods (cold storage and field genebanks) and *in situ* approaches (community seed banks and on-farm conservation).

EBI developed a digital platform (ebi.gov.et) to manage and share germplasm data. Strong national and international collaborations support its role in breeding, food security and climate resilience.

PHOTO: NORA CASTAÑEDA-ÁLVAREZ/CROP TRUST

BOX 2 About Seeds for Resilience

The Seeds for Resilience project, led by the Crop Trust since 2019, works to strengthen national genebanks in Ethiopia, Ghana, Kenya, Nigeria and Zambia. These genebanks conserve the crop diversity that is essential for developing climate-resilient, nutritious and productive crops. A key feature of the project is its collaboration with farmers, who evaluate and select varieties best suited to local needs. This farmer engagement helps prioritize seeds that are most useful for improving food security. By enhancing genebank operations and connecting them with farming communities, the project supports agricultural resilience across Africa. The goal is to make a wider range of climate-resilient seeds available to farmers, supporting sustainable agriculture and benefiting those most affected by climate challenges, particularly women, who play key roles in African farming systems.

- GUG members who are actively involved in participatory variety selection (PVS) (20%);
- Farmers who belong to a community seed bank (CSB) but are not engaged in PVS (40%);
- Farmers who are not affiliated with either GUGs or CSBs (40%).

Focus group discussions and descriptive statistical analysis (supported by chi-squared testing) were used to triangulate the data and assess group differences.

The GUG Model: Structure and Engagement

GUGs were established at several CSBs as structured groups consisting of male, female and youth farmers. EBI staff supported each GUG by providing training, participatory selection protocols and supervised field trials using materials sourced directly from the genebank. Selection criteria were co-developed with farmers and facilitated by EBI staff.

The activities took place not on individual farms but on shared seed multiplication sites managed by the CSBs. This communal structure allowed for close interaction with genebank staff and researchers and served as a practical learning environment for participants. Farmers evaluated crop accessions – such as wheat and black cumin – according to locally relevant traits like adaptability, yield and agronomic performance.

Farmer-Genebank Interaction: Key Findings

Increased Awareness of Genebank Functions

Participation in GUGs significantly enhanced farmers' understanding of the multifaceted role played by the EBI genebank. While 71.5% of all respondents were aware that genebanks conserve seeds, GUG members exhibited a deeper and more nuanced comprehension. They were more likely to recognize the genebank's role not only in conservation but also in seed distribution and accession collection. The analysis revealed statistically significant differences in genebank awareness between GUG members and the other two groups.

Seed Access and Use

A marked increase in seed requests was observed among GUG members. Prior to group participation, only 43.6% of GUG respondents had requested seeds from the genebank via their CSB more than once annually. After joining, this figure rose to 82.1% (Figure 1). Furthermore, 100% of GUG participants had accessed seeds at least once

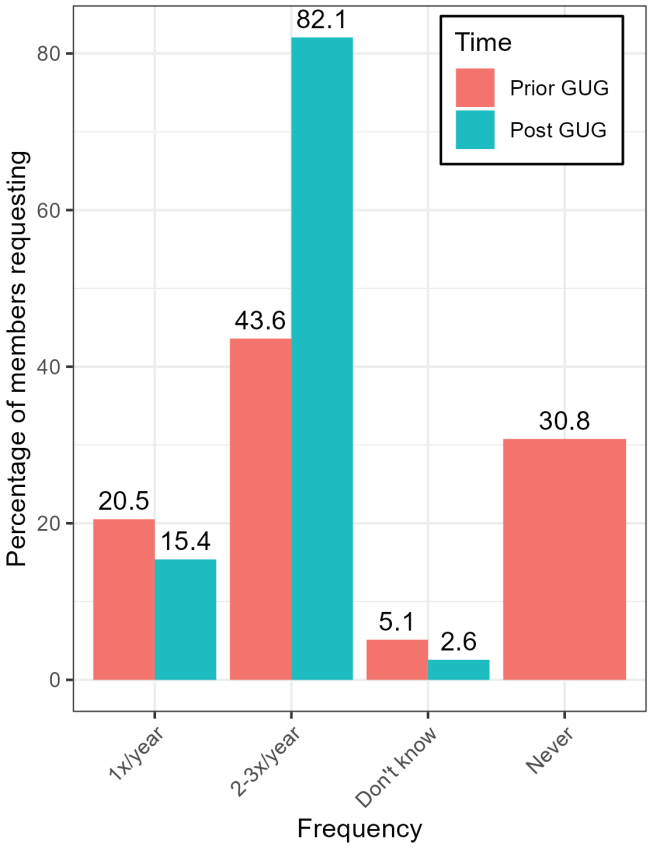

Figure 1. Farmer genebank seed request trend before and after user group participation.

