SVALBARD GLOBAL SEED VAULT

Annual Progress Report 2023

NordGen

NordGen report on the agreement on the funding, management and operation of the Svalbard Global Seed Vault.

Contents

Front page photo: Harsh weather during the 15-year anniversary week in February 2023. Photo: Jonatan Jacobson, NordGen.

2023 at a glance

- In total 71,895 safety duplicates from 41 depositors were added to the Seed Vault collection in 2023. By the end of the year the total holding of seed accessions in the Seed Vault was 1,267,127 samples deposited by 102 genebanks/institutes.
- The Seed Vault celebrated its 15-year anniversary in 2023. On the February deposit event, 15-year-olds in Svalbard assisted handling of seed deposits from 20 gene banks and marked the anniversary by placing seeds of modern Graminor cultivars in the glass tube used during the foundation stone laying in 2006.
- The CSIR - PGRRI gene bank in Ghana became Seed Vault depositor #100 at the October deposit event. Eight other gene banks deposited seeds for the first time in 2023, located in Albania, Croatia, North-Macedonia, Benin, Italy, Armenia, Kenya and Germany. The gene banks in Benin and Italy were represented at their first-time deposits, in February and June respectively.
- The partners cooperated closely within the Crop Trust managed BOLD- and Seeds for Resilience-projects, which provide financial support to genebanks in developing countries for seed production and Seed Vault deposits. The significant number of new depositors is partly a result of activities in these projects.
- As part of the anniversary, a virtual tour of the Seed Vault was recorded and published in cooperation with Crop Trust and the Norwegian Ministry of Agriculture and Food.
- New samples of test seeds belonging to the 100-year seed germination experiment in the Seed Vault were deployed in 2023.
- By the end of 2023, around 70% of seed boxes in the Seed Vault has been equipped with nanofilm labels displaying data on conserved seed samples.

Foreword

NordGen manages and operates the seed deposits at the Svalbard Global Seed Vault in partnership with the Norwegian Ministry of Agriculture and Food (LMD) and the Global Crop Diversity Trust (Crop Trust) and in accordance with the Three Party Agreement between the partners, signed for ten years and valid from 1st of July 2017.

The objective of the Seed Vault is to provide a safety net for the international conservation system of plant genetic resources, and to contribute to securing the maximum amount of plant genetic diversity of importance to humanity for the long term. We are happy to note that the success of the Seed Vault has continued in this 15-year anniversary year, not at least confirmed by the high number of new depositors during 2023. The anniversary also boosted the public interest and awareness about the purpose of the Seed Vault.

By the end of 2023, the Seed Vault holds 1,267,127 safety duplicates representing wide inter- and intra-specific crop diversity deposited by 102 genebanks from around the world. Nine of these deposited seeds for the first time in 2023. This result is partly due to high activity in the BOLD- and Seeds for Resilience projects, and we appreciate good cooperation with Crop Trust in these two projects, funded respectively by the Norwegian and German governments.

We take this opportunity to thank our partners LMD and the Crop Trust for the good collaboration. I would also like to thank Statsbygg for the cooperation and excellent working conditions when handling seed deposits in Svalbard.

It is with great satisfaction we see that the confidence and global interest for the Svalbard Global Seed Vault and for depositing seeds has remained on a high level also in 2023.

Lise Lykke Steffensen
Executive director NordGen

1. Introduction

This annual progress report for the Svalbard Global Seed Vault gives an overview of the NordGen operation of the Seed Vault and related activities in 2023. NordGen's responsibilities are stated in the Three-Party Agreement providing for the long-term funding, management and operation of the Svalbard Global Seed Vault. The annual progress report is prepared by NordGen in accordance with obligations in the Three-Party Agreement Article 3.19.a).

The overall guidelines for the NordGen mission is to fulfil the objectives for the Svalbard Global Seed Vault as they are expressed in the standard deposit agreement between depositors and the Royal Norwegian Ministry of Agriculture and Food, saying that the Seed Vault was established with the "*objective to provide a safety net for the international conservation system of plant genetic resources, and to contribute to the securing of the maximum amount of plant genetic diversity of importance to humanity for the long term in accordance with the latest scientific knowledge and most appropriate technique*".

The operation of the Seed Vault is collaborative at several levels. At the management level NordGen collaborates closely with LMD and Crop Trust. At the facility operation level NordGen cooperates with Statsbygg in Longyearbyen. At the seed logistics level, we cooperate with the institutions sending safety duplicates as well as the chain of logistics and security partners involved in shipment and transport to the Seed Vault. The partnerships at all levels have worked very well also in 2023.

2. Seed deposits and depositors in 2023

In total, 41 genebanks deposited 71,895 seed samples in 2023, which represents a significant increase in the number of depositors compared to 2022, while the number of deposited seed samples is quite equal to the previous year. Three Seed Vault openings were organized, as scheduled and pre-announced.

Four genebanks deposited seeds at two occasions, and nine genebanks deposited seeds for the first time in 2023:

- Agricultural University of Tirana, Albania
- National Plant Genebank, Ministry of Agriculture, Croatia
- Fabia CSB Bogdanci, North-Macedonia
- Groupe de Recherche, Innovation agricole, Gestion de la biodiversité et Action pour un développement Durable et Equitable à la Base, Benin
- Institute of Biosciences and BioResources, Italy
- The Scientific Center of Vegetable and Industrial Crops, Armenia
- Botanical Garden, University of Bonn, Germany
- Genetic Resources Research Institute, Kenya Agricultural & Livestock Research Organization, Kenya
- Council for Scientific and Industrial Research, Plant Genetic Resources Research Institute, Ghana

Table 1. Seed Vault deposits and dates in 2023. The total number of deposited samples is 71,895.

Month / Year		Acronym	Inst.Code	Accesions
February 2023	**Totals**	**20 depositors**		**19585**
Plant Gene Resources of Canada		PGRC	CAN004	2740
International Livestock Research Institute		ILRI	ETH013	951
Millennium Seed Bank, Kew Garden		MSB, Kew	GBR004	25
Suceava Genebank "Mihai Cristea"		BRGV	ROU007	99
Agricultural University of Tirana		IPGR	ALB026	290
Julius Kühn Institute		JKI	DEU451	1
National Agrobiodiversity Center		RDA / NAC	KOR011	4000
Leibniz Institute of Plant Genetics and Crop Plant Research		IPK	DEU146	2761
International Crop Research Institute for the Semi-Arid Tropics		ICRISAT	IND002	4000
Centre of Estonian Rural Research and Knowledge		METK	EST019	103
National Plant Genebank, Ministry of Agriculture		HRPGB	HRV044	161
Fabia CSB Bogdanci		Fabia	MKD007	144
National Agricultural and Food Centre		SVKPIEST	SVK001	150
Agricultural Plant Genetic Resources Conservation and Research Centre		APGRC	SDN002	200
Institut d'Economie Rurale		IER	MLI002	1565
John Innes Centre Genetic Resources Unit		JIC	GBR247	599
Institute of Cereal Crop Improvement, Tel Aviv University		ICCI	ISR003	41
Nordic Genetic Resource Center		NordGen	SWE054	725
Groupe de Recherche, Innovation agricole, Gestion de la biodiversité et Action pour un développement Durable et Equitable à la Base		GRIGADEB	BEN098	427
Africa Rice Center		AfricaRice	CIV033	603
June 2023	**Totals**	**9 depositors**		**40506**
Latvian State Forest Research Institute "Silava"		LSFRI	LVA009	26
International Centre for Agricultural Research in Dry Areas		ICARDA	LBN002	9042
SADC Plant Genetic Resources Centre		SPGRC	ZMB030	552
World Vegetable Centre		WorldVeg	TWN001	8545
Institute of Biosciences and BioResources		IBBR	ITA436	392
National Center for Genetic Resources Preservation		USDA	USA996	20303
Centre for Genetic Resources		CGN	NLD037	742
University of Haifa		ICGB	ISR037	338
Plant Breeding and Acclimatization Institute		IHAR	POL003	566
October 2023	**Totals**	**16 depositors**		**11804**
SADC Plant Genetic Resources Centre		SPGRC	ZMB030	386
National Rice Seed Storage Laboratory for Genetic Resources, Rice Department		NRSSL	THA012	240
The Scientific Center of Vegetable and Industrial Crops		SVCIC	COL003	234
Centro Internacional de Agricultura Tropical		CIAT	ARM008	872
Crop Research Institute		CRI	CZE122	515
Instituto Nacional de Recursos Biológicos		INIAV	PRT001	458
Seed Savers Exchange		SSE	USA974	111
Agricultural University of Tirana		IPGR	ALB026	760
National Center for Genetic Resources Preservation		USDA	USA996	1410
International Crop Research Institute for the Semi-Arid Tropics		ICRISAT	IND002	1300
Instituto Nacional de Investigacion Agropecuaria		INIA	URY003	1570
Botanical Garden, University of Bonn		ABGBONN	DEU038	12
World Agroforestry Centre		ICRAF	KEN023	222
Genetic Resources Research Institute, KALRO		Gerri	KEN010	2644
CSIR, Plant Genetic Resources Research Institute		CSIR-PGRRI	GHA091	420
Nigeria National Centre for Genetic Resources and Biotechnology		NACGRAB	NGA010	650

