

## Frequently Asked Questions

### **What is crop diversity?**

Crop diversity is the biological base of agriculture. Agriculture depends on relatively few crops (only about 150 are cultivated on any significant scale worldwide); however, each comes in a vast range of different forms. They may vary, for example, in height, flower colour, branching pattern, fruiting time, seed size, or flavour. They may also vary in less obvious ways such as their response to cold, heat, or drought; nutritional qualities; or their ability to tolerate specific pests and diseases. Farmers and scientists must continually draw on this irreplaceable resource to ensure productive harvests.

### **What is the Svalbard Global Seed Vault (SGSV)?**

The purpose of the Svalbard Global Seed Vault is to provide insurance against both incremental and catastrophic loss of crop diversity held in traditional seed banks around the world. The Seed Vault offers “fail-safe” protection for one of the most important natural resources on earth.

### **What groups are involved in the Svalbard Global Seed Vault?**

The Seed Vault is owned and administered by the Ministry of Agriculture and Food on behalf of the Kingdom of Norway and is established as a service to the world community. The Global Crop Diversity Trust will provide support for the ongoing operations of the Seed Vault, as well as funding for the preparation and shipment of seeds from developing countries to the facility. The Nordic Gene Bank (NordGen) will operate the facility and maintain a public on-line database of samples stored in the seed vault. An International Advisory Council will oversee the management and operations of the Seed Vault.



### **Why Svalbard?**

Svalbard was chosen for several reasons. Its cold climate and permafrost make the area a perfect location for underground cold storage. The surrounding sandstone is stable for building and is low in radiation. In terms of security, Svalbard scores high marks compared to the locations of many other genebanks in the world. The infrastructure is good, with daily flights and a reliable source of energy from local coal supplies. The vault is located an extraordinary 120 metres (393.7 feet) into the rock, ensuring that the vault rooms will remain naturally frozen even in the event of failure of the mechanical cooling system and rising external air temperatures due to climate change.

### **How much did it cost to build the vault?**

The Kingdom of Norway spent approximately US\$9 million.

**What are the dimensions of the vault?**

The distance from the front door of the portal building to the back of the vault is approximately 145.9 metres (478.7 feet). The width of the each vault is approximately 9.5 to 10 metres (31.2 to 32.8 feet) and the height is 6 metres (19.7 feet). Each vault is approximately 27 metres (88.6 feet) long.

**What is the name of the mountain housing the seed vault?**

The mountain housing the Seed Vault is called "Platåberget," or "plateau mountain" in English.

**How many seeds will be stored in the Svalbard Global Seed Vault?**

The Seed Vault has the capacity to store 4.5 million seed samples. Each sample contains an average count of 500 seeds, so a maximum of 2.25 billion seeds can be stored in the facility. The collection and storage of seeds will continue for some time. When just half of the first of three vault rooms is filled, it will hold the world's largest collection of seeds.

**How will the seeds be stored?**

The seeds will be stored at minus 18 degrees Celsius (minus 0.4 degrees Fahrenheit). The seeds will be sealed in specially-designed four-ply foil packages that will be placed in sealed boxes and stored on shelves inside the vault. The low temperature and moisture level will ensure low metabolic activity, keeping the seeds viable for decades, centuries, or in some cases thousands of years. The permafrost will still ensure the continued viability of the seeds if the electricity supply should fail.

**Who will own the seeds in the Svalbard Global Seed Vault?**

Depositors will retain ownership rights over the seeds sent to the facility. The boxes with seeds will be sealed by the depositors and will not be distributed to or given access to by anyone other than the depositors.

**What type of seeds may be stored in the Seed Vault?**

Priority will be given to crops that are important for food production and sustainable agriculture. The facility will start with receiving security collections of the Consultative Group on International Agricultural Research (CGIAR) and certain key national genebanks. The focus will be on safeguarding as much of the world's unique genetic material as possible and avoiding duplication.

