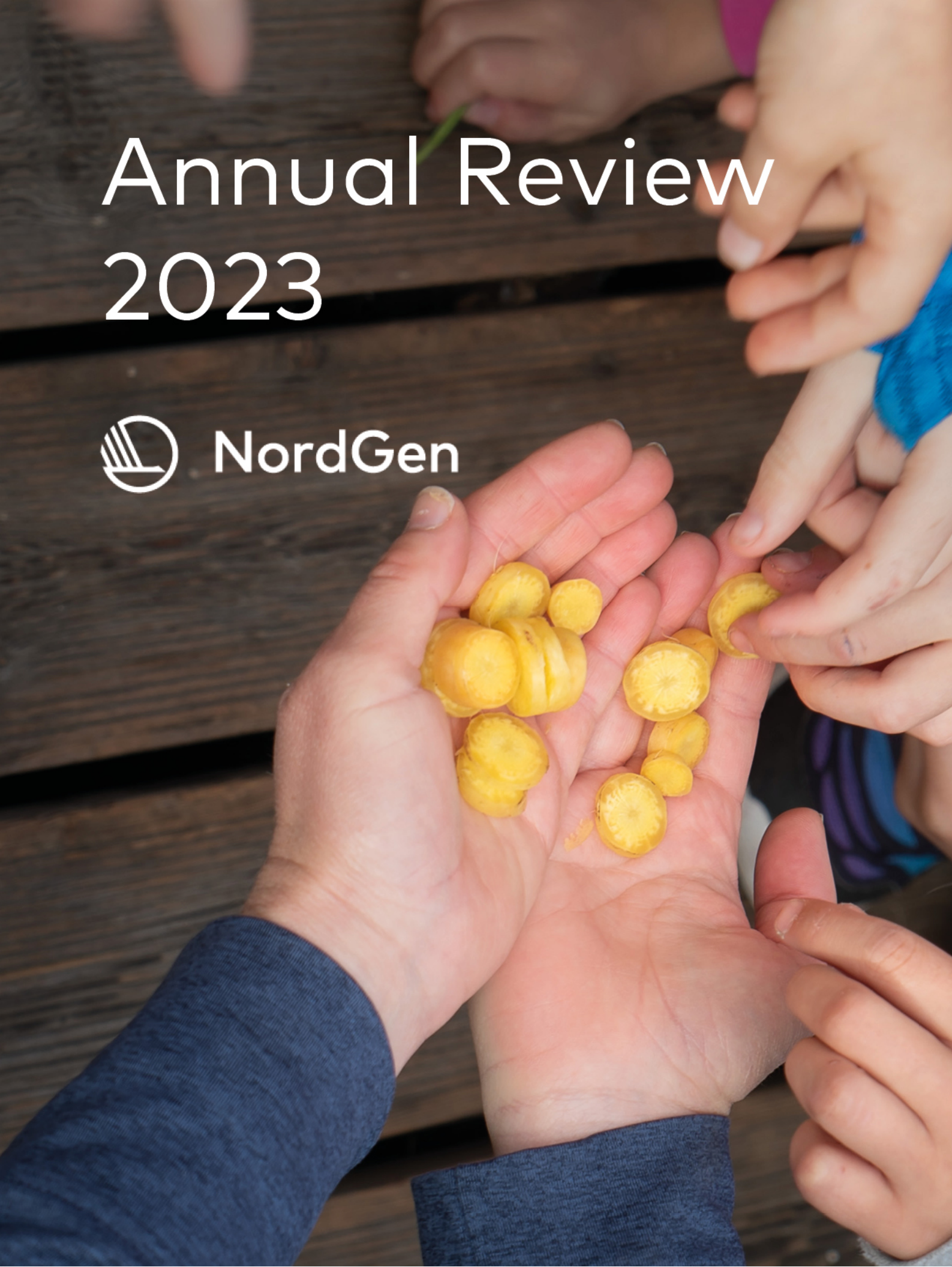


# Annual Review 2023



NordGen



# Table of Content

INTRODUCTION	3
ABOUT NORDGEN	5
KNOWLEDGE CENTER	7
Knowledge Centre – NordGen Plants	9
Knowledge Centre – NordGen Farm Animals	12
Knowledge Centre – NordGen Forest	15
GENEBANK	17
Genebank – Sustainable Use of Plant Genetic Resources	20
Genebank – Digitalization	22
PROJECTS	23
PLANTBASED PROTEIN	31
SVALBARD GLOBAL SEED VAULT	33
PUBLIC-PRIVATE PARTNERSHIP FOR PRE-BREEDING	36
FINANCIAL STATEMENT	39
BOARD	40

# INTRODUCTION



*Lise Lykke Steffensen, NordGen's Executive Director, sums up the year of 2023. See the video [here](#).*

As a research institution under the Nordic Council of Ministers, NordGen has an important social responsibility as we are working for the sustainable use and conservation of genetic resources that are important for Nordic agriculture and forestry. Climate change is currently happening faster than nature's ability to adapt, that is why our mission is more important than ever.

We have several important tasks ahead of us to ensure future biological climate-smart solutions, resilience in our ecosystems and to increase the competitiveness in the Nordic countries. NordGen plays an important role in this complex work at a time when society faces major challenges: to mitigate the effects of climate change, reduce the loss of biodiversity, the need for a more plant-based diet. There is also a desire for an increased food self-sufficiency in the Nordic countries, something that is becoming increasingly obvious due to the war in Ukraine.

## Fudamental Element for Human Life

Genetic diversity is a fundamental element for long-term and stable solutions, so that we can produce food, feed, fibers, energy, building materials, medicine and much more in the future. This is precisely why we work with conservation and sustainable utilization of genetic resources, tasks that requires knowledge and insight.

The year 2023 was a busy year with strengthened and new collaborations with universities, private companies and international organizations. It was the year when NordGen



*NordGen plays an important role in this complex work at a time when society faces major challenges.*



*Group photo from the NordGen PPP Conference.*

became the focal point for conferences, networks, workshops and other meeting places for knowledge exchange. Many new contacts, consortia and, not least, projects were created during the year. These collaborations will generate new research that will contribute to a sustainable development in the Nordic Region.

## Strategy

In 2023, NordGen began the first year of the current strategy period 2023-2025. In the strategy, NordGen continues with its conservation activities, and at the same time prioritizes research-based work focusing on documentation, characterization and evaluation of the genetic resources. During the year 2023, there has been particular focus on three major areas:

1. Research in collaboration with the profession and universities.
2. Reduction of back-logs.
3. Use and documentation of the genetic resources within farm animals and plants in particular.

All three areas have a major impact on the work at NordGen. At the same time, it has been a year in which great results have again been achieved for NordGen's entire operations. Read more about these activities in the following pages.



*The collage shows some of the beans that were grown by NordGen during 2023 for characterization.*



## ABOUT NORDGEN

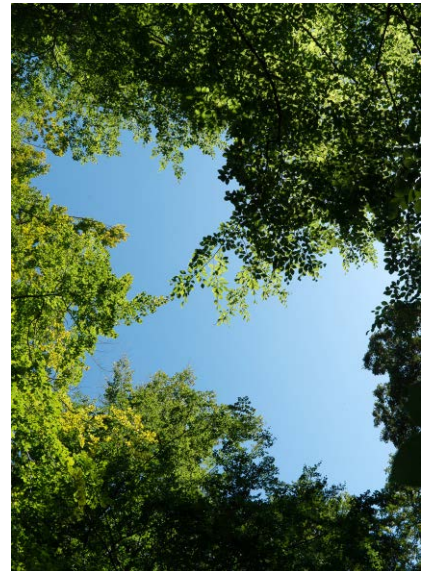
Nordic Genetic Resource Center (NordGen) is the Nordic Knowledge Center for plant, animal and forest genetic resources as well as the Nordic genebank for seeds and plants. The institution was established in 2008 as a merger between the Nordic Genebank (established 1979), Nordic Genebank for Farm Animals (established 1983) and the Nordic Council for Forest Reproductive Material (NSFP) (established 1970).