During 2023 NordGen has on behalf of LMD, signed Deposit Agreements (DA) with 14 new institutions, and by the end of the year 116 institutions have signed the DA. Out of these 102 are active depositors, and by the end of the year the total holding of seed accessions in the Seed Vault was 1,267,127.

Two depositors that have deposited non-PGRFA seed samples with special permissions from the Norwegian Ministry of Agriculture and Food are not included in the publicly accessible part of the Seed Portal. These are the Forest Research Institute, Myanmar (deposited wild growing orchid seeds) and the University Centre in Svalbard (depositing non-PGRFA seeds from the Svalbard wild flora). Figures for seed deposits and withdrawals during the years from 2008 to 2023 are shown in Table 2 and visualized by graphs in Figure 1.

Table 2. Deposited and withdrawn seed accessions pr year and in total for the years 2008-2023. Figures showing status at the end of each year.

Year	Deposited pr year	Accumulated	Withdrawals	Current holdings
2008	320549	320549		320549
2009	169505	490054		490054
2010	111101	601155		601155
2011	113364	714519		714519
2012	58078	772597		772597
2013	29155	801752		801752
2014	38052	839804	3[1)]	839801
2015	36130	875934	38073[2)]	837858
2016	42979	918913		880837
2017	64403	983316	54354[2)]	890886
2018	92638	1075954		983524
2019	32572	1108526	24064[2) 3)]	992032
2020	82501	1191027	40 [4)]	1074533
2021	50926	1241953		1125419
2022	69825	1311778		1195244
2023	71895	1383673	12 [5)]	1267127
Totals		**1383673**	**116506**	**1267127**

[1)] *Three Hordeum accessions withdrawn by NordGen for regeneration*

[2)] *ICARDA withdrawals in 2015, 2017 and 2019*

[3)] *Seven Secale accessions withdrawn by Agroscope, Switzerland for regeneration*

[4)] *40 samples withdrawn from the 2020 seed deposit before departure from ICARDA. The figure was already registered in the Seed Portal.*

[5)] *A review of the total NordGen deposits in 2023 revealed that 12 registered accessions did not exist in the seed boxes and the corresponding data was removed from the Seed Portal.*

A complete list of signatories and their deposited seed samples are shown in Annex 1. Further details and key figures for the years 2017 to 2023 for seed deposits, stored boxes, depositors and seed deposit events are shown in Annex 3.

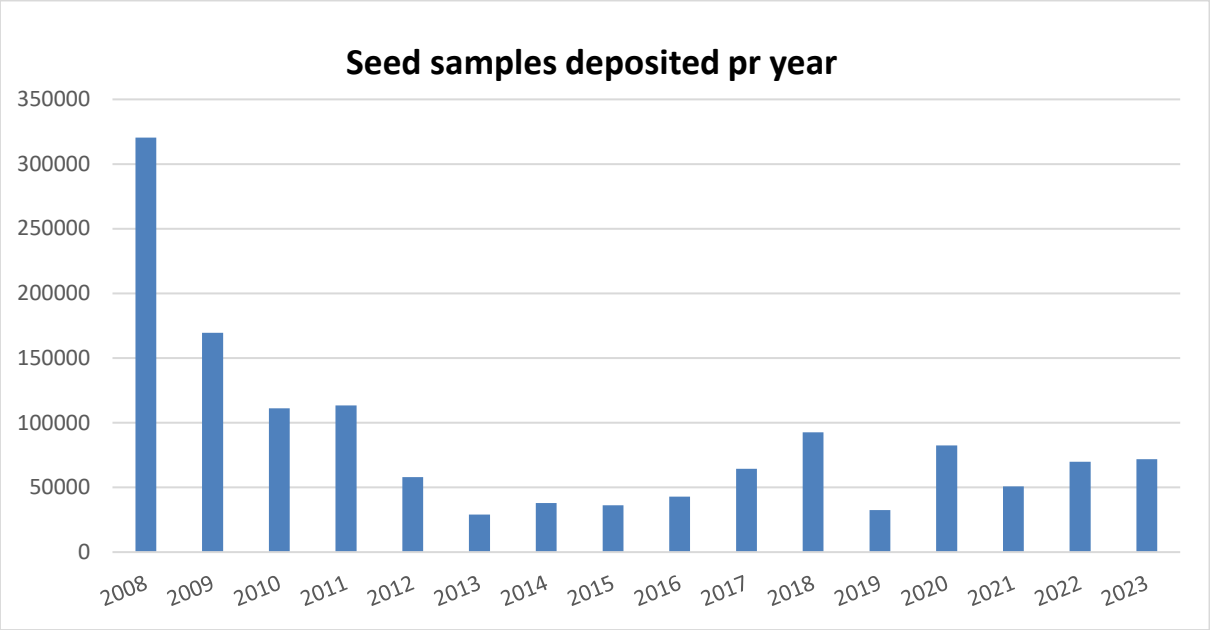

Figure 1. Seed samples deposited pr year from 2018 to 2023.

Figure 2 shows the proportion and numbers of safety duplicates deposited by different categories of genebanks by the end of 2023. The largest share (56,7%) of the current holdings in the Seed Vault is deposited by IARCs represented by institutes belonging to the Consultative Group of International Agricultural Research Centres (CGIAR), the Asian Vegetable Research Centre (AVRDC) and the Tropical Agricultural Research and Higher Education Centre (CATIE), all holding collections of PGRFA in trust for the UN Food and Agriculture Organisation (FAO).

Thirteen [1)] of the current 102 depositors are International Agricultural Research Institutes (IARCs), 79 are national gene banks and universities, two are regional genebanks and seven are NGO gene bank collections. One of the depositors is a private company that has deposited seeds in cooperation with the country's government (Singapore).

Two depositors are regional genebanks, SPGRC and NordGen, standing for 3,3% of the total number of deposited accessions, while 39,5% of the seed samples in the Seed Vault have been deposited by national genebanks and universities.

