

GENETIC RESOURCES OF CULTIVATED PLANTS FOR AGRICULTURE

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Abstract: The conservation and sustainable use of plant genetic resources are crucial for the development of agriculture and the maintenance of food security. In Azerbaijan, the National Gene Bank has established extensive collections of cultivated plants that reflect the nation's genetic diversity. These collections include various cultivated species, their wild relatives, local landraces, scientific breeding lines, and other valuable genetic materials. The samples maintained in the Gene Bank are preserved under controlled conditions, regenerated and multiplied as needed, made available for scientific research, and documented in comprehensive databases. These measures ensure long-term conservation and promote the effective utilization of genetic resources.

Keywords: genetic diversity, food security, in situ and ex situ conservation, gene bank, sustainable agriculture, crop improvement.

Plant genetic resources serve as a strategic foundation for agricultural progress. They provide the raw material for breeding new and productive varieties, increasing crop resistance to diseases and adverse climatic conditions. On a global scale, challenges such as climate change, soil degradation, and population growth increase the importance of conserving genetic diversity. In this regard, safeguarding rare and endangered species, as well as locally adapted landraces, is essential for maintaining agricultural productivity and ensuring food security for current and future generations.

The main objective of this study is to evaluate the role of plant genetic resources essential for agriculture and food production and to analyze current approaches to their conservation and sustainable use. Information from national and international scientific sources was systematically reviewed, and the experiences of different countries in the management and preservation of genetic resources were compared. The analysis highlights the need for integrated conservation strategies that combine both **in situ** (on-site) preservation in natural habitats and **ex situ** (off-site) preservation in Gene Banks and laboratories.

Additionally, the participation of local farmers in maintaining traditional varieties and the preservation of indigenous knowledge are vital for sustaining genetic diversity. At the global level, coordinated international collaboration is necessary to ensure the conservation of plant genetic resources. Raising awareness, strengthening research activities, and developing national strategies are among the top priorities in this field. The findings emphasize that sustainable agricultural development and food security are closely linked to the effective management, protection, and rational utilization of plant genetic resources.

In conclusion, maintaining and utilizing genetic resources not only supports crop improvement and adaptation to environmental changes but also underpins long-term agricultural sustainability. Strategic investment in plant genetic resources is therefore indispensable for ensuring the resilience and productivity of agricultural systems and safeguarding food security worldwide.