As a knowledge center, research institution and genebank, NordGen's mission is to safeguard the Nordic genetic resources and facilitate the sustainable use for agriculture, horticulture and forestry, for current and future generations. The mission also includes providing knowledge and genetic material to facilitate sustainable food and feed production and other biobased solutions in the Nordic region's changing climate.

As a knowledge center, NordGen also promotes collaboration between farm animals, plants, forest and the environmental area as well as disseminates knowledge and raises awareness about genetic resources. NordGen also promotes management and competences within the three disciplines.

NordGen provides technical advice and information to decision makers in the Nordic countries in national and Nordic collaborations and international negotiations on the conservation and sustainable use of genetic resources.

NordGen has a special responsibility for conserving and documenting genetic variation of Nordic material to ensure biodiversity and sustainable use of genetic resources. As early as 1979, the Nordic countries decided that a joint Nordic genebank for plants should conserve and facilitate the utilization of national plant genetic resources.



In the 2004 Kalmar Declaration, the Nordic countries have adopted the basis for how NordGen should manage access and rights to genetic resources. All accessions in the genebank, except for collections held by NordGen for other genebanks, are under joint Nordic management and are a common good.

The genebank's seed collection should contribute to more resilience and new solutions to avoid biodiversity loss and contribute to increased use of genetic resources to achieve sustainable climate solutions, robust food and feed supply including new protein sources, better health and sustainable ecosystem services. At the same time, efforts will be made to improve documentation by characterizing and evaluating the seed collection, so that more data becomes available to the Nordic community.

NordGen manages the program Nordic Public Private Partnership for Pre-breeding (PPP), which aims to support the development of Nordic plant pre-breeding.

NordGen has the operational responsibility for the Svalbard Global Seed Vault in a partnership with the Ministry of Agriculture and Food in Norway and the Global Crop Diversity Trust.

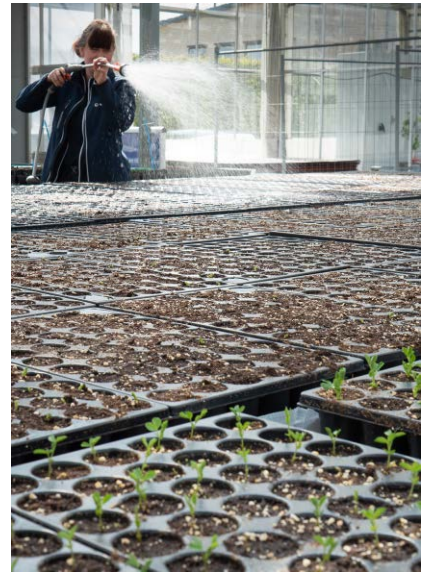
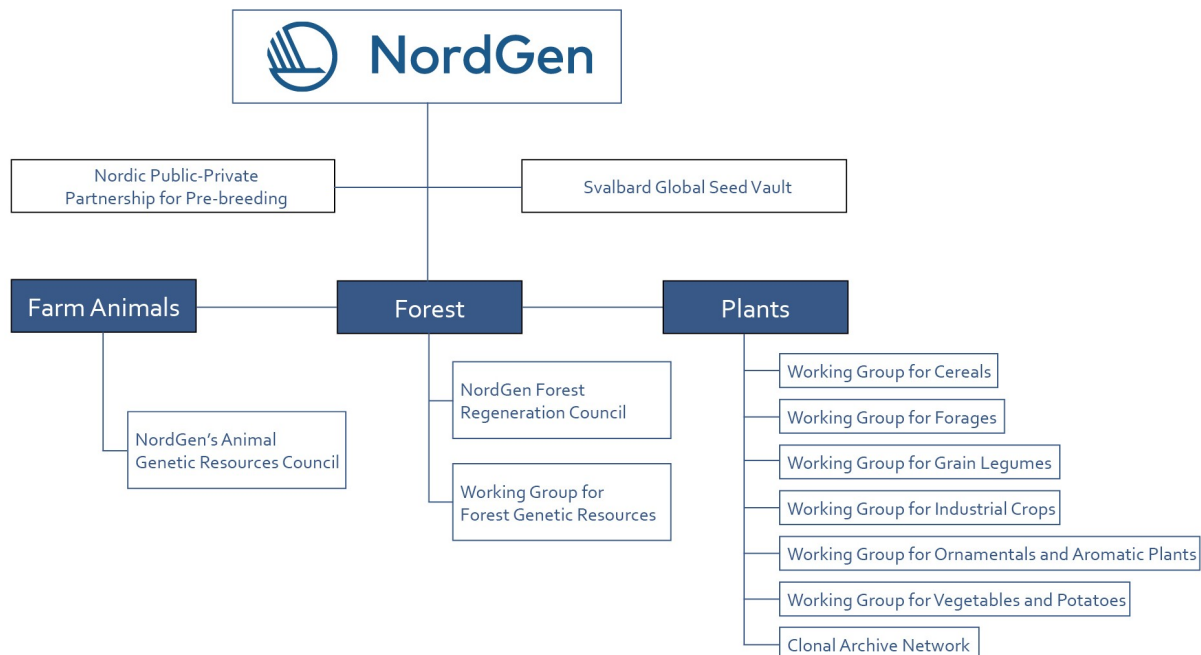


Figure 1: Organogram – NordGen.





## KNOWLEDGE CENTER

As the Nordic knowledge center for genetic resources, NordGen participates in and leads research projects, arranges outreach activities and shares information with relevant stakeholders concerning conservation and sustainable use of genetic resources important for food and agriculture. NordGen is also participating in several Nordic, European and International networks and commissions.

Our most important tools for exchanging knowledge within the Nordic countries are our working groups and councils. The different working groups of NordGen Plants, the working group and the council of NordGen Forest and the council of NordGen Farm Animals are vital advisory groups consisting of experts within each field from all the Nordic countries. The Board of NordGen also provides valuable input and knowledge exchange. Information is disseminated through our website [nordgen.org](http://nordgen.org), social media, project reports, press releases, arranged events, network meetings and targeted e-mails.

Followers Social Media	2022	2023
Instagram	2.470	3.014
Facebook	3.789	4.300
LinkedIn	1.994	2.732
Twitter	1.610	1.951

*Table 1: Social media statistics, numbers from the month December.*

In 2023, NordGen continued developing its competence within digitalization considerably. Video online meetings and seminars

has increased the bridgebuilding over country borders, both internally and externally. Externally, our digital competence has enabled us to reach a wider audience that can take part in important knowledge sharing events concerning genetic resources without having to spend time and resources on travelling. It is expected that NordGen will continue to use these digital options at future events.

During the year the work with the new website continued. The site is now easier to navigate, more visually appealing and in accordance with the new European web accessibility rules. It also has, apart from a Scandinavian and English version, a Finnish version enabling us to reach members of a very important target group in their native tongue.

## The NordGen Day

On June 16 2023, NordGen celebrated its 15th anniversary with "The NordGen Day" together with invited guests to the head quarter in Alnarp. The program included tours of the main building with the laboratories, excursions of the greenhouse and field cultivations, festivities and informations stands on NordGen's entire operations. The day was successful with about 100 participating guests.

## Other Visits and External Events

The new main office in Alnarp was inaugurated in 2022, these new facilities offers new opportunities for receiving short term and long term visitors. In 2023, we noted a continued high interest in visiting NordGen. During the year there were many visits from journalists, politicians, students, companies as well as other European and international genebanks. In 2023 NordGen also organized several workshops, one such example was a seed laboratory workshop for genebanks in Ethiopia, Ghana, Kenya, Nigeria and Zambia, in collaboration with the Crop Trust project "Seeds for Resilience". We also designed longer training programs for genebanks colleagues in Thailand and Ukraine (read more about the last example in [Projects](#)).