[1)] *ICARDA is registered twice in the database due to one added WIEWS code related to the relocation and split of the genebank to Lebanon and Morocco.*

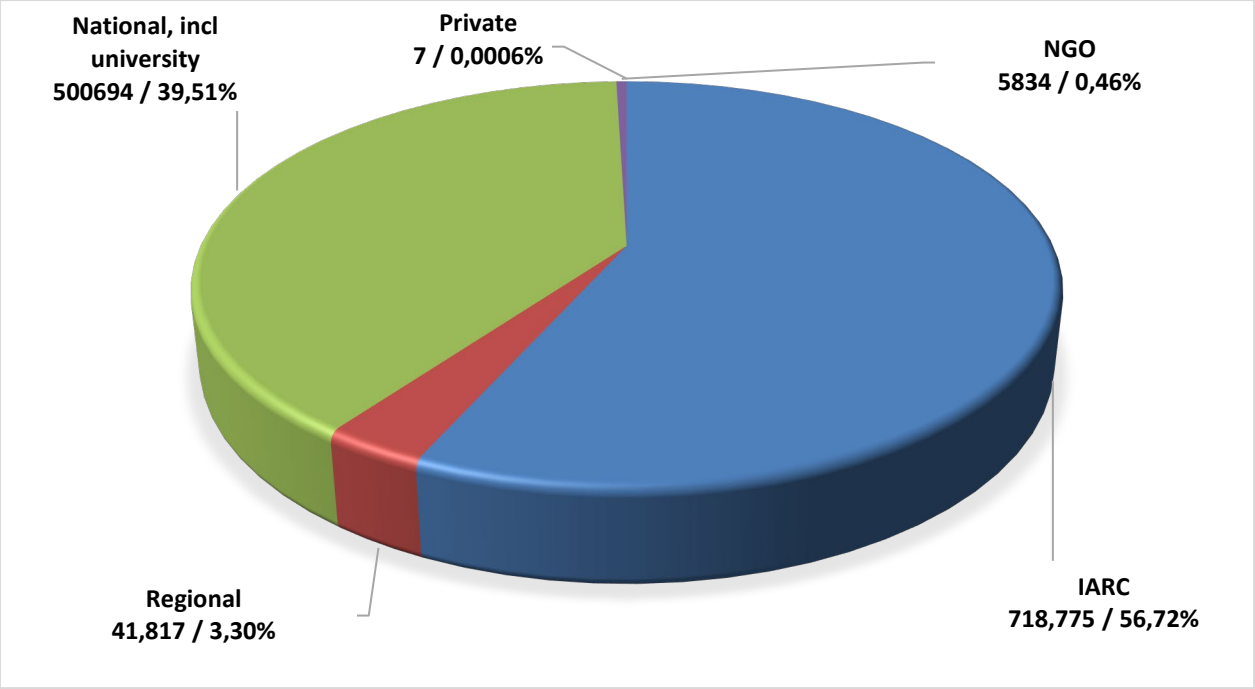

Figure 2. The proportion and numbers of safety duplicates currently deposited in The Seed Vault at the end of 2023 by different categories of genebanks.

In total, 254 seed boxes were taken into the Seed Vault in 2023. Over the years, 3985 regular seed boxes have been deposited in the Seed Vault. 325 boxes have been taken out, and consequently the number of regular seed boxes in the Seed Vault at the end of 2023 is 3660.

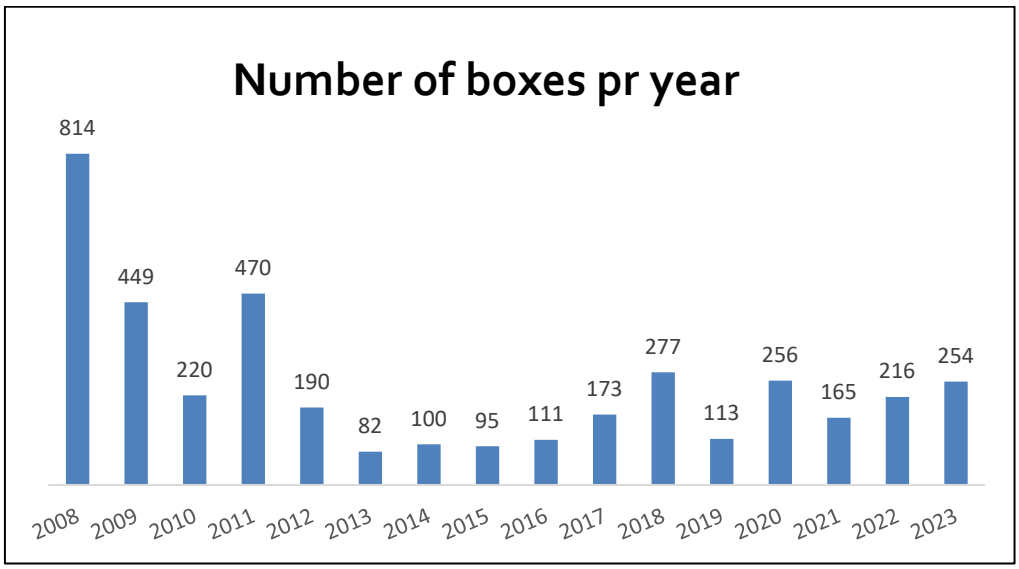

Figure 3. Numbers of boxes deposited per year 2008-2023. (Withdrawals not shown.)

In addition, there are 78 boxes registered as test boxes in the Seed Vault. Seven genebanks have deposited test samples in one or more separate boxes. In addition, boxes that contain seeds not categorized as regular crop seeds in the Seed Portal database are marked as test boxes (pasture seed mixtures from the Millennium Seed Bank, orchid seeds from the Forest Research Institute, Myanmar and seeds from the wild flora in Svalbard, deposited by the University Centre in Svalbard).

Seed shipment logistics imply that depositor genebanks send their seeds directly to Svalbard. Logistics in Svalbard have been handled in collaboration with the local company Pole Position Logistics, who pick up the seed boxes upon arrival, store them temporarily until the Seed Vault opening date and bring the boxes to the airport for scanning and afterwards to the Seed Vault.

Security screening of seed boxes upon arrival in Svalbard has been handled in collaboration with Avinor at Longyearbyen airport and the security company Avarn Security Aviation AS. Statsbygg has provided support with logistics and technical backstopping in Svalbard and accompanied at all work inside the Seed Vault. The work carried out in Svalbard has been carried out smoothly and efficiently in 2023. All seed samples and seed boxes that have been shipped to Svalbard have arrived safely and have been secured in the Seed Vault.

3. Supportive projects – BOLD and Seeds for Resilience

Through 2023, NordGen has cooperated closely with Crop Trust within the Norwegian funded BOLD WP4 project and the German funded Seeds for Resilience project. Both projects are funding genebank activities leading to securing duplicates of genebank collections in the Seed Vault. These projects are one main reason for the high number of new depositors and new Deposit Agreement signatories in 2023.

Through the Seeds for resilience project (S4R), five genebanks in five African countries have received financial support for a wide range of genebank activities, among these, depositing duplicates of genebank samples in the Seed Vault. NordGen has informed about options and guidelines through on-line lectures and individual communication with S4R partners. Four of these made seed deposits to the Seed Vault in October 2023. One of these, the Plant Genetic Resources Research Institute at the Council for Scientific and Industrial Research in Ghana became genebank #100.

Work package 4 of the Crop Trust organized BOLD-project (Biodiversity for Opportunities, Livelihoods and Development) aims directly at supporting seed production, packing and depositing seed duplicates from genebanks in the Seed Vault. Genebanks in least developed and low-income countries have been prioritized. NordGen has participated in a team that evaluated more than 60 applications for financial support.

During 2022 and 2023, 43 genebanks have signed project contracts. NordGen has informed about guidelines and routines for depositing seeds in the Seed Vault through individual email communication and through a workshop organized by Crop Trust in Berlin in November 2023.

Eight BOLD partners were already depositors to the Seed Vault from previous years and twelve new genebanks receiving BOLD support has signed the Deposit Agreement by the end of 2023. Five of these have deposited seeds for the first time in 2023. The BOLD WP4 projects end during 2024, and it is expected that the rest of BOLD partners will deposit seeds produced will BOLD support during 2024 and the first part of 2025.

4. Data management

NordGen maintains and updates the Seed Portal database. The Seed Portal keeps accurate records of deposited seed samples, depositors, species, seed deposit events etc., and it displays basic data in a publicly accessible interface at https://seedvault.nordgen.org/.

After introduction of the Seed Portal 2.0 in 2021, a significant cleanup of the database taxonomy has been carried out. The genera and species database registers are updated and are now consistent with internationally agreed taxonomy. Reviewing, harmonizing and correcting the full scientific name taxonomy is more complicated, and it is beyond the capacity of NordGen to establish a taxonomy that is agreed and used by all genebanks. However, during the last two years around 2000 taxon names have been corrected, merged and removed from the database, and this task is considered to be accomplished.

