New-AEGIS Peer Review Report

Genebank reviewed: LEPL Scientific-Research Center of Agriculture, Tbilisi, Georgia

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Background

The New AEGIS project is a collaborative European initiative coordinated by the European Cooperative Programme for Plant Genetic Resources (ECPGR). It aims to revitalize and strengthen the AEGIS system (A European Genebank Integrated System) by improving the quality and efficiency of genebank operations across participating countries. The project promotes the implementation of the AEGIS Quality System (AQUAS), supports the development of standardized procedures, and encourages the sharing of challenges and genetic resources among European genebanks. Peer reviews of national genebanks are a central component of the project, providing mutual learning opportunities, capacity building, and constructive recommendations for further development to enhance alignment with international standards and ensure the long-term conservation and accessibility of plant genetic resources in Europe. It is highly important in light of very rich and unique PGR diversity that was developed and saved in Georgia since Neolithic period to the present.

This report summarizes the findings and observations from the peer review visit to the Georgian Genebank (LEPL Scientific-Research Center of Agriculture), conducted within the framework of this project. Key reference material was the Genebank Manual (February 2025) provided by the host institution.

Visit organization

The Georgian Genebank, managed by the LEPL Scientific-Research Center of Agriculture (SRCA) under the Ministry of Environmental Protection and Agriculture of Georgia, is located in Tsilkani, where seed genebank and *in vitro* collection are located. Fruit trees orchard, vineyards and agroforestry crops are located in Jighaura and were not part of the peer-review visit. Tamar Jinjikhadze welcomed all participants and provided basic information about the center and the genebank. Then she introduced all colleagues involved in the activities of the genebank and all the procedures. This was followed by a tour of the genebank facilities, with an explanation of the individual steps from seed accepting to their storage. In this peer review, the current situation of the Georgian genebank was described. The reviewers were informed that a new building with all necessary facilities and infrastructure important for the national genebank is going to be constructed, taking into account all recommendations and international standards.

Organisation, Management and Funding

The LEPL Scientific Research Center of Agriculture (SRCA) in Georgia operates its genebank under the authority of the Ministry of Environmental Protection and Agriculture. The genebank conserves primarily cereals and legumes—namely wheat (846 accessions), maize (486 accessions), and beans (1 473 accessions) — with particular emphasis on local Georgian landraces, Crop Wild Relatives (CWR) with a special emphasis on endemic species of Georgia, and traditional and local varieties. The genebank was established in 2016 and is dedicated to conserving selected accessions in active (+4°C) and base collections (-18 to - 22°C). Although funding is provided through an annual allocation from the state budget, additional support is obtained via national and international projects. The staffing structure is composed of qualified and experienced personnel, including the head of genebank, curators, and laboratory technicians, whose current capacity is deemed sufficient for existing operations.

Recommendation 1 - The long-term financial strategy addressing inflation, project discontinuity, and institutional sustainability should be established.

Recommendation 2 - The absence of a formal contingency plan could jeopardise operations during emergencies and thus should be urgently addressed.

Recommendation 3 - Based on the review of the LEPL Genebank, it is strongly recommended that Georgia establishes a formal National Programme for the Conservation of Plant Genetic Resources for Food and Agriculture. A national programme would provide a clear structure for setting conservation priorities, defining institutional roles, securing long-term funding, and aligning with international obligations. Without it, conservation efforts risk remaining fragmented and less effective in protecting the country's valuable agrobiodiversity for future use.

Recommendation 4 – The LEPL Genebank subsequently enrols material according to crop collections starting from the most important crops (wheat, maize, beans). The genebank should be aware of a duty to take care of all cultivated species with a priority to those originating or bred in the country. The later it starts to gather the material the more accessions may disappear. Therefore, it is strongly recommended to gather all current landraces and varieties that are available and put them to freezers. They may be subsequently regenerated and evaluated.