**Why is the Seed Vault important to developing countries?**

Food security is a challenge in many developing countries. Crop diversity is the resource to which plant breeders must turn to develop varieties that can withstand pests, diseases, and remain productive in the face of changing climates. It will therefore underpin the world food supply. Also, the Seed Vault will ensure that unique diversity held in genebanks in developing countries is not lost forever if an accident occurs. A backup copy will exist in Svalbard.

**What are the main differences between the Seed Vault and other genebanks?**

Svalbard will be a kind of insurance policy for other seed banks. Plant breeders and researchers depend on seed banks around the world to obtain varieties with useful traits that they need. If those seed banks later lose their own resources, because of natural or man-made disaster, the collections could be restored by getting the copies back from Svalbard.

**Will genetically modified seeds be stored in the Seed Vault?**

Norwegian law, promulgated prior to the establishment of the Seed Vault and intended therefore to apply more generally to research and use of genetically modified organisms in Norway, effectively prohibits importation of genetically modified seeds and their storage in Svalbard at this time.

## Genebanks

### What is a genebank?

A genebank is a facility for maintaining crop diversity, typically in the form of seeds, stored and conserved in a frozen state. The ideal temperature is between minus 10 and minus 20 degrees Celsius. Each different type of seed is stored in its own container, such as a bottle, can, or sealed aluminium foil package. Genebanks may also contain living plants and parts of plants in those cases where it is difficult to store the crop in the form of seeds.

### How many genebanks are there?

According to the UN's Food and Agriculture Organization (FAO), there are approximately 1400 genebanks in more than 100 countries around the world.

### How many samples do genebanks currently house?

Approximately 6.5 million seeds samples are stored in genebanks today. About 1 to 2 million of these seeds are estimated to be distinct.

### Who uses genebanks?

Plant breeders and researchers are the major users of genebanks. The diversity stored in the genebanks is the raw material for plant breeding and is also used for basic biological research. Several hundred thousand samples are distributed annually for such purposes.

### Is it really necessary to conserve such a big diversity of crops?

Crop varieties have different characteristics. Not all the differences are visible to the eye. Genetic traits may contain a wealth of differences in disease resistance, adaptability to various soils and climates, different tastes, and nutritional qualities. If we ever need these unique and often hidden traits found in particular crop varieties, then we must ensure that the variety is available.

### What are the threats to genebanks and their collections?

The biggest threat comes from lack of access to resources and funding. Poor management can be a major problem. Genebanks also can be subject to natural disasters, war and civil strife.

### How many plant varieties have been lost?

It is impossible to know; no organisation or government kept detailed records of all varieties of crops from past centuries. But much diversity has surely been lost. In 1903, for instance, U.S. farmers used 578 varieties of beans; some 80 years later, just 32 still existed, protected in genebanks.

### How long can seeds live in a frozen state?

This varies from crop to crop. Some crops will survive for decades, but others such as sorghum appear capable of surviving for thousands of years in cold storage. Eventually, all seeds will lose the ability to germinate and die. Before this happens, seeds are taken from the stored samples and planted. Fresh, new seed is then harvested and placed in storage, perpetuating the original variety.

### What crops can't be stored as seed?

Most potato, cassava, and banana varieties can only be conserved in field collections, tissue culture, or cryopreservation (in liquid nitrogen). A number of fruits and berries and some tuber crops also cannot be conserved by freezing seed, because there is no seed, or the seed just cannot be frozen and still remain viable.

## Collecting Seeds

### **How are seed samples collected?**

One must collect seeds when they are mature—typically at the end of the season. In assembling a serious collection of any crop, a collector or curator generally tries to get as much diversity as possible, including early- and late-maturing varieties, and varieties that are grown in hot and cold climates or wet and dry climates.

### **Do collectors take notes on the seeds' environment?**

Collectors record information about the conditions in which a variety is grown as well as interview local farmers about the history and characteristics of the crop.