By the end of the year, 1164 genera and 6143 species are represented in the Seed Vault. Having the genera and species registers updated, provides opportunities for noticing increases in these numbers. During 2023 seeds of 18 new genera and 48 new species were deposited in the Seed Vault.

By the end of 2023, there are seeds of 11,524 registered taxa in the Seed Vault. This number largely reflects the diversity of taxonomy practices in the depositor genebanks, more than it reflects the diversity of genetic material conserved in the Seed Vault.

In total, 46 datasets have been validated and uploaded to the Seed Portal in 2023 (24 sets in 2021 and 34 in 2022).

5. The International Advisory Panel

The International Advisory Panel (IAP) did not meet in 2023, however, NordGen has through the year provided information and supported the IAP members activities as Seed Vault ambassadors.

IAP members in 2023 have been:

- Yasmina El Bahloul, INRA, Morocco, Chairperson (resigned November 2023)
- Alwin Kopse, Federal Office for Agriculture, Switzerland, Chairperson (from November 2023)
- Lavern Gueco, University of the Philippines, Los Baños
- Ana Maria Barata, Instituto Nacional de Investigação Agrária e Veterinária, Portugal
- Axel Diederichsen, Plant Gene Resources Canada
- Stefanos Fotiou, FAO
- Marie-Noelle Ndjiondjop, AfricaRice, Cote d'Ivoire
- Kristin Børresen, Graminor, Norway

NordGen appreciates that IAP members have acted as Seed Vault ambassadors during 2023.

6. Public awareness activities

In accordance with the Three Party Agreement and with the work plan and budget for 2023, NordGen has worked considerably with public outreach activities, coordinated with the partners in the Seed Vault Communication Group.

Some outreach activities have been carried out in connection with the Seed Vault 15-year anniversary in 2023. On the occasion of the 15th anniversary on the 26th of February, 15-year-olds in Svalbard assisted when seeds from 20 genebanks were deposited and they laid down seed bags of new cereal varieties from the Norwegian breeding company Graminor in the glass tube foundation item used when the go-ahead for construction was given in 2006.

The Norwegian Minister og Agriculture and Food Sandra Borch participated in the celebration, together with Innocent Dossou Aminon from the GRIGADEB genebank in Benin, that deposited seeds for the first time, supported by the BOLD-project. Representatives for partners and authorities in Svalbard were invited to this event and simple food and refreshments were served. A new virtual tour of the Seed Vault was published in 2023 as part of the anniversary.

As previous years, information about the Svalbard Global Seed Vault has been passed on through several platforms: responding to questions about the operation from the public and from media, presentations and lectures for different scientific and public audiences, media interviews, social media posts and written articles. NordGen has produced information, text and photos for information material and the Seed Vault official web site. Information about lectures and one written proceeding article in 2023 can be found in annexes 4 and 5. A significant part of the presentations have been given through on-line platforms.

NordGen cooperated with partners LMD and Crop Trust on side events focusing on the Seed Vault at the CGRFA meeting during the 17th to the 21st of July and at the ITPGRFA Governing Body meeting from the 20th to the 24th of November. Both events took place at FAO in Rome.

The event at the CGRFA meeting *Svalbard Global Seed Vault - An Arctic backup facility for the Plant Genetic Resources of the world* was organized on Thursday the 20th of July. It was chaired by Svanhild-I. B. Torheim, from the Norwegian Ministry of Agriculture and Food and presentations were given by NordGen executive director Lise Lykke Steffensen, Kent Nnadozie from the ITPGRFA secretariate, Yasmina El Bahloul from INRA Morocco (also chairing IAP) and Janny van Beem from Crop Trust.

The side event *Svalbard Global Seed Vault: 15 years of safeguarding crop diversity* at the ITPGRFA GB 10 meeting was organized Tuesday the 21st of November 2023. The side event was chaired by Svanhild-I. B. Torheim and presentations were given by Kent Nnadozie, Lise Lykke Steffensen and Stefan Schmitz.

Both side events were attended by a significant number of delegates and possible seed deposits from new genebanks and countries were discussed.

Seed Vault opening occasions are first and foremost occasions for bringing new seeds. However, as the Seed Vault has strengthened its position as an iconic symbol for the importance of conserving plant genetic resources, the Seed Vault openings are also important events for dissemination of information to media, to genebanks, other visitors and to the general public.

Coordinated by the Communication Group, press releases are produced and distributed at all deposit events, containing information about the current seed deposits, highlighting and inclusion of information and quotes from some of the depositing genebanks and statements from the Seed Vault partners.

NordGen has received journalists and media teams and given interviews at all three Seed Vault opening occasions. Several interviews are also given by on-line platforms. When genebanks or other stakeholders are represented, meetings and ceremonies are organized in the management building. Highlights from the three Seed Vault openings are:

<u>26th and 27th February 2023:</u>

a) An open day focusing on the Seed Vault was organized at Svalbard Museum. The agenda included speeches and greetings, children's program, presentation of seed art by Artists for Plants, short lectures and launch of the new Virtual tour of the Seed Vault.
b) Celebration of the Seed Vault 15-years anniversary combined with seed deposits at the Seed Vault, attended by the Norwegian Minister of Agriculture and Food, Sandra Borch, Secretary General of Nordic Council of Ministers Karen Ellemann, representatives from first time depositor genebank GRIGADEB, Benin and representatives from Seed Vault partners and the local community in Longyearbyen.

c) In cooperation with Store Norske Spitsbergen Kulkompani, an information point was installed in Coal Mine#3, aiming at informing tourists visiting the coal mine about the Seed Vault.

Figure 4. 15-years olds in Longyearbyen assisted at the 15 years anniversary seed deposit by showing flags for represented countries and reading information about their seeds. The event was attended by NordGen director Lise Lykke Steffensen (left), the Norwegian Minister of Agriculture and Food Sandra Borch, GRIGADEB genebank manager Innocent Dossou Aminon, Secretary General of the Nordic Council of Ministers Karen Ellemann and Crop Trust director Stefan Schmitz.

5th to 9th June 2023:

Figure 5. IBBR genebank curator Gaetano Laghetti receives the First-time depositor diploma from Espen Stokke, LMD (left) and the Italian delegation assists when their two first seed boxes are brought to the Seed Vault. From the right Ignazio Verde (CREA-MASAF), Gaetano Laghetti (IBBR), Gabriella Sonnante (IBBR), Domenico De Paola (IBBR) and Åsmund Asdal (NordGen).

24th to 26th October 2023:

a) The number of seed depositing genebanks passed 100. Four Seeds for Resilience supported genebanks deposited seeds and two of these were represented at the seed deposit ceremony. In addition, representatives from first time depositor Botanical Garden in Bonn, Germany and ICRISAT attended the seed deposit.
b) The US ambassador to Norway Marc B. Nathanson visited and assisted when seed boxes from genebanks in the US were brought to the Seed Vault.
c) NordGen deployed extra staff to attach nanofilm labels to seed boxes in seed chamber #2. By the end of 2023, approximately 90% of the boxes in seed chamber #2 have been equipped with nanofilm labels showing the content of the seed box.

Figure 4 (left). The Seeds for Resilience team organized seed deposits from four partner genebanks in October 2023. Among these two genebanks were represented; Graybill Munkombwe, Zambia Agriculture Research Institute (right) and Mayowa Olubiyi, NACGRAB, Nigeria (no 2 left). Here together with Alexander Kambili, Crop Trust and Kuldeep Singh, ICRISAT. (Photo Crop Trust). Right: The US Ambassador to Norway Marc B. Nathanson (left) visited the Seed Vault in October and assisted when seed boxes from US genebanks USDA and Seed Savers were brought to the Seed Vault. He was assisted by Kathleen A. Larkin and Leslie M. Leedy Stroope (right) both U.S. Department of State. In the middle, Grethe Evjen, LMD and Åsmund Asdal, NordGen.

