

## Seed Bank And Its Role in Crop Diversity

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Seed banks are essential for preserving plant genetic resources, ensuring food security, promoting sustainable development, and preventing the extinction of rare or endangered species.

They gather, store, and disperse seeds from various plant species to maintain their viability for future generations. Seed banks collect, store, characterize, and distribute seeds, ensuring successful breeding, research, and agricultural growth. However, they face

challenges such as genetic erosion, lack of funds, technical and logistical issues, and climate change's environmental impact. Future strategies for enhancing seed banks' role include integrating genomic technologies, promoting global collaboration, promoting public support for conservation, and enhancing climate resilience in seed collection.

The preservation and maintenance of plant genetic resources is the primary responsibility of seed banks. Securing food security, bolstering agricultural resilience, and promoting sustainable development all

depend on their role in preserving crop diversity. Seed banks play an important role in preserving the genetic diversity that is the foundation of world agriculture by gathering, preserving, and dispersing seeds from a



tremendous variety of plant species. In addressing their goals, strategies, difficulties, and potential future paths, this article examines the complex role that seed banks play in preserving crop variety.

### Seed bank

A seed bank is an establishment that gathers and stores seeds from various plant species in an effort to keep them viable for future generations. Its principal goal is to preserve plant genetic resources for the benefit of future generations while also preserving genetic variety. In order to keep seeds viable for a longer period of time and avoid degeneration, seed banks usually store them in controlled environments with low humidity and temperatures.

There are a number of essential purposes seed banks fulfill in relation to crop diversity:

- 1. Protecting Genetic Diversity:** Seed banks work to preserve the DNA of many different plant species, including both domesticated and wild varieties. The success of breeding efforts and the ability to adjust to new environments depend on this genetic variety.
- 2. Preserving Genetic Resources:** Seed banks play an important role in averting the extinction of rare or endangered plant species by storing their seeds. In light of human-caused stresses such as habitat loss and climate change, this is of paramount importance.
- 3.** Seed banks are a great resource for scientists and breeders since they have access to a large database of genetic material. To create new crop kinds that can withstand more extreme weather, provide more nutrients, and thrive in a variety of habitats, this substance is essential.
- 4.** Replanting and restoration efforts can be aided by the seeds stored in seed banks in the case of epidemics, natural catastrophes, or other emergencies. In order to restore agricultural systems and guarantee food security, this competence is crucial.

## Methodology

Various approaches are employed by seed banks to accomplish their conservation objectives:

- 1. Seed collection:** Seeds are gathered from a variety of places, such as wild populations, traditional types, and industrial cultivars. The main goal of collection activities is to get a wide range of genetic

variety so that different traits and adaptations are represented.

- 2. Storage:** To keep seeds alive for a long time, they are kept in controlled circumstances. Usually, this means cooling, drying, and packing seeds in a way that keeps them from going bad as quickly as possible. Seeds are often kept safe at very low temperatures using cryopreservation methods in places that store things for a long time.
- 3. Characterization:** Different tests are used to figure out the genetic and behavioral traits of seeds. This knowledge is very important for knowing the genetic diversity in the seed bank and choosing how to use the seeds.
- 4. Distribution:** Seed banks make it easier for academics, breeders, and farmers to use genetic resources by giving seeds to them. The goal of seed distribution is to make sure that seeds are used successfully for breeding, research, and agricultural growth.

## Seed Bank Challenges

Seed banks confront many obstacles despite their importance:

- 1. Genetic Erosion:** Genetic drift and loss can diminish stored seed genetic diversity. Seed regeneration and continued efforts are needed to maintain a diversified collection.
- 2.** Seed banks typically lack funds and resources. Seed sample collection, storage, and upkeep require sufficient funding. Conservation activities might fail without enough money.
- 3.** Complex technical and logistical issues arise when managing big and diversified seed collections.

Specialists and equipment are needed to store seeds properly, handle them without destroying them, and keep correct records.

#### **4. Climate Change and Environmental Impact:**

Climate change threatens seeds and their habitats. Seed banks must adjust to climate change's effects on seed storage and conservation.

#### **Future Perspective**

Several potential techniques might enhance seed banks' crop diversity role:

- 1. Integration with Genomic Technologies:** Advances in genomics and molecular biology aid understanding and management of genetic variability. Integrating genomic data with seed bank collections enhances genetic resource selection and utilization.
- 2. Crop variety protection** may include worldwide collaboration among seed banks, research institutes, and governments. Collaborative networks facilitate the exchange of resources, knowledge, and best practices.
- 3. Seed banks and crop diversity** might be promoted to increase public support and financing for

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conservation. Educational and communication efforts can stress the importance of genetic resources and their conservation.

- 4. Strategies to increase seed collection climate resilience** are critical. This includes creating new storage methods, increasing regeneration, and ensuring seed collections reflect a wide range of climatic conditions.

#### **Conclusion**

The preservation of crop diversity is essential for food security, agricultural innovation, and ecological balance, and seed banks play a critical role in this regard. A vast amount of genetic resources that support worldwide agriculture are protected by seed banks through their work in distribution, characterization, storage, and collecting. Even though they have obstacles including finance, genetic degradation, and environmental effects, future developments and cooperative efforts might improve their efficacy. A robust and sustainable food system will continue to depend on seed banks' ability to preserve and use crop variety as agriculture adapts to new global challenges.