During 2023, NordGen staff also participated in several external events by other organizers to inform about our operations. For example we were present during the Nordic Council Session in Oslo and at the Icelandic democracy festival "Fundur fólksins" in Reykjavik. In the following pages, our different sections and their activities during 2023 will be introduced.



*Some of the highlights during the NordGen Day: field excursion of flax cultivation, information stands on NordGen activities, presentation of the Nordic potato collection and the welcome introduction.*



*Germination tests studied at the laboratory workshop.*



# Knowledge Centre – NordGen Plants

We live in a time when climate change is affecting our ability to grow our own food. Drought, floods and higher mean temperatures means that developing new plant varieties that can withstand the new challenges are more important than ever. But no plant breeding is possible without the green infrastructure stored in the DNA of seeds. And not even advanced gene technology can replace the natural genetic diversity that we find in our wild, semi-wild and cultivated crops. The most important task of NordGen Plants is to safeguard and facilitate the sustainable use of plant genetic resources that are important for agriculture in the Nordic countries. By doing so, we create conditions for a more environmentally friendly agriculture that can better withstand diseases, climate change and at the same time produce more nutritious food that corresponds to the consumers' demands.



## Key Activities

The research conducted at NordGen Plants is mostly carried out within different projects. Read more about this under the section "Projects".

## Nordic Collaboration

NordGen is part of and arranges several different meetings and seminars for the Nordic stakeholders concerning plant genetic resources. 2023 was again a year filled with many interesting meetings in Alnarp and in other locations in the Nordic region. During the year, NordGen continued to experience an increased demand for knowledge on utilization of the plant genetic resources from both public and private research programs, that reaches out to NordGen for collaboration within utilization of the genebank collection.

One such current example is the collaborative project on [the Nordic oat collection](#) between NordGen, Oatly, Lantmännen and ScanOats. Another ongoing collaboration is [the Nordic flax project](#) between NordGen, Skånelin, Science Park Borås and the project "1 KVM LIN". In this project 30 Nordic flax varieties were cultivated during 2023 to find out which ones that are suitable for fiber or oil production. Many other Nordic projects were also ongoing during the year in NordGen's different plant working groups.



*One of the flax varieties that was cultivated during 2023.*

## International Collaboration

Preserving and distributing genetic resources requires international collaboration, and the foundation for this work is laid out in the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and the Convention on Biological Diversity (CBD), ratified by all the Nordic governments. To NordGen, as part of the global genebank community, international collaboration is crucial. Forums for this work is the Governing Body to the ITPGRFA and the Commission on Genetic Resources for Food and Agriculture (CGRFA), The European Cooperative Programme for Plant Genetic Resources (ECPGR) and the Conference of the Parties (COP) to the CBD.



*NordGen participated in the CGRFA meeting in Rome in July and organized several side events, for example about the report "**Access and Rights To Genetic Resources – A Nordic Approach II**" that was published in 2023.*

## Development of a State-of-the-Art Facility

To ensure the establishment of a new infrastructure for backup storage of the Nordic plant seed collection, NordGen was granted more than 8 million DKK from the Danish Novo Nordisk Foundation. The infrastructure will improve conservation, long-term viability and characterization of plant seeds and can contribute to scientific progress in future crop production as it will allow for an extensive overview and description of plant seeds for the benefit of researchers, educators, and breeders in the Nordic countries and worldwide.

A project plan was prepared for repackaging and quality assurance of all samples and work on this was completed during 2023. This project will lead to an increased value and a considerable improvement of the Nordic seed collection and its safety.



*Photo of the backup storage facility.*

**NordGen Plants** is the largest department. It is divided in two, with the genebank maintaining the Nordic seed collection of about 34 000 seed samples and the research department working in a close relationship with public institutions, plant breeding companies and other organizations in order to identify green solutions for a more sustainable society.

A central part of NordGen Plants is the seven different Working Groups on plant genetic resources that together with the national programs constitute the very core of NordGen's network of Nordic experts. They are an important link between the Nordic and the national technical work within a specific species group. The working groups contribute with insights to each Nordic country's operations with genetic resources and is also important for knowledge exchange and network contacts.

# Knowledge Centre – NordGen Farm Animals

The genetic diversity that our Nordic native farm animal breeds carry is invaluable. Over hundreds of years, they have developed desirable traits that make them robust and well adapted to the Nordic climate and way of life. Native breeds have a wider genetic base than commercial breeds and great potential for future food production in a sustainable way. For example, research shows that milk from Nordic native cattle breeds is among the best in the world when it comes to cheesemaking, and also contain valuable nutrients that could be used to develop bioactive food components. If further investigated, the genetic diversity of the native breeds can help adapt the Nordic agriculture to the needs of the market, climate change and new production systems. However, many of the about 160 farm animal breeds native to the Nordic countries are today at risk of becoming endangered. NordGen Farm Animals is working to reverse that trend.

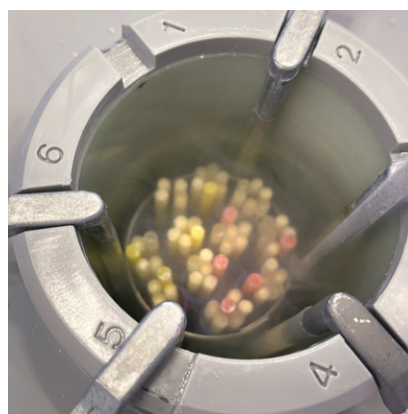


## Key Activities

During 2023, NordGen Farm Animals has worked in several projects and continued in maintaining networks that serve as a platform for discussing joint research applications and increased communications on its activities. The increased communication and knowledge sharing with stakeholders supports the current strategic goal to proactively strengthen NordGen's position as a Nordic knowledge center for genetic resources.

## Guidelines in Cryoconservation Published

Several years of cooperation between FAO and NordGen culminated in 2023 when the book "[Innovations in cryoconservation of animal genetic resources](#)" was published together with over 40 international authors. This publication integrates extensive research from the EU HORIZON project 'IMAGE Innovative Management of Animal Genetic Resources'. It provides an overview of cryoconservation method as maintaining animal genetic resources, including technical specifications, germplasm types, and biological principles across different species. Additionally, it incorporates the latest insights into sanitary interventions, data management strategies, legal considerations, and approaches to capacity building.



## Northern European Horse Network

Through an ERFPA ad-hoc action ("European Regional Focal Point for Animal Genetic Resources") – we expanded to a new and broader network in 2022 – "The Network for native horse breeds in the Baltic Sea region and Northern Europe". The network's primary goal is to strengthen cooperation in the entire Northern European region by seeking new regional projects, hosting workshops and promoting the exchange of best practices between national programs. The network is committed to creating material for stakeholders' training and promotional activities. This involves producing content highlighting these breeds' historical importance and value to local areas, benefiting local businesses. In addition, the network aims to increase visibility and appreciation among the general public.



In 2023, the network expanded to include new member countries, notably the UK. Additionally, the European Regional Focal Point (ERFP) awarded the network a grant to host a physical meeting in 2024. To further strengthen the network activities, an online meeting was held on October 25th, where participants agreed on continuation, such as collection of missing data and planning another in-person meeting.