NordGen has received and responded to a significant number of emails from media, scientists, politicians and the public during 2023. No exact statistics are made, but the number of emails and inquiries is estimated to be a bit higher than for 2022, due to extra publicity related to the anniversary.

7. Long term seed storage experiments

The *100 year Seed Longevity Experiment in the Svalbard Global Seed Vault* started in 2020. The project includes seeds of 14 different crops and six genebanks as project partners producing seeds for the experiment. According to the scientific design, seeds of five genotypes of each crop are produced over three years and deployed in the Seed Vault after drying and packing at NordGen facilities. Identical samples will be taken out and analyzed for germination every tenth year. Partners and crops are shown in table 3.

Table 3. Crops and genebank institutes included in the experiment.

Institute	**Providing seeds of crops**
National Rice Seed Storage Laboratory for Genetic Resources (NRSSL), Thailand	Rice (*Oryza sativa*)
Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Germany	Barley (*Hordeum*), pea (*Pisum)*, wheat (*Triticum*), lettuce (*Lactuca)* and *Brassica oleracea* [1)]
The International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), India	Groundnut *(Arachis),* chickpea (*Cicer*), pearl millet (*Pennisetum*), Sorghum (*Sorghum*) and pigeon pea (*Cajanus*)
Instituto Nacional de Investigação Agrária, INIAV, Portugal	Maize (*Zea mays*)
Empresa Brasileira de Pesquisa Agropecuária (Embrapa), Brazil	Soybean (*Glycine max*)
Nordic Genetic Resource Centre, Sweden	Timothy (*Phleum pratense*)

After significant delays related to the covid pandemic and to bureaucratic difficulties with shipments of seeds from genebanks located outside Europe, the project has more or less catched up and is well on track to be accomplished in the first half of 2025. Status shown in table 4. By the end of 2023, all seed sets have been delivered, except for the last/third sets from ICRISAT, which are expected to arrive in the second half of 2024.

Table 4. Status of seed production and deliveries, drying and packing process and deployment of test samples to the 100-year longevity experiment in the Seed Vault pr. 31st of December 2023.

Species	**Provider**	**Status pr 31.12. 2023**
Rice	NRSSL	Two sets in place, 3rd set to the Seed Vault in February 2024
Barley	IPK	Two sets in place, 3rd set to the Seed Vault in February 2024
Pea	IPK	All three sets in place
Wheat	IPK	Two sets in place, 3rd set to the Seed Vault in February 2024
Lettuce	IPK	Two sets in place, 3rd set to the Seed Vault in February 2024
Cabbage	IPK	Two sets in place, 3rd set to the Seed Vault in February 2024
Soybean	Embrapa	Two sets in place, 3rd set to the Seed Vault in February 2024
Groundnut	ICRISAT	First set in place, 2nd set in drying process, 3rd set delivery in 2024
Chickpea	ICRISAT	Two sets in place, 3rd set in drying process
Pearl millet	ICRISAT	First set in place, 2nd set in drying process, 3rd set delivery in 2024
Pigeon pea	ICRISAT	First set in place, 2nd set in drying process, 3rd set delivery in 2024
Sorghum	ICRISAT	First set in place, 2nd set in drying process, 3rd set delivery in 2024

Maize	INIAV	All three sets in place
Timothy	NordGen	Two sets in place, 3rd set to the Seed Vault in February 2024

8. Accession data on nanofilm

The nanofilm project increases the security and integrity of conserved seed sample data by printing box wise data on nanofilm and attaching film stripes to all seed boxes in the Seed Vault. Preparing accession data and producing film stripes for 3142 boxes deposited before the end of 2021 was completed in 2022. Attachment of film labels have been carried out during spare hours and days during Seed Vault opening weeks in 2022 and 2023.

Attaching film stripes to more than 3000 boxes has been a labour demanding task, but after deployment of extra NordGen staff in October 2023, approximately 90% of the boxes in seed chamber #2 have been equipped with nanofilm labels. In total around 400 printed labels remain to be attached to their respective boxes in 2024. Next step will be to order film stripes/labels to 470 boxes that have been deposited in 2022 and 2023.

9. Financial result

Key figures for funding and the financial result and account wise budget and spending for 2023 are shown in Annex 2. The financial result, as the difference between budget and spending for 2023, summarized for core activities and projects shows a total surplus of SEK 166,714.

Spending lower than budget is in particular due to lower IAP activities, and lower costs in the 100-year seed longevity experiment, which is related to delayed deliveries and analysis of seeds for the 100 year experiment. Postponed activities will need unspent project budget for activities in subsequent years. More details account wise below.

Approved budget for 2023 was SEK 3,419,885, shared by contributions from partners at SEK 2,964,214 and SEK 455,670 from the working capital fund (wcf). Due to lower spending and a positive currency exchange rate between SEK and Euro Total, the result shows a surplus of SEK 81,498, without contributions from wcf. This amount has been added to the wcf, that at the end of the year contains SEK 600,260.

Directing and interaction with partners

Total spending compared to the budget shows a deficit of SEK 32,934. This is due to increased time spent on overarching administration, management and contact with genebanks.

Administration, planning and documentation

Total spending shows a deficit of SEK 30,894. The deficit is due to increased need for support from administrative staff related to the 15-year anniversary and formal procedures connected to the large number of new genebanks entering the Seed Vault mission in 2023.

Liaising with depositors and handling of seeds

Total spending for 2023 shows a minor surplus, and spending is quite in line with the budget.

Data management

Total spending shows a surplus of SEK 30,044. Reviewing and harmonizing the Seed Portal taxonomy have been accomplished with less working hours than expected and some improvements and upgrades of the Seed Portal database system has started in cooperation with consultants.

Communication attracting new depositor genebanks

Total spending shows a deficit of SEK 71,345, which is due to extended communication with a significant number of potential new depositor genebanks that are partners in the Crop Trust organized Seeds four Resilience and BOLD WP4 projects. The number of new DA signatories and new depositing genebanks have been higher than previous years.

Public awareness activities

Total spending compared to the budget shows a surplus of SEK 64,685. Lower spending reflects that resources have been re-allocated to communication and- information activities related to new depositor genebanks. Travel costs have been lower than in previous years due to increased use of virtual meetings and on-line presentations.

International Advisory Panel

Total spending shows a surplus of SEK 84,848. When the budget for 2023 was made and approved, the possibilities for a fourth meeting of the International Advisory Panel in 2024 was on the table. During 2023, it was decided to organize the next meeting in 2025 and communication and preparing information to the IAP has therefore been lower than expected.

Long term storage experiment

Total spending compared to the budget shows a surplus of SEK 137,331. The project has also this year suffered from delays in seed shipments related to the pandemic, in particular the program for germination tests and chemical analysis of the seed material at external laboratories has been

postponed. In addition, the seed providing partner genebanks have covered shipments costs themselves, partly because shipments of test material have been coordinated with regular seed deposits to Svalbard.

Some unspent budget has been re-allocated to extra working hours in the other of the two projects included in the Seed Vault budget, equipping seed boxes with nanofilm labels with printed accession data. Unspent project budget will be needed the following years to cover postponed activities on preparing seed samples and seed analysis.

Conserving data on long-term storage medium

Total spending for this project shows a deficit of SEK 18,156 compared to the budget. Attaching label holders with nanofilm stripes to the seed boxes has been rather labour demanding and the progress has been lower that planned. To catch up, extra NordGen staff went to Svalbard in October, and the result after two working weeks in October/November is that approximately 90% of the boxes in seed chamber #2 has been equipped with corresponding film stripes.

Annex 1. List of deposit agreements and depositors

List of depositors to the Svalbard Global Seed Vault listed in order of Deposit Agreement signature. Updated pr 31. Dec. 2023.