BOX 3 Germplasm User Groups

Germplasm user groups (GUGs) are locally organized farmer collectives designed to foster collaboration, knowledge sharing and access to crop diversity in partnership with national genebanks. Developed with support from the Seeds for Resilience project, GUGs facilitate mutual learning and seed exchange tailored to local contexts. Their flexible structure allows adaptation to diverse social and agroecological conditions, making them effective conduits between genebanks and smallholder farming communities.

BOX 4 The Genebank Impacts Fellowship | Dereje Tamiru Demie

During this fellowship with the Crop Trust, I was involved in coordinating fieldwork activities and supporting the supervision of enumerator teams to collect data from and analyze data from farming communities This experience gave me the opportunity to improve my skills in socio-economic data analysis, which was a new area for me at the time. Through this work, I gained a better understanding of some of the key challenges facing smallholder farmers, such as limited access to improved seeds and the gradual loss of local landraces. Although Ethiopia has a high level of crop diversity, the project highlighted that many farmers still face barriers in accessing diverse and high quality and sufficient quantity germplasm. I also learned how farmer groups can play a useful role in the dissemination of technology, especially seeds, and in strengthening local seed systems. Overall, the

fellowship contributed to my growing interest in crop diversity conservation and farmer-oriented approaches to agricultural development.

annually post-intervention, compared to 70% beforehand. This trend suggests that interactive engagement with genebank representatives demystifies the access process and builds farmers' confidence in using formal seed sources.

Changes in Agricultural Practices

Beyond seed access, GUG participation influenced farmers' agricultural practices. Most notably, many adopted row planting techniques – a departure from traditional broadcasting methods – after learning about its benefits during PVS trials. This indicates that GUGs also serve as knowledge exchange platforms, where farmers can acquire practical skills directly applicable to their own farms.

Farmer Intentions to Diversify Crops

A majority of farmers from all groups expressed intentions to grow more crop varieties and species in the next five years. This suggests that structured engagement with genebank resources encourages a forward-looking approach to diversification, likely driven by increased access, awareness, and confidence in trying new germplasm.

Motivation and Benefits of Participation

Farmers cited several motivations for joining GUGs. Chief among these were the opportunity for training (25%), access to new seed varieties (20%), and personal invitations from genebank staff (24%). Participants reported significant benefits from involvement, including:

Photo 1. Data collection at Goro, Ethiopia, 14 June 2024. Photo: Dereje T. Demie

Photo 2. Cleaning seed at the Ethiopian Biodiversity Institute (EBI) in Addis Ababa. Photo: Nora Castaneda-Alvarez/Crop Trust

- Capacity building
- Problem-solving support
- Exposure to new technologies and varieties
- Opportunities for networking

These benefits reflect the multifaceted value of structured farmer-genebank collaboration and underscore the importance of moving beyond one-way seed dissemination toward more interactive engagement models.

What Farmers Want Going Forward

Farmers across all groups expressed a strong desire to:

- Access more varieties
- Grow crops suited to changing climate conditions
- Learn more about improved practices

GUG participants especially want to continue working with the genebank, try new crops like barley, and expand their land use for cultivation.

Implications for Genebank Utilization

GUGs are an effective mechanism for improving the accessibility and practical relevance of national germplasm collections. They provide farmers with:

- Clear pathways to request and test new varieties
- Opportunities to co-evaluate accessions alongside experts
- A sense of ownership in the crop selection and trials

Such participatory models may also generate feedback loops that benefit genebank curators and researchers, by surfacing user preferences and field-level observations that can inform future breeding or conservation priorities.

Importantly, the initiative appears to shift the perception of the genebank from a static repository to a dynamic partner in agricultural development. By fostering trust, increasing knowledge, and improving communication channels, GUGs can help align national conservation strategies with on-the-ground farmer needs.

Conclusion

The interaction between GUGs and the Ethiopian Biodiversity Institute genebank provides a compelling example of how participatory models can enhance the impact and relevance of national genetic resource conservation. By facilitating informed access to germplasm, GUGs empower smallholder farmers to explore diverse agricultural options, increase their engagement with formal seed systems, and adopt improved agronomic practices. In turn, genebanks gain vital field-level feedback and broaden their user base.

This mutually beneficial relationship supports a more dynamic and inclusive system for germplasm management—one in which farmers are not merely passive recipients of seed but active contributors to its selection, evaluation, and deployment.

Additional details can be found in the overview paper: Heaton et al., 2025

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