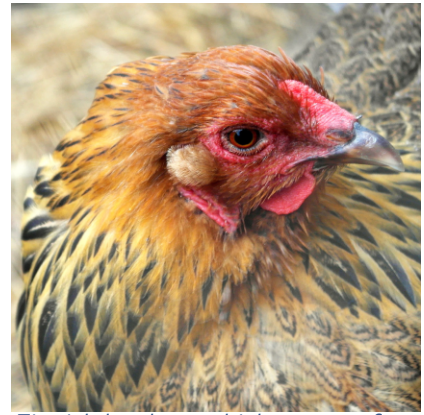
## Breed Stories

In 2023, NordGen Farm Animals continued the ambitious task of creating portraits of all the Nordic native animal breeds. The portraits contain information about each breed and its current status and are being written with support from the different breeding organizations in the Nordic countries. As we have some 160 different animal breeds this is a time-consuming and resource demanding project, but it fills a void and constitute information

asked for as there is no other place where curated information about our Nordic native animal breeds can be found all in one place.

## NordMeat Publication

The goal of the project "NordMeat – characterizing the meat of indigenous Nordic breeds" was to gather information to understand the special features of meat production of Nordic native breeds. Until now, traits such as growth potential and slaughter quality compared to commercial breeds have remained largely uncharted. The NordMeat survey showed that the carcass characteristics of native breeds have comparative advantages in an extensive feeding system. They may also be more successful in value-added markets than mainstream beef production. These results were published in 2023 in a scientific article.



*Finnish landrace chicken, one of many breed stories at NordGen's website.*

## Project Activities

A significant part of the work conducted during 2023 in the farm animal section was carried out in various projects. Read more about the projects "NordFrost", "NaNo Horse" and "Hästnäring i Norden" in the chapter "Projects".

**NordGen Farm Animals** is a service and knowledge centre working to conserve and promote sustainable management of the animal genetic resources in the Nordic region. Contributing to the Nordic countries' own work by promoting the genetic, economic, cultural, historical and social values that come with a wide variety of different animals in Nordic agriculture.

NordGen Farm Animals' activities are providing tools and advice to preserve the genetic variation in living populations (*in situ*) but also to establish cryo-storage of genetic material (*ex situ*). Through a variety of projects, NordGen Farm Animals are working to initiate research and development projects related to categorization, conservation, management and sustainable use of animal genetic resources.

NordGen Farm Animals also organizes workshops, seminars and courses for various Nordic stakeholders and promotes good collaboration between them. Actively distributes information about animal genetic resources and partake in international networks. Works to promote sustainable breeding practices and good principles for fair trade in animal genetic material.

# Knowledge Centre – NordGen Forest

Nordic forests provide wood and bioenergy, protection against wind and erosion, biodiversity and is a carbon dioxide sink. The trees planted today will grow for decades to come but climate change can hit our forests hard, and we must deal with the emergence of new pests and diseases that haven't existed in the Nordic region before. Within the forest industry there is a need for strong, resilient forests in the future and an important key to this resilience is genetic diversity. Since different trees carry different genes, chances are that some of them can resist the new threats. For example, the ash dieback disease is today threatening the Nordic ashes. But by identifying particular trees that carry resistance genes, the species could be saved. NordGen Forest is working to exchange knowledge about these kind of issues in the Nordic forest community.

## Key Activities

For NordGen Forest, the year 2023 was again a year filled with fruitful meetings on site in several Nordic countries. For example, a successful forest conference was arranged in Ringsted, Denmark.

## Thematic Day, Conference and Seminar

The first NordGen Forest event in 2023 was a thematic day organized on 13 April in Mógilsá, Iceland. About 50 persons participated during the day of presentations. A lesson learned from the discussions was that nursery owners, planters and the forestry service need more communication.

The annual NordGen Forest conference was arranged on 4-5 September 2023 in Ringsted, Denmark. About 100 persons participated in the conference that was titled "Forests of the Future". During the first day, 10 lecturers gave presentations covering many important topics, for example tree species selection in times of climate change and the potential for new species. During the second day of the conference, the participants were offered to take part in forest excursions at Bregentved Estates to see, among other things, stands of oak and sycamore (*Acer pseudoplatanus*) as well as at the beech forests around Sorø Academy. All meetings in the NordGen Forest Regeneration Council and in the NordGen Forest Working Group on Genetic Resources were arranged as planned. In August, the Working



*Photos from the conference in Ringsted. Erik Dahl Kjær, professor at the University of Copenhagen, during his presentation at the conference.*

Group gathered in Southern Norway for meetings, forest excursions and a seminar held at the County governors office in Arendal, Norway.

## Scholarships and Statistics Report

A total of 24 applications (8 from Sweden, 6 from Finland, 2 from Iceland, 2 from Denmark, 1 from Norway and 5 from countries outside the Nordic region) were received by the deadline on 15 February 2023. Six of them were granted, three out of the approved applications were Finnish, two were Swedish and one from Denmark. The grants (in total NOK 100.000) were given to travels and field work, supporting activities in several Nordic countries. During 2023, the grants were for example used to organize a webinar, attend the IBFRA conference in Helsinki and to make a research visit to Umeå Plant Science Center.

In 2023, NordGen also published the report *Statistics: Forest Seeds and Plants in the Nordic Region – Version 2023*. The publication compiles statistics and information on forest seed and plant material from the entire Nordic region provided by NordGen Forest Regeneration Council. The report is the second edition in an ongoing series in which the first was published in 2021. The new edition is updated with statistics from the years 2020 and 2021, but also contains information on more forest tree species and is expanded with additional statistics categories.



**NordGen Forest** addresses conservation and sustainable use of forest genetic resources, by being a forum for researchers, practitioners and managers working on forest genetic resources, seeds, planting stock and regeneration. We facilitate flow of scientific information and knowhow between these groups.

NordGen Forest consists of two bodies: The NordGen Forest Regeneration Council, which meets twice a year and organize our conferences and thematic days, and the NordGen Forest Working Group on Genetic Resources, which meets once a year. In cooperation with Nordic Forest Research (SNS), NordGen Forest also grants scholarships to enhance knowledge and competences in the area of seed, plants and forest regeneration.

NordGen Forest is focusing on knowledge exchange about conservation and sustainable use of forest genetic resources, forest seed and plant production and regeneration of forests. By disseminating knowledge and experience between the various actors and to the public, we aim to support better plant production and better regeneration methods of forest, as well as conservation of forest genetic resources. We conduct various types of projects and information activities.





## GENEBANK

NordGen's genebank is a joint plant genebank for all the Nordic countries. It conserves and documents seeds and living plant samples of Nordic heritage and of importance for the Nordic countries. The genebank ensures that the genetic resources that underpin our food supply are both secure in the long-term for future generations and available in the short term for use by farmers, gardeners, plant breeders, and for research and development.

The seed and plant collections of NordGen are important to ensure that agricultural and horticultural plants do not become endangered or extinct over time. Because these plants may contain genes which enables them to resist diseases, have enhanced nutrition composition or survive in changing or harsh climate environments. The services of the genebank are a common public good. The plant genetic resources stored in our genebank are available for research, education, and breeding purposes.

”

*The plant genetic resources stored in our genebank are available for research, education, and breeding purposes.*



*The seed samples are conserved in bags made of laminated layers of plastic and aluminum.*

Plant groups represented in the active collection	Number of seed samples
Cereals	21.435
Grain legumes	2.858
Vegetables	2.069
Forages	4.682
Oil, textile fibre and root crops	1.611
Medicinal plants and spices	421
Ornamentals	272
Potatoes	96

Table 2: Plant groups and number of seed samples (accessions) in the Nordic seed collection.

The genebank contains about 34.000 seed samples (accessions) in the active collection from 438 different plant species. These species carry a wide palette of different genetic traits that constitutes the green infrastructure for research and development of a sustainable agriculture and green growth.