Acronym	Country	Institute name	Wiews code	SDA	Accessions end 2022
WARDA	International, Benin	Africa Rice Center	CIV033	2007/2008	21222
CIAT	International, Columbia	Centro Internacional de Agricultura Tropical	COL003	2007/2008	58406
CATIE	International, Costa Rica	The Tropical Agricultural Research and Higher Education Center	CRI001	2007/2008	1314
ILRI	International, Ethiopia	International Livestock Research Institute	ETH013	2007/2008	7233
ICRISAT	International, India	International Crop Research Institute for the Semi-Arid Tropics	IND002	2007/2008	123013
ICRAF	International, Kenya	World Agroforestry Centre	KEN023	30.01.2008	1758
CIMMYT	International, Mexico	Centro Internacional de Mejoramiento de Maiz y Trigo	MEX002	2007/2008	181641
IITA	International, Nigeria	International Institute of Tropical Agriculture	NGA057	2007/2008	23333
CIP	International, Peru	Centro Internacional de la Papa	PER001	2007/2008	9696
IRRI	International, Philippines	International Rice Research Institute	PHL001	2007/2008	126447
ICARDA	International, Lebanon / Morocco	International Centre for Agricultural Research in Dry Areas	SYR002/ LBN002	2007/2008	115907
AVRDC	International, Taiwan	The World Vegetable Center	TWN001	2007/2008	48805
NORDGEN	Regional, Sweden	Nordic Genetic Resource Center	SWE054	30.01.2008	28884
IPK	Germany	Leibniz Institute of Plant Genetics and Crop Plant Research	DEU146	30.01.2008	66992

CGN	Netherlands	Centre for Genetic Resources	NLD037	30.01.2008	21703
PGRI-NARC	Pakistan	Plant Genetic Resources Institute, National Agricultural Research Centre	PAK001	30.01.2008	4932
SSE	USA	Seed Savers Exchange	USA974	30.01.2008	4321
NGBK	Kenya	Kenya Agricultural & Live-stock Research Organisation (KALRO): Genetic Resources Research Centre	KEN015	26.02.2008	3958
NAC / RDI	South Korea	National Agrobiodiversity Center	KOR043	06.05.2008	Transferred to KOR011
IAS	North-Macedonia	Institute of Agriculture Skopje	MKDxxx	11.06.2008	0
NBPGR	India	National Bureau of Plant Genetic Resources	IND001	04.07.2008	3292
VIR	Russia	N.I. Vavilov All-Russian Scientific Research Institute of Plant Industry	RUS001	04.07.2008	6082
RAC	Switzerland	Station Federale de Recherches en Production Vegetale de Changins	CHE001	27.10.2008	11321
EMBRAPA	Brazil	The Brazilian Agricultural Research Corporation	BRA008	06.11.2008	5122
AFT	Ireland	Oak Park Research Centre	IRL001	16.01.2009	577
DAFF	Ireland	Department of Agriculture, Food and Rural Development	IRL029	22.01.2009	435
TARI	Taiwan	Taiwan Agricultural Research Institute	TWN006	26.02.2009	10503
UAAS	Ukraine	Institute of Plant Production n.a. V.Y. Yurjev of UAAS	UKR001	03.03.2009	2782
PGRC	Canada	Plant Gene Resources of Canada, Canadian Genetic Resources Program	CAN004	05.11.2009	34952
ILRF	Georgia	I. Lomouri Research Institute of Farming.	GEO001	23.02.2010	305

AAS	North Korea	Pyongyang AAS	PRK013	18.03.2010	5700
UNALM	Peru	Universidad Nacional Agraria La Molina	PER002	25.05.2010	1296
ICCI	Israel	Institute of Cereal Crop Improvement, Tel Aviv University	ISR003	23.06.2010	941
DELEP	USA	Desert Legume Program. University of Arizona	USA971	24.08.2010	134
ARC	Sudan	Agricultural Research Corporation	SDN034	18.10.2010	Transferred to SDN002
SPGRC	Regional, Zambia	SADC Plant Genetic Resources Centre	ZMB030	09.11.2010	12933
NAGREF	Greece	National Agricultural Research Organization	GRC035	02.02.2011	25
ICABIOGRAD	Indonesia	Indonesian Center for Agricultural Biotechnology and Genetic Resources	IDN179	02.02.2011	1050
MPGRPPD	Myanmar	Department of Agricultural Research	MMR003	23.02.2011	718
INIAP	Ecuador	Instituto Nacional Autónomo de Investiga-ciónes Agropecuarias	ECU076	12.04.2011	168
NARO	Uganda	National Agricultural Research Organization	UGA031	26.05.2011	Transferred to UGA528
BARI	Bangladesh	Plant Genetic Resource Centre, Bangladesh Agricultural Research Institute	BGD164	10.06.2011	0
LSB	Italy	University of Pavia, Department of Earth and Environmental Sciences, Lombardy seed bank	ITA411	23.06.2011	2
NACGRAB	Nigeria	National Centre for Genetic Resources and Biotechnology	NGA010	06.09.2011	1450
IRAG	Guinea	Institut de Recherche Agronomique de Guinée	GIN020	07.10.2011	0
RNGRC	Tajikistan	Republican National Genetic Resource Center	TJK027	14.11.2011	1646

AGRI	Azerbaijan	Genetic Resources Institute of the Azerbaijan National Academy of Sciences	AZE015	17.02.2012	1522
INRB	Portugal	Instituto Nacional de Recursos Biológicos	PRT005	05.03.2012	Transferred to PRT001
ISABU	Burundi	Agricultural Research Institute of Burundi	BDI003	19.06.2012	829
IER	Mali	Institute of Rural Economy	MLI002	19.09.2012	2323
PSARTI	Mongolia	Plant Science Agricultural Research Institute	MNG030	02.10.2012	360
INIA La Platina	Chile	Unidad de Recursos Genéticos -INIA La Platina	CHL002	03.10.2012	Transferred to CHL044
AUG	Georgia	Georgia State Agrarian University	GEO028	15.10.2012	120
NPGRL	Philippines	National Plant Genetic Resources Laboratory	PHL129	18.10.2012	2254
ASAU	Armenia	Armenian State Agrarian University, Laboratory of Plant Gene Pool and Breeding	ARM035	16.12.2012	175
CN FCRC	Thailand	Chai Nat Field Crops Research Center	THA214	01.03.2013	150
UzRIPI	Uzbekistan	Uzbek Research Institute of Plant Industry	UZB006	01.03.2013	2038
SARDI	Australia	South Australian Research and Development Institute	AUS006	12.06.2013	Transferred to AUS167
AGG	Australia	Australian Grains Genebank/Australian Tropical Crops Collection	AUS165	26.11.2013	27152
BWPRC	Japan	National University Corporation Okayama University	JPN009	26.11.2013	5268
NRSSL	Thailand	National Rice Seed Storage Laboratory for Genetic Resources, Rice Department	THA012	14.08.2013	1234

AGES	Austria	Austrian Agency for Health and Food Safety, Dept. for Plant Genetic Resources	AUT001	17.03.2014	2358
BGRIPGR	Bulgaria	Institute for Plant Genetic Resources "K.Malkov"	BGR001	17.03.2014	2119
NCGRP	USA	National Center for Genetic Resources Preservation, USDA	USA996	SIGNED 18.01.2015	156950
NFSC	Norway	The Norwegian Forest Seed Centre	NOR056	08.01.2015	208
Luke	Finland	Natural Resources Institute Finland	FIN027	21.01.2015	7
CRI	Czech Republic	Crop Research Institute	CZE122	28.08.2015	1982
UCR-CIA	Costa Rica	Universidad de Costa Rica	CRI092	08.09.2015	Transferred to CRI003
PdeP	Peru	Parque de la Papa	PER862	09.09.2015	750
AGRESEARCH	New Zealand	Margot Forde Germplasm Centre	NZL001	11.1.2016	2597
CHAIPATT	Thailand	Chaipattana Foundation	THA513	11.2.2016	34
APG	Australia	Australian Pastures Gene Bank	AUS167	11.3.2016	34735
GRIBL	Bosnia & Herzegovina	Genetic Resources Institute, University of Banja Luka	BIH039	16.6.2016	1148
INRA	France	National Institute for Agricultural Research	FRA040	16.6.2016	2
TLL	Singapore	Temasec Life Sciences Laboratories Ltd.	SGP008	19.8.2016	7
JHI	UK	James Hutton Institute	GBR251	09.11.2016	1416
MNREC	Myanmar	Myanmar Ministry of Natural Resources and Environmental Conservation	MMR075	09.11.2016	491
RPCNASBAF	Belarus	Scientific Practical Centre of the National Academy of Sciences of Belarus for Arable Farming	BLR011	17.01.2017	341

