

Seed Vaults and Seed Banks

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Plant extinction is progressing at an alarming rate, researchers warn, driven by increasing human population, pollution and deforestation, even before many species are catalogued. In such a scenario, seed vaults and seed banks are becoming resources of vital importance for the future of humankind.

In news: Last resort: the seeds kept safe in a South Korean mountain

Placing it in syllabus: Environment

Dimensions

- What are they?
- Biggest seed vaults in the world
- Uses of seed banks and seed vaults in maintaining crop diversity and biodiversity

Content:

What are they?

Seed Banks:

- A seed bank is a facility used to store seeds of various crops and wild plants, in an effort to maintain biodiversity.
- These structures can be found scattered all over the world, established by governments and organizations concerned about crop diversity.
- A seed bank is a place where seeds are stored to preserve genetic diversity for the future.
- They are usually flood, bomb and radiation-proof vaults holding jars of seeds from different plant species.
- The seeds are typically kept at low humidity and in cold conditions – around -20°C . This helps to preserve the

seeds, ensuring they can still grow when they are needed later.

- In seed banks, samples stored can be regularly withdrawn for various purposes
- There are more than 1,000 seed banks located all over the world.
- The **Vavilov Institute of Plant Industry** was established in 1894 in St. Petersburg, Russia, and is the oldest seed bank in the world.

Seed Vault:

- While those seed banks are great sources of seed samples, they're also vulnerable to the same types of disasters they're meant to protect seeds from.
- Natural disasters, wars, and even breakdowns in machinery, such as refrigerators, could wipe out the stored seed samples.
- **A Seed Vault provides long-term storage of duplicates of seeds conserved** in genebanks and seed banks around the world.
- The Seed Vault's value is considered to lie in **providing back-up** to individual collections in the event that the original samples, and their duplicates in conventional genebanks, are lost due to natural disasters, human conflict, changing policies, mismanagement, or any other circumstances.
- Deposits in seed vaults are meant to be permanent, with use intended only as a last resort to prevent extinction.

How are seeds stored in Seed Banks used?

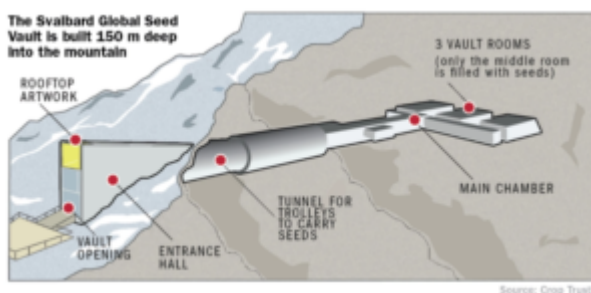
- Seeds stored at the bank may be owned by the collectors or the curators, and the owner will have the final say on the use of the seeds.
- Some banks only store seeds related to agricultural crops as insurance against genetic loss in our food

varieties. Others only hold seeds from rare species and may be very selective on how these seeds are used.

- Or they might hold many seeds for various purposes, from restocking populations to research projects and plant breeding programmes.

Example:

- The clover glycine (*Glycine latrobeana*) is a rare herb native to Australia.
- In 2007, around 1,200 seeds were sent to the UK for storage at the Millenium Seed Bank.
- When bushfires destroyed a major habitat for the small plant in early 2020, the seed bank was able to send 250 seeds back to Australia to help them reestablish in the wild again.



Locating Svalbard:

- Svalbard is the Norwegian archipelago halfway between the Northern pole and Mainland Norway.
- This location is in many ways perfect for the world's seed backup.
- Norway is a quiet and safe corner at the top of the world, and a long distance from the seed vaults housing the original collections, which are mostly located in the Southern regions.
- Even though Svalbard is affected by global warming, it is still expected to remain one of the world's coldest places.
- The seeds are placed in the chambers inside the frozen mountain and artificial cooling plants keep the

temperatures at a constant minus 18C.

- The permafrost in the mountains surrounding the Seed Vault is certain to keep the seeds cold for a long time, even in the event of no artificial cooling.

The Arctic World Archive:

- It's located near to the Svalbard Global Seed Vault.

It aims to **preserve data** for the world's governments and private institutions

Baekdudaegan National Arboretum Seed Vault Centre:

- It is located in the southeastern mountainous county of Bonghwa in **South Korea**
- The vault's samples are largely of flora from the Korean peninsula and its space is available to other countries also.
- It has a maximum capacity to store two million seeds.
- Currently, it preserves nearly 100,000 seeds from 4,751 different wild plant species to ensure they are not lost to "apocalyptic events"
- The vault is designated as a security installation by **South Korea's National Intelligence Service**
- The facility was built in the "safest spot" in South Korea and is designed to withstand a 6.9-magnitude earthquake and even an atomic strike.
- It's geographically very safe and is constructed in a 46 metre-deep underground tunnel to ensure it's safe from war and nuclear threats.

Uses of seed banks and seed vaults in maintaining crop diversity and biodiversity:

Saving Plant Species from Extinction:

- Globally, it's estimated that 40% of plant species are vulnerable to extinction.
- Plants are under threat from many factors, including

habitat loss, climate change, pollution, pests and diseases.

- The rate of their impact is also increasing, leading to an ever-greater risk of an incremental and catastrophic loss. We are potentially losing plants faster than we are discovering them.
- A seed bank is a form of insurance, a way of maximising the number of plant species we can save from this fate.

Store of Crop Genetic Variations:

- A seed bank is established to save samples of crop variations, so that they do not disappear forever. These variations make the plants more drought tolerant, frost resistant, nutritionally valuable, or easy to harvest.
- A crop could be highly vulnerable if one variety was heavily cultivated.
- A disease which evolved to attack the crop could devastate stocks worldwide if farmers all grew the same variety.
- If a seed bank had not been established, the crop might actually disappear, because no new plants could be grown.

Preserving regional heritage:

- A seed bank also preserves important pieces of regional heritage, such as rare and unusual crop varieties which are not viable commercially.
- A growing number of crops are cultivated for size, ease of harvesting, and shipping ability, at the cost of biodiversity and taste.
- A seed receptacle preserves antique varieties of a crop, and many biodiversity organizations also encourage farmers to grow heritage and heirloom crops on parts of the farms so that they do not die out.

Ensuring Human Survival:

- Wild plants hold promise as future medicines, fuels and food
- This is especially important with “orphan crops” such as cassava and taro, which make up a huge part of people’s diets in some parts of the world.
- Damage to these crops could have a very serious impact which can be averted by a seed bank.
- Seeds banks can supply scientists samples of seeds they can use to create new supplies of seeds to reestablish food crops in the aftermath of terrible disasters.
- Thus seed banks help in ensuring long-term food security.

Mould your thought: How is a seed bank different from a seed vault? Discuss their role in the contemporary world.

Approach to the answer:

- Introduction
- Define each and mention the key differences between the two
- Add examples of each
- List out their uses
- Conclusion