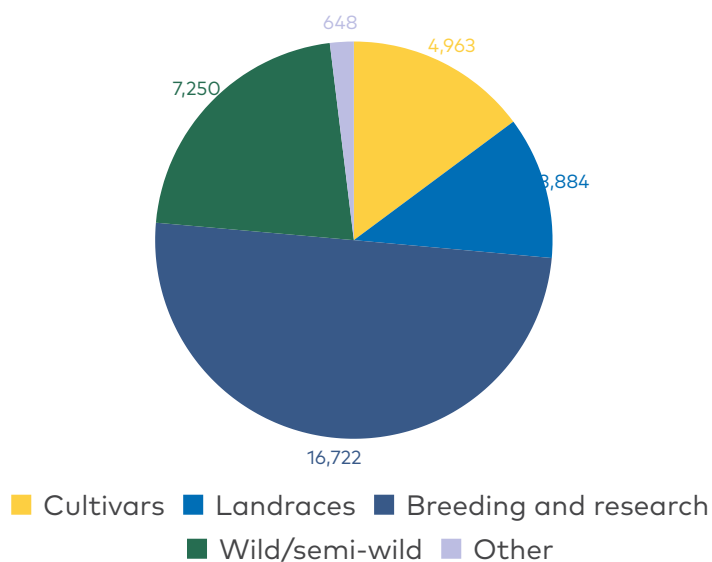


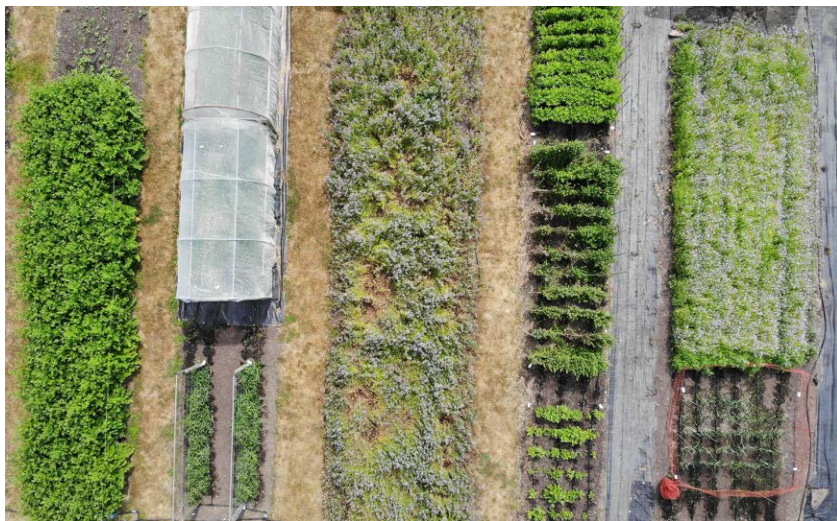
Figure 2: Plant groups represented in the Nordic seed collection.

## Laboratories

NordGen has a well-equipped seed laboratory for quality assessment of seed samples and follows the FAO's international genebank standards. This includes, among others, species identification, seed drying, seed cleaning, estimation of thousand grain weight and seed viability. The molecular laboratory provides facilities to prepare and conduct DNA extractions, both PCR-based marker analyses as well as prepare samples for more complex downstream analyses. The *in vitro* laboratory provides sterile working conditions and incubators for tissue culture or germination in controlled light and temperature. A room for cryo-preservation is planned for in the new building and will enable safe long-term storage of different kind of samples.

## Cultivation Facilities

NordGen greenhouse and field team has experience with regeneration of a very broad variation of agricultural and wild plants. This includes valuable knowledge about specific requirements of sowing, transplanting, isolation, fertilization, watering, weeding, winter storage and seed harvest. The team can also assist in recording plant descriptors during the regeneration.



*One part of NordGen's garden used for regeneration captured by drone in June, 2023.*

## Reducing the Regeneration Backlogs

Due to historic accumulation of new material to the collection of plant genetic resources at NordGen, a backlog of accessions which needs handling to secure long- term conservation has been built up 2008 -2016. To further expand NordGen's regeneration activities to reduce the backlog, the Board of NordGen adopted in 2019 a project plan to eliminate the backlog by end of 2024. The project named 'No regeneration backlog by 2024' is funded by an extraordinary grant from the Nordic Council of Ministers. In 2023 the project showed good progress and all expected goals were met.

# Genebank – Sustainable Use of Plant Genetic Resources

NordGen provides genetic material to facilitate sustainable food and feed production and other biobased solutions in the Nordic region's changing climate. The best way to preserve genetic diversity is to use it and the Nordic seed collection is no exception.

Therefore, NordGen sends out thousands of seed samples annually to scientists, plant breeders, companies, museums, botanical gardens and home gardeners with an interest in old cultural plants. Seeds are primarily requested by Nordic and European countries.

The seed samples are mainly ordered by universities and research/breeding institutes while others interested in the material are seed saver organizations, museums, schools and municipalities for education or demonstration use.



*The best way to preserve genetic diversity is to use it and the Nordic seed collection is no exception.*

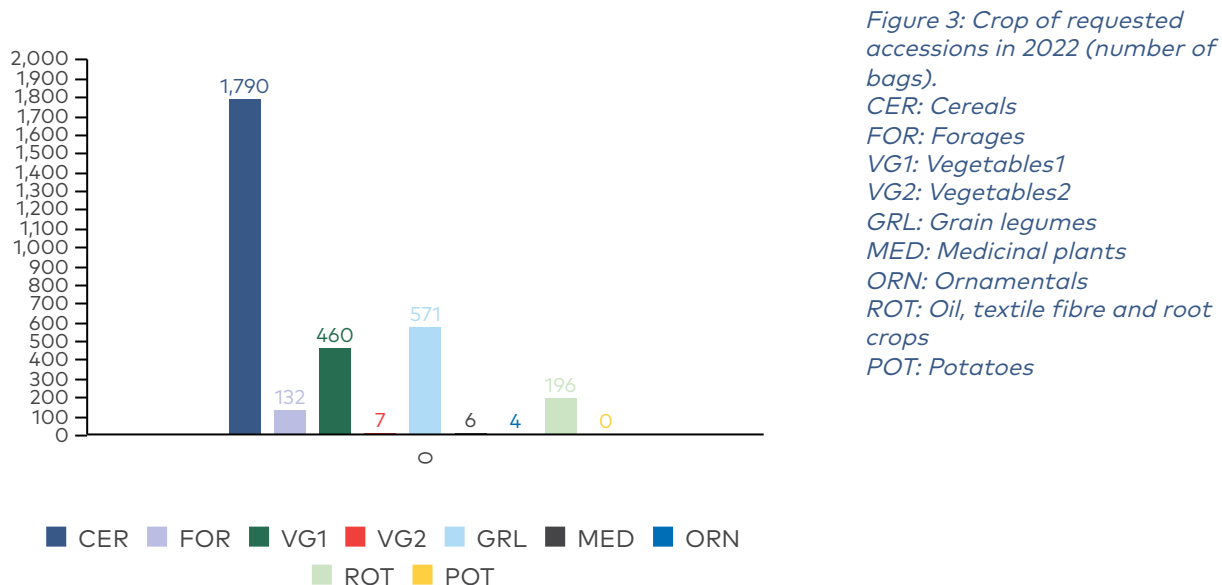


Figure 3: Crop of requested accessions in 2022 (number of bags).  
 CER: Cereals  
 FOR: Forages  
 VG1: Vegetables1  
 VG2: Vegetables2  
 GRL: Grain legumes  
 MED: Medicinal plants  
 ORN: Ornamentals  
 ROT: Oil, textile fibre and root crops  
 POT: Potatoes

In addition to the distribution of seed samples for scientific purposes, the seed lab also handles the seed orders in NordGen's online shop where the number of orders per year has reached over 1000 since 2020.

As one of the ways to promote the sustainable use of plant genetic resources to the general public, NordGen has established an online shop where we distribute our surplus of seeds for a small admin fee. During springtime, hobby growers and home gardeners with an interest in older varieties of vegetables, flowers and cereals can order seed samples and mini tubers of potatoes from NordGen.