METK (formerly ETKI)	Estonia	Centre of Estonian Rural Research and Knowledge	EST019	25.10.2017	236
SVKPIEST	Slovak Republic	National Agricultural and Food Centre	SVK001	08.01.2018	1232
INIAV	Portugal	Banco Português de Germoplasma Vegetal	PRT001	26.02.2018	1076
INIA	Chile	Instituto de Investigaciones Agropecuarias	CHL044	06.04.2018	145
DOA	Thailand	Department of Agriculture, Ministry of Agriculture and Cooperatives	THA032	09.08.2018	55
UKVGB	United Kingdom	University of Warwick	GBR006	13.08.2018	1090
LSFRI	Latvia	Latvian State Forest Research Institute "Silava"	LVA009	28.10.2018	179
BDNA	South-Korea	Baekdudaegan National Arboretum	KOR048	03.06.2019	10
APGRC	Sudan	Agricultural Plant Genetic Resources Conservation and Research Centre	SDN002	13.09.2019	2843
JKI	Germany	Julius Kühn Institute	DEU451	30.09.2019	14
IHAR	Poland	Plant Breeding and Acclimatization Institute	POL003	09.10.2019	9113
BRGV	Romania	Suceava genebank "Mihai Christea"	ROM007	23.10.2019	1058
MSB, Kew	United Kingdom	Royal Botanic Gardens, Kew	GBR004	18.12.2019	25
UCR	Costa Rica	Universidad de Costa Rica	CRI003	08.09.2015 (as CRI092)	57
LARI	Lebanon	Lebanese Agricultural Research Institute	LBN020	14.01.2020	453
ICGB	Israel	Wild Cereal Genebank, University of Haifa	ISR037	30.03.2020	661
CN	USA	Cherokee Nation	USA1005	21.01.2020	9
INRA	Morocco	Institut National de la Recherche Agronomique	MAR123	24.02.2020	983

JIC	United Kingdom	John Innes Centre, Germplasm Resources Unit	GBR247	10.07.2020	4933
RDA / NAC	South Korea	RDA genebank/National Agrobiodiversity Center	KOR011 (former KOR043)	12.10.2020 New code confirmed	34272
IFVCNS	Serbia	Institute of Field and Vegetable Crops	SRB002	23.08.2021	96
UNGB	Uganda	Uganda National Genebank	UGA528 (former UGA031)	06.09.2021 New code confirmed	946
CSIC	Spain	Agencia Estatal Consejo Superior de Investiga-ciones Cientificas	ESP004	28.02.2022	979
VMT	Lithuania	State Forest Service	LTH021	28.04.2022	123
INIA	Uruguay	Instituto Nacional de Investigacion Agropecuaria	URY003	12.08.2022	3462
SBSTC-MOA	Iraq	Directorate of Seed Testing and Certification	IRQ001	29.08.2022	418
IPGR	Albania	Institute of Plant Genetic Resources	ALB026	24.10.2022	1050
SCVIC	Armenia	Scientific Centre of Vegetable and Industrial Crops	ARM008	23.01.2023	234
ASC / ANAU	Armenia	Agrobiotechnology Scientific Center, Armenian National Agrarian University Foundation	ARM059	06.02.2023	0
BRAC	Bangladesh	Bangladesh Rural Advancement Committee	BGD099	07.02.2023	0
IBBR	Italy	Institute of Biosciences and BioResources - National Research Council	ITA436	10.02.2023	392
GRIGADEB	Benin	Groupe de Recherche, Innovation agricole, Gestion de la biodiversité et Action pour un développement Durable et Equitable à la Base	BEN098	13.02.2023	426

HRPGB	Croatia	National Plant Genebank, Ministry of Agriculture	HRV044	15.02.2023	161
FABIA	North-Macedonia	FABIA CSB Bogdanci	MKD007	15.02.2023	144
OAU	Nigeria	Obafemi Awolowo university	NGA026	22.03.2023	0
KSRIAPG	Kazakhstan	Kazakh Scientific Research Institute of Agriculture and Plant Growing	KAZ014	15.05.2023	0
CSIR - PGRRI	Ghana	Council for Scientific and Industrial Research – Plant Genetic Resources Research Institute	GHA091	19.06.2023	420
EGF	Cameroon	Ecogerm Farmers	CMR205	19.06.2023	0
ABGBONN	Germany	Botanical Garden, University of Bonn	DEU038	13.10.2023	12
SSN	Kenya	Seed Savers Network Association	KEN214	23.10.2023	0
BIT	Indonesia	Borneo Institute	IDN415	06.11.2023	0

Annex 2. Budget and spending 2023

Budget and Spending - Svalbard Global Seed Vault
NordGens management and operation 2023

Activity area/activity	2024-01-30	Budget currency SEK	Actual currency SEK	Budget against actual
Directing and interaction with partners	Management and meetings	290 732	363 115	
Project no 709513	Management assistance and meetings	70 871	49 865	
	Travels	30 000	11 557	
	Sub-total	**391 603**	**424 537**	**-32 934**
Administration, planning and documentation	Administration management	83 316	109 768	
Project no 709524	Support accounts, archive & logistics	69 001	55 228	
	Support project coordinator	0	19 853	
	Documents and background information	496 098	482 747	
	Travels	0	11 713	
	Sub-total	**648 415**	**679 309**	**-30 894**
Liaising with depositors and handling of seeds	Communication & Seed handling	425 227	425 250	
Project no 709515	Seed handling in Svalbard	86 047	70 408	
	Travel	100 000	119 357	
	Contracted services	45 000	28 126	
	Sub-total	**656 275**	**643 141**	**13 134**
Data management	IT & Seed Portal support	34 246	28 161	
Project no 709514	Preparing datasets and Seed Portal update	212 614	178 154	
	Contracted services	30 000	52 500	
	Travel	12 000	0	
	Sub-total	**288 859**	**258 815**	**30 044**
Communication attracting new depositor gene banks	Communication activities	141 742	232 753	
Project no 709525	Travel	20 000	334	
	Sub-total	**161 742**	**233 087**	**-71 345**
Public awareness activities	Respond to enquiries, lectures/articles, website	354 356	330 015	
Project no 709516	Serve media, produce material, website & SE	0	0	
	Travel	60 000	29 656	
	Sub-total	**414 356**	**359 671**	**54 685**
International Advisory Panel	Secretary	181 707	110 172	
Project no 709517	Secretary assistance	13 313	0	
	Secretary assistance	0	0	
	Logistics arrangments	0	0	
	Travel	0	0	
	Meeting costs	0	0	
	Sub-total	**195 020**	**110 172**	**84 848**
	Basic costs Svalbard incl IAP 709517	**2 756 270**	**2 708 732**	**47 538**
	Basic costs Svalbard excl IAP 709517	**2 561 250**	**2 365 473**	**195 777**
Long term storage experiment in the Seed Vault	Coordination	0	0	
Project no 709529	Preparing and handling of test samples	97 567	68 998	
	Seed technician	60 000	43 050	
	Contracted seed analysis program	90 000	27 143	
	Shipment costs	40 000	11 045	
	Sub-total	**287 567**	**150 236**	**137 331**
Conserving data on long-term storage medium	Administration	0	0	
Project no 709523	Compiling data	0	19 922	
	Staff	86 047	87 406	
	Travel	90 000	86 875	
	Contracted services	0	0	
	Sub-total	**176 047**	**194 203**	**-18 156**
	Sub-total	**463 614**	**344 439**	**119 175**
	Reservation of Currency difference 2023	**200 000**		

	Budget	Actual	
Total Costs	**3 419 885**	**3 053 171**	**166 714**
Total Costs EURO	**307 350**	**274 393**	exkl reservation

	Total Income Budget	Total Cost
	3 419 885	**3 053 171**

	Total Income 2023	Total Result 2023
Crop Trust Funding 2023	1 572 030	
NordGen Funding 2023	110 408	
LMD Funding 2023	1 452 231	
	3 134 669	**81 498**

	Working capital fund	
Total Working capital fund 31 dec 2021	**866 191**	2021
Total Working capital fund 31 dec 2022	**518 762**	2022
Total Working capital fund 31 dec 2023	**600 260**	2023

Annex 3. Key figures - deposits and depositors

Seed deposits, depositors, seed boxes in the Seed Vault and seed deposit events for 2017-2022, actual numbers for each year and accumulated figures.