Germplasm management

In terms of germplasm management, the genebank employs various acquisition strategies including collecting missions, exchanges with international institutions under the Standard Material Transfer Agreement (SMTA), and contributions from individual breeders or farmers. A significant recent advancement is the establishment of safety duplication arrangements with the Svalbard Global Seed Vault, implemented in 2025. There is currently no formal safety duplication policy to guide these practices. The genebank does not yet perform systematic viability monitoring of seed accessions, nor does it apply minimum viability thresholds to trigger regeneration. While some measures are in place to ensure genetic integrity—such as pollination control in maize—many operational steps, including regeneration and seed drying, are handled without standardised procedures. There is a lack of equipment for controlled seed drying, and the drying process depends on ambient conditions, which may compromise seed longevity. The moisture content of seeds is as or even more important for their longevity as/than the temperature.

Recommendation 5 – It is highly appreciated that the most important accessions (domestic landraces, obsolete varieties and collected material of above mentioned crop collections) are backed-up in the Global Seed Vault (GSV). However, it is crucial to ensure that they are also duplicated in another genebank as a first safety duplication. Create a formal safety duplication policy to ensure consistent practices and back-ups.

Recommendation 6 – The need to develop and implement viability testing protocols, including initial seed viability testing, establish clear regeneration thresholds, and adopt written standard operating procedures for seed handling and conservation. Investment in appropriate drying equipment and enhanced storage capacity should also be prioritised.

Recommendation 7 – to invest in emergency backup equipment (power generator, back-up cooling - compressors) to maintain storage conditions during power outages should be taken into consideration.

Recommendation 8 - It is also necessary to establish a minimum threshold for the number of seeds per accession (in accordance with international recommendations) in order to conserve the diversity within the samples for both collections (active and base).

Recommendation 9 - It is also important to define the thresholds for the minimum and maximum number of seeds to be made available to requesters and users.

Recommendation 10 – It is important to plan periodical testing of seed viability to prevent deterioration of collections. Based on these data a system of notification for regeneration necessity can be designed.

Documentation and information

The genebank currently relies on a Microsoft Access-based database for orthodox seed collections. The field and *in vitro* collections are not yet digitally documented. The internal database is in development and is expected to conform to EURISCO and Multi-crop passport descriptor standards by the end of 2025. Backups are performed weekly, yet the genebank does not currently publish its data to EURISCO, nor does it participate in machine-to-machine data sharing platforms.

Recommendation 11 – To strengthen its documentation and information infrastructure, the genebank should prioritise the digitisation of vegetatively propagated collections (field trials, orchards, vineyards etc.), including *in vitro* data and expedite the publication of accession data to EURISCO. It is further advised to establish standard procedures for data entry, validation, back-up, and staff training in documentation systems. The adoption of more advanced or integrated data management systems, such as GRIN-Global or similar platforms, should also be considered in the medium term.

General Recommendations

1. Training and Capacity Building: Provide regular training to staff on best practices in germplasm conservation, proper regeneration, quality control, and data management.

2. Collaboration and Networking: Strengthen collaboration with other genebanks and research institutions to share knowledge, resources, and best practices.

3. Funding and Resource Allocation: Secure additional funding to address gaps in equipment, storage capacity, and technical support.

4. Implement a quality control system (e.g., ISO 9001) to standardize seed health, purity, and viability assessments.

Conclusion

In conclusion, the Georgian Genebank has demonstrated a strong commitment to the conservation of national plant genetic resources, with notable progress in areas such as SMTA implementation and the initiation of safety duplication in Svalbard. The commitment and high level of expertise of the staff are particularly commendable. Their enthusiasm and professionalism are the main strengths of the genebank.

It is also encouraging that the genebank operates under a national genetic resources conservation strategy and applies the Multilateral System (MLS) for Annex I crops, while for other species, the genebank uses its own Material Transfer Agreement (MTA) — a structured and transparent approach that ensures compliance and accessibility.

In addition, the planned construction of a new genebank facility represents a major step forward and a promising development for the future of PGRFA conservation in Georgia.

Nevertheless, several areas need to be improved to bring them in line with international standards and best practices. These include developing comprehensive operational strategies for collecting, conservation, evaluation, characterization, regeneration and maintenance of plant genetic resources, investing in infrastructure, improving data management and transparency, and preparing for risk and emergency scenarios. Strengthening these components will significantly improve the genebank's resilience, efficiency and international integration, thereby ensuring its role as an important institution for the conservation and sustainable use of Georgia's plant genetic resources.