In 2023 the website work with the online shop continued, for example the product range was expanded with new products.

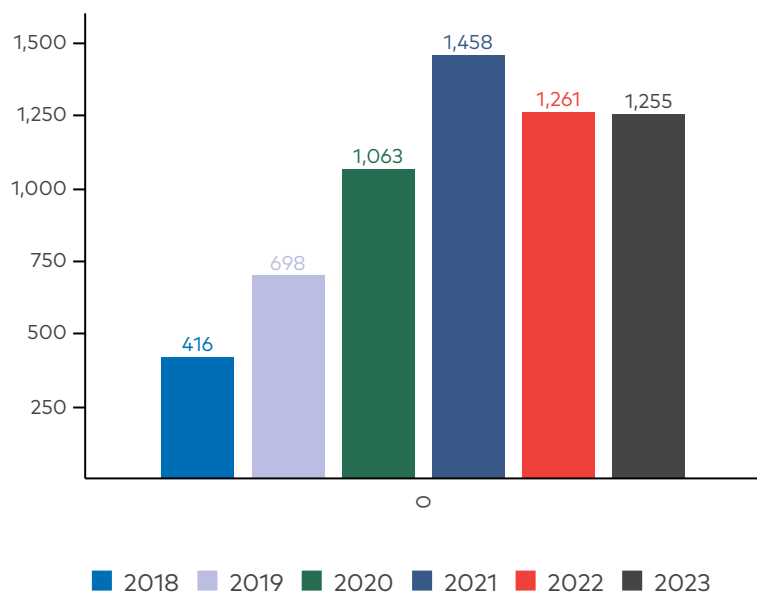


Figure 4: Number of orders in the online shop 2018-2023.



Gift box containing vegetable seeds for sale in the webshop during Christmas holidays 2023.

# Genebank – Digitalization

The very core of NordGen's genebank is the information system that contains all the data gathered over the years about the seeds and the plants in the Nordic seed and plant collection. This data is unique and invaluable for the research and development of new crop varieties needed to support future food production in the Nordic countries. During the last few years, NordGen has been on an ambitious digitalization journey to that the genebank information system is future proof. In 2019, NordGen decided to implement the internationally well-known genebank data management software GRIN-Global.

The project reached a very important milestone in 2020 with the launch of the **Nordic Baltic Genebanks Information System, GENBIS**, which is built within the GRIN-Global data management system. This is a critical step bringing improved possibilities for strengthening documentation processes in the genebank, and will secure efficiency, security and accuracy in the seed handling and documentation as well as providing a more user-friendly interface for seed requesters.



GENBIS is not only serving NordGen but also enable users to explore data from eleven different genebanks, including the Nordic and Baltic national genebanks. This has in a positive way impacted collaboration between NordGen and the Nordic and Baltic national programs for plant genetic resources. During 2023, the cooperation with the Baltic countries continued and in April, a workshop was organized by NordGen on site in Alnarp. During the year, the last implementation were also made in GENBIS, leading to a more user-friendly interface. Within the digitalization area the work with optimizing the data servers continued and the database website was relaunched in 2023.



*GENBIS workshop group, 2023.*

*The GENBIS webiste was relaunched during 2023.*



## PROJECTS

To participate in and lead different projects is an important part of NordGen's operations. In close collaboration with public institutions, private companies and other organizations, the overall purpose of all projects is to conserve and promote the sustainable use of genetic resources for Nordic food and agriculture. The funding for the projects is granted by the European Union, the Nordic Council of Ministers, directly from the Nordic countries through its government bodies or from public and private foundations and other organizations. Below is a summary of some of our more high-profile projects that were active in 2023.

### See, Sow and Taste

Where does our food come from? How is it cultivated and which plants can thrive here in our cold climate? In the project **"See, Sow and Taste"** children and young people can learn more about these important issues through hands-on exercises. The project, which is financed by the Nordic Council of Ministers, is a pedagogic and cultural pilot project lead by NordGen in collaboration with other Nordic institutions and local actors in Lithuania.



The project started in 2023 with a collaboration with The Botanic Garden and The Nordic House in Reykjavík. During the spring, NordGen developed education material that was distributed along with seeds and cultivation material to pre-schools, schools and after-school clubs in Reykjavík. The education material consists of instructions and background material to four different cultivation experiments that can be performed using seeds provided by NordGen. About 1 000 Icelandic children participated in the project during the first year. In September 2023, NordGen

also took part in "Fundur fólksins", the Icelandic Democracy Festival and held project workshops for children of different ages. During 2024, the project will expand to the Faroe Islands and Lithuania.

## Crop Wild Relatives

Crop Wild Relatives (CWR) are wild plant species that are closely related to crops. They are of great importance since traits in these wild species can be transferred to crops by traditional plant breeding approaches. In many cases, wild species have traits that are not present in modern crops, for example pest and disease resistance, tolerance to drought, waterlogging or heat stress. Such traits are very important when adapting crops to future climate conditions and diseases and are therefore central for climate change adaptation and future food security.

The Nordic network on CWR was initiated in 2015 with the long-term aim to promote a well-functioning, climate- and environmentally friendly Nordic agriculture by strengthening CWR conservation and facilitating use of CWR. The third phase of the project was initiated in 2020 with funding from NKJ (The Nordic Joint Committee for Agricultural and Food Research). Funding was granted from the Nordic Committee of Senior Officials for the Environment and Climate in December, which made it possible to expand the Nordic work on CWR during 2021-2024, and in 2023, NordGen's CWR working group was granted additional internal funding for seed collection.

During 2023, several project activities were carried out with the goal to strengthen *in situ* and *ex situ* conservation of CWR and facilitate sustainable use. Inventories of CWR were conducted in Denmark, in areas of the nature national parks in Husby and Stråsø, a research area in Mols, and privately owned land in Katstrup. On Åland, an inventory has been carried out in 44 inventory squares within the Nåtö-Jungfruskär nature reserve. Seeds of CWR were collected in several locations in Denmark, Finland, Iceland, Norway, Sweden, and Åland. To better understand the impact of climate change on Nordic CWR, climate modelling was used to evaluate future geographic distributions under different climate scenarios. The distribution of genetic diversity was studied in selected CWR across the Nordic region using molecular markers.

In addition, several approaches were used to communicate about



*Prickly lettuce (Lactuca serriola) is a Nordic CWR that is related to cultivated sallat.*



CWR and project outputs. The outdoor exhibitions continued in Denmark, Finland, Iceland, and Norway. Plant portraits and short films were also published on the **Nordic CWR webpage**. The inventory reports from **Oulanka och Nuuksio national parks** and **Abisko-Torneträsk** were made publicly available, two scientific papers on CWR were published, **"Limited genetic changes observed during *in situ* and *ex situ* conservation in Nordic populations of red clover (*Trifolium pratense*)"** and **"Complementary Analysis and Implementation Plan for Conservation of Crop Wild Relatives in Finland"** and a popular science article **"Sukulaiset avuksi"**. In November, **a stakeholder workshop was organized in Helsinki** to increase and share knowledge about CWR. About 40 persons participated in the meeting that was held at the Ministry of Agriculture and Forestry of Finland.

## NordFrost

In case of extreme events, entire animal populations can be wiped out, since farm animal and fish genetic resources are most often small and locally adapted populations. The native breeds show large adaptation potential and may become crucial for increased resilience of Nordic agriculture. Within the NordFrost project, stakeholders will develop a regional action plan for Nordic cryopreservation activities. It will develop common cryopreservation procedures by describing the existing best practices but also mapping weaknesses. In the long term, these guidelines will help increase the resilience of Nordic agriculture.