Year	2017	2018	2019	2020	2021	2022	2023
Seed accessions [1) 2)]							
Accessions deposited	64403	92638	32572	82501	50926	69825	71895
Deposited in total, by 31.12	983316	1075954	1108526	1191027	1241953	1311778	1383673
Withdrawals [3)]	54354		24064	40			12
Withdrawals in total by 31.12.	92430	92430	116494	116534	116534	116534	116546
Seed Vault collection by 31.12	890886	983524	992032	1074533	1125419	1195244	1267127
Depositors							
Depositors	15	30	7	42	22	31	41
New depositors	3	3	3	8	2	4	9
Depositors in total by 31.12	74	77	80	87	89	93	102
New signatories	2	6	6	5	1	5	14
Signatories in total by 31.12	79	85	91	96	97	102	116
Number of deposit events	4	3	4	3	3	3	3
Seed boxes [1)]							
Number of deposited boxes	173	277	113	256	165	216	254
Deposited boxes in total	2704	2981	3094	3350	3515	3731	3985
Number of retrieved boxes	161		36				
Retrived boxes in total	289	289	325	325	325	325	325
Boxes in Seed Vault by 31.12	2415	2692	2769	3025	3190	3406	3660

1) *Test seed samples and test boxes are not included.*
2) *Deposited seed samples not registered in the Seed Portal database are not included. These are seeds from Svalbard native flora, orchid seeds from Myanmar and pasture seed mixtures deposited by Royal Botanical Gardens, Kew in the UK.*
3) *Details on withdrawals in Report table 2*

Annex 4. Lectures and presentations 2023

Lise Lykke Steffensen:

20.7. Depositing seeds at Svalbard Global Seed Vault. Side *Event Svalbard Global Seed Vault - An Arctic backup facility for the Plant Genetic Resources* at the 19th Regular Session of the Commission on Genetic Resources for Food and Agriculture (CGRFA 19) 17. – 21. July. Rome, Italy.

21.11. Depositing seeds at Svalbard Global Seed Vault. Side Event *Svalbard Global Seed Vault: 15 years of safeguarding crop diversity* at the 10th Governing Body of the ITPGRFA meeting 20.-24. November. Rome, Italy.

Åsmund Asdal:

10.2. What is being saved in the Svalbard Global Seed Vault? Webinar Global Landscapes FORUM (GLF) https://m.youtube.com/watch?v=YFOUWIwe8aw&feature=youtu.be

26.2. Svalbard Seed Vault operations and the role of genebanks. Lecture at Svalbard Museum on the event of celebrating the 15 years anniversary of the Svalbard Global Seed Vault. Longyearbyen, Norway.

16.3. Conserving plant genetic resources in genebanks and in the Svalbard Global Seed Vault. Rabat American School, Morocco. On-line lecture.

22.3. Svalbard Svalbard Globale Frøhvelv – Noahs ark for frø i Arktis. Gråtenmoen Bydelshus, Skien, Norway.

13.4. Conserving plant genetic resources in genebanks and in the Svalbard Global Seed Vault. Agricultural Secondary School in Pisa, Italy. On-line lecture.

18.4. Svalbard Global Seed Vault – Noahs Ark for seeds in the Arctic. Presentation for LEGADO - The Global Legacy Programme. On-line presentation in the meeting room of the Technical Building at the Seed Vault. (Assisted by Statsbygg)

30.4. Svalbard Global Seed Vault – Biodiversity conservation at the time of the climate crisis. Presentation at Risvegli Conference, Padova Botanical Garden, Padova, Italy.

01.6. Mission and operation of the Svalbard Global Seed Vault. Lecture and discussion with Youth for the SDGs Program for the UN Ocean Decade. On board Peace Boat, Norway.

04.6. The Svalbard Global Seed Vault. Its mission and operation. Lecture on board Peace boat, Longyearbyen, Svalbard, Norway.

06.6. Svalbard Global Seed Vault. Mission and operation. On the occasion of the first seed deposit from Institute of Biosciences and BioResources (IBBR), Italy. Technical Building, Svalbard Global Seed Vault, Longyearbyen, Norway.

07.6. Svalbard Global Seed Vault. Mission and operation. Presentation for visiting representatives from Germplasm Bank of Wild Species of China, Kunming Institute of Botany, Chinese Academy of Science (CAS) and National Crop Genebank, Chinese Academy of Agricultural Science (CAAS). Technical building, Svalbard Global Seed Vault, Longyearbyen, Norway.

16.6. Presentation of the Seed Vault Virtual Tour and the Seed Portal for visitors at the NordGen Open Day at the occasion of celebrating the NordGen 15 year anniversary. Alnarp, Sweden.

15.8. Sikkert som banken – frøhvelvet på Svalbard 15 år. Presentation at Arendalsuka (Arendal political festival) Included in the seminar: En framtid for norske gener? Organized by NIBIO (Norwegian Institute of Bioeconomy Research), Arendal, Norway.

18.8. Vi ser, sår og smaker. Workshop om såfrø og matsikkerhet. Presentation in Nordens tent for school children at Arendalsuka (Arendal political festival). Organized by Nordic council of Ministers, Norwegian Genetic resources Center and NordGen.

29.8. Management and operation of the Svalbard Global Seed Vault. On-line presentation in the NordGen board meeting 29.-30. august, in Gatersleben, Germany.

18.9. Svalbard globale frøhvelv. Noas ark for frø 15 år. Lunch seminar, Norwegian institute of Bioeconomy Research. NIBIO Tjøtta. Norway

19.9. Svalbard Global Seed Vault – Mission and operation. On-line lecture for students at University of Stavanger / UNIS.

21.9. Svalbard globale frøhvelv. Pecha-Kucha lecture. Streetfood Arendal, Arendal, Norway

10.10. Conserving duplicates of genebank collections in the Svalbard Global Seed Vault. On-line lecture for the National Plant Genebank of Iran.

11.10. About conservation of Plant Genetic Resources and Svalbard Global Seed Vault. A new Vision for Earth. Global Landscapes forum hybrid conference, Nairobi, Kenya. Session: Reaping what we sow: The role of seed banks in a rapidly changing climate. On-line participation.

24.10. The Svalbard Global Seed Vault. Its mission and operation. Seed deposit ceremony with depositing genebanks located in India, Nigeria, Zambia and Germany. Technical building, Svalbard Global Seed Vault, Longyearbyen, Norway.

26.10. The Svalbard Global Seed Vault. Its mission and operation. Seed deposit ceremony with US Embassy staff. Technical building, Svalbard Global Seed Vault, Longyearbyen, Norway.

05.11. Svalbard Global Seed Vault – Noahs Ark for seeds in the Arctic. On-line lecture for SVEA 253. Vasa Order of America Lodge. Indianapolis, Indiana, USA.

09.11. Svalbard Globale frøhvelv – verdens største sikkerhetslager for frø. Lecture Forum 60+, Bærum kulturhus, Sandvika, Norway.

Annex 5. Publications 2023

Asdal, Å. 2023. Crop biodiversity and plant genetic resources. In The IV International Symposium on Plant Cryopreservation. Programme and Abstracts. Oslo, Norway, June 12-15,2023. ISHS and NIBIO.