According to the submitted proposal, "The main objective of the NordFrost network is to develop a regional action plan for the Nordic ex-situ *in vitro* conservation programmes that will serve as a new tool to increase resilience of agriculture in the Nordic region". In these programmes cryoconservation of farm animal genetic resources is a crucial tool for the success in management and conservation of genetic diversity in small native farm animal populations. Subsequently, NordFrost project has created roadmap aiming at Nordic back-up ex situ gene banks for the native farm animal breeds. Related to that, in 2023 NordFrost project focused on the following topics:

- A workshop titled "Conservation of Animal Genetic Resources: Towards Conserving Nordic Livestock Biodiversity" was held at NMBU in Ås, Norway, on April 18-19, 2023. This workshop featured 15 invited speakers from 10 different



countries and attracted 37 participants from 12 countries. During the event, stakeholders wished to strengthen collaboration in gene banking efforts.

- Furthermore, NordFrost organized a practical workshop on April 20, 2023, at NMBU in Ås, Norway. Guided by NordGen, this session concentrated on the collection and cryopreservation of epididymal sperm using a bull for demonstration purposes. This initial workshop welcomed participants from four Nordic countries.
- Additionally, NordFrost's proposed solution for the development of genebank activities. It led to concrete modifications in gene banking regulations in Finland, facilitating safer and more efficient gene banking practices.

## Mapping of Nordic Protein Crops

During 2023, the project "Next generation genebanking – Unlocking the potential of plant genetic resources in the sequencing era" was granted by Novo Nordisk Foundation. In this collaborative project, NordGen and Aarhus University will map the Nordic seed collection of protein crops. The project will lead to a substantial lift for the genebank collection since researchers and plant breeders will get access to brand new information about NordGen's seeds – information which is vital for developing future plant-based protein sources.



The project focuses on 4500 protein crop accessions from the Nordic seed collection, such as peas, beans, lentils, and clover, that will be genotyped and phenotyped. Further, a number of so called core collection will be established. Core collections are a smaller number of seed samples that can represent a large part of the genetic diversity for each species. The project partners will create an entirely new genebank infrastructure enabling researchers to easier and faster find the genes that code for certain traits in the plant. The project, which will run from 2024-2026, also involves sharing all the gathered information under open access.

## NaNo Horse

"Genomic Characterization as a Tool Towards Sustainable Breeding of the native Nordic Horse Breeds" (NaNo horse) aims to fill in knowledge gaps by characterizing the standing genetic diversity and relatedness within breeds, and unique variation

between the breeds. This information can be utilized by breed associations to make well informed conservation and breeding plans.

The aim of the project is to characterize genomic diversity and inbreeding, within and between Nordic native horse breeds. There are broad knowledge gaps regarding our native breeds, and the true status of their genetic diversity and relatedness. This is an essential first step in describing standing genetic variation within breeds to be preserved, and unique variation between breeds. It can further provide knowledge about genomic regions with unique characteristics and diversity.

This information can be utilized by breed associations to make well informed conservation and breeding plans.

During 2023, the project advanced according to the research plan: the DNA samples were sequenced, and the preliminary bioinformatic analysis was performed. Concurrently, a master's student from the University of Copenhagen explored the genetic relationships between Faroese horses and other horse breeds from the Northern Atlantic region, also examining to genomic diversity and inbreeding of Faroese horses. The project will be running from 2022-2024.



## Nordic Oat Collaboration

In 2022, 764 different accessions (seed samples) of oats from NordGen were sown in the field, among other things to study the plants' cultivation traits. During the year, a project was developed to genotype all the accessions (i.e. genetic characteristics of the plant individual investigated through DNA analyses). NordGen, Oatly, Lantmännen and ScanOats share equally the costs of the DNA analyzes which are being conducted by bioinformaticians at ScanOats.

NordGen and Oatly have also carried out characterization based on phenotype (physical characteristics such as straw height, grain color, panicle shape and tendency for shattering). The effort required many hours of work in the field, a job that demonstrated the genetic diversity among the 800 oat varieties.

The new data will result in much more knowledge about the collection and provide information on the genetic relationship between all the samples. Because of this, it will be easier for researchers and plant breeders to be able to choose exactly the



varieties they have a use for in the future. A better described genebank collection thus becomes more useful for those actors who are interested in developing new oat varieties that are more nutritious, more profitable or better adapted to a changing climate.

## Securing and Developing Ukraine's Genebank

Only a few weeks after Russia's invasion of Ukraine, it was clear that there was an imminent risk of damage to the national genebank's seed collection located in Charkiv. Along with other European institutions and support from the Novo Nordisk Foundation, NordGen coordinated emergency support to genebank already in the spring of 2022. After the initial phase, a major project coordinated by the United Nation's Food and Agriculture Organization (FAO) helped the Ukrainian genebank to duplicate and move about the seed collection, from Kharkiv to the west of Ukraine.

In the end of 2023, NordGen welcomed a group of Ukrainian genebank colleagues to the headoffice in Alnarp, Sweden, to attend training sessions in data management systems and seed laboratory work. This visit is part of a long-term plan for securing and developing Ukraine's genebank and its invaluable seed collection. In Alnarp, the Ukrainians, for example, received intensive training in GRIN Global, the data system NordGen and many other genebanks are using to store information about their seed collections. Another part of the longterm plan is to send a second backup of the seeds to Svalbard Global Seed Vault.



## PRO-GRACE

Europe has more than 2 million plant genetic accessions conserved *ex situ* in 410 institutes and associated countries. Even more diversity is found *in situ* in European farmlands and wild habitats, where it contributes significantly to agricultural resilience and climate mitigation. However, the European PGR system is far from perfect. Information on genebank accessions is, at best, fragmentary, while for *in situ* accessions it is almost non-existent. Many genebanks and other collections lack appropriate resources, capacities, infrastructure and quality controls and *in situ*/on-farm activities have received short-term and fragmentary support.



As a result of these and other challenges, many genebanks are currently unable to provide to their customers (scientists, breeders, farmers) the services needed in terms of access to the breadth of PGR diversity and associated information and all European countries lack integrated *in situ*/on-farm activities.

The PRO-GRACE (Promoting a Plant Genetic Resource Community for Europe) project aims to fill these gaps by laying the foundations for a European Research Infrastructure dedicated to the conservation, management and study of European plant genetic resources. The project began in 2023 and in addition to NordGen, the project includes 31 (mainly European) project partners.

## Nordic Flax Cultivation

Up to the time of industrialization, flax cultivation was common throughout the Nordic region and was an important industry. The Nordic climate is perfect for cultivation of flax and the plant can be cultivated sustainably with low input. Despite of this, flax is today only cultivated in limited amount in the Nordic region, and mostly for oil and industrial fiber for material – not for textile fibers.



However, the public interest for Nordic flax cultivation has increased and in 2023, a collaborative project on Nordic flax began that was initiated by NordGen's working group for industrial crops. The project "Evaluation and characterization of NordGen's Nordic flax accessions to increase knowledge and facilitate use" is led by NordGen and includes the following project partners: Skånelin, the project "1 KVM LIN" and Science Park Borås.

NordGen has 27 accessions of flax in the active core collection, but there is no evaluation and characterization data available on these accessions. In addition, the accession type (fiber or oil) is missing for most of them. Therefore, the aim of the project is to evaluate and characterize all NordGen's active core accessions of Nordic flax (and three additional flax accessions obtained by the project partner Skånelin), determine the accession type, and in cooperation with stakeholders, find the best accessions for fiber respectively oil production with potential to be used by the fiber-flax growers in Norden. During 2023, the 30 accessions were cultivated for characterization. The project will continue and expand in 2024.

## Nordic Horse Project "Hästnäring i Norden"

The role of Nordic horses has been pivotal and ever evolving, influenced by various social challenges. These challenges have significantly impacted the horse industry, particularly the usage of native breeds. Despite collaboration among the Nordic countries within the horse sector, there has been a notable gap in integrated data regarding the state of the sector across Nordics.

The report generated by this project is, to our best knowledge, the first compilation of data from all the Nordic countries on the horse sector and aims to outline the existing gaps in the genetic resource's viewpoint.



NordGen led the information gathering for the "Breeding and genetic resources" segment with the aim of mapping the horse sector from the genetic resources standpoint. This initiative focused on collection critical data such as the total horse populations, breed demographics, intended uses of various breeds, and identifying key stakeholders. This segment provides a comprehensive overview of the conservation status and trends among the local horse breeds, thereby contributing valuable insights into their preservation and sustainable development.



## PLANTBASED PROTEIN

The impact of climate change is becoming increasingly clear for every year. As a result, the demand for plant-based protein food is on the rise, not least domestically produced.

The Nordic countries have a long cultivation tradition of grain legumes such as fava beans and peas. Given the increased interest, the future of Nordic cultivation of grain legumes should be bright. An enlarged domestic production would also contribute in a positive direction when it comes to Nordic food security being a climate-smart alternative to imported soybeans. In addition, grain legumes such as peas have the capacity of nitrogen fixation in the fields, a property with many benefits.

NordGen's collection includes fava beans, common beans, lentils and more than 2.000 accessions of peas – an asset that can be of importance for the future Nordic plant breeding. Below you can read more about some of our work with grain legumes.

### Key Activities

#### Nordic Bean Collection Characterized

NordGen is a stakeholder in the international EU research project **INCREASE**. The project aims at improving the sustainable use of plant genetic resources by enhancing the status of the genetic resources of four important food legumes: chickpea, common bean, lentil, lupin. Within the framework of the project, NordGen's entire collection of beans (144 accessions) were cultivated in the greenhouse for characterization during 2023. In the project, the morphology of leaves, flowers, pods and seeds is studied as well as time for flowering and seed maturity, plant height and seed

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*Given the increased interest, the future of Nordic cultivation of grain legumes should be bright.*



*A selection of the pea varieties that were cultivated during 2023 in the INCREASE project.*

yield. Leaf samples were also collected for genotyping.

Another European project that NordGen is part of is called [ExploDiv](#) and is organized through The European Cooperative Programme for Plant Genetic Resources (ECPGR). Institutions from twelve European countries are partners in the project which, among other things, aims to identify and secure genetic resources within grain legumes to sustain adaptive capacity for resilience to climate change. During 2023, 30 accessions from the Nordic bean collection were cultivated in NordGen's garden to gain more knowledge on morphological traits.

## Near Infrared Analyzes of Peas

In a collaboration between NordGen, Swedish University of Agricultural Sciences (SLU) and Foss analytics, a significant part of the Nordic pea collection was analyzed in 2023 using NIR (Near infrared) technology. This effort leads to more information about the pea collection, not least when it comes to the seed samples content of fat, protein, water as well as standard color.



*Peas analyzed using NIR technology.*

## Upcoming Focus on Protein Crops

As mentioned in the previous chapter "Projects", a new project focusing on protein crops such as peas, beans, lentils and clover, was granted in 2023.



*Michael Lyngkjær, NordGen's Teamleader Plant Senior Scientists and Torben Asp, Professor at Aarhus University.*





# SVALBARD GLOBAL SEED VAULT

Svalbard Global Seed Vault is a backup facility for the world's crop diversity. By putting seed duplicates for long-term and safe storage in Svalbard, genebanks reduce the risk of losing invaluable genetic material if anything should happen to their original collections. NordGen is responsible for operating the Svalbard Global Seed Vault in cooperation with the Norwegian Ministry of Agriculture and Food and the international organization Global Crop Diversity Trust. NordGen's role in the Seed Vault partnership is to communicate with genebanks, handle seed deposits and update the Seed Portal – a publicly accessible database gathering information about the seeds stored in the Seed Vault.

<p>Seed Vault Openings:</p> <p><b>3 (February, June and October)</b></p>	<p>Depositing Institutions:</p> <p><b>41 (9 for the first time)</b></p>	<p>Number of seed samples in the Vault (31/12 2023):</p> <p><b>1.267.127</b></p>
<p>New seed samples duplicates:</p> <p><b>71.895</b></p>	<p>New institutions signing the deposit agreement:</p> <p><b>14</b></p>	<p>Number of depositing institutions (31/12 2023):</p> <p><b>102</b></p>



*Seed boxes and NordGen staff during the February deposit.*

## Key Activities

### New Depositors

Nine genebanks deposited<sup>1</sup> seeds for the first time in 2023. The CSIR–PGRI genebank in Ghana became Seed Vault depositor #100 at the October deposit event.

### More Than 70,000 Safety Duplicates

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.



*NordGen staff carried many boxes with seed samples into the Seed Vault during the year.*

### 15-Year Anniversary

The Seed Vault celebrated its 15-year anniversary in 2023. During the February deposit event, a group of 15-year-olds in Svalbard assisted handling of seed deposits from 20 genebanks and marked the anniversary by placing seeds of modern Graminor cultivars in the glass tube used during the foundation stone laying in 2006. As part of the 15-year anniversary, [a virtual tour of the Seed Vault](#) was also published in cooperation with Crop Trust and the Norwegian Ministry of Agriculture and Food.

#### *New Depositors during 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*



*A ceremony marked the 15-year anniversary during the February seed deposit.*

## 100-year Seed Experiment

New sets of seed samples to the 100-year seed germination experiment in the Seed Vault have been deployed in the Seed Vault in 2023. By the end of the year, all seed sets have been delivered, except for the last/third sets from one genebank, which are expected to arrive in the second half of 2024.

## Nanofilm Securing Information

By the end of 2023, around 70% of seed boxes in the Seed Vault have been equipped with nanofilm labels displaying data on conserved seed samples. Attaching already produced film labels to seed boxes will continue in 2024.

**The Seed Vault** was established in 2008 and is owned by Norway. NordGen is responsible for managing the Seed Vault in partnership with the Norwegian Ministry of Agriculture and Food and the international organization Crop Trust. The iconic building, safeguards security copies of seeds stored in genebanks and thereby contributes to securing the world's food supply.

The location of the Seed Vault was chosen due to Svalbard being a remote, cold and safe place, yet easily accessible for shipping and handling. In addition, the Nordic Genebank (now NordGen) stored a backup of the Nordic seed collection here already from 1984, something that inspired to the establishment of the Svalbard Global Seed Vault. The seed chambers of the Seed Vault are carved out from the solid rock of the Plateau mountain. They offer a frozen environment where artificial cooling keeps the temperature at a constant  $-18^{\circ}\text{C}$  and according to FAO's genebank standards. The ownership of the seeds stored in the Seed Vault remains with the depositing genebank, and only the institution that deposited the seeds are allowed to withdraw them.



## PUBLIC-PRIVATE PARTNERSHIP FOR PRE-BREEDING

Together we are stronger. That's the very essence of the Nordic Public-Private Partnership (PPP) for pre-breeding. Through the partnership, plant breeding companies in the Nordic region can cooperate in a non-competitive way on pre-breeding projects and cooperate on research with the Nordic public institutions. The Nordic Public-Private Partnership for pre-breeding is a collaboration aiming to strengthen plant pre-breeding in the Nordic countries and through its work promoting sustainable use of genetic resources in the Nordic region with its unique climate, temperature, and daylight. The Nordic Public-Private Partnership (PPP) for pre-breeding is funded by the Nordic countries and plant breeding entities, and the secretariat is placed at NordGen.

2023 was an eventful year within the Nordic Public-Private Partnership for pre-breeding, as it marked the third year for the program period 2021-2023 and several projects continued their activities. Read more about the current projects below.

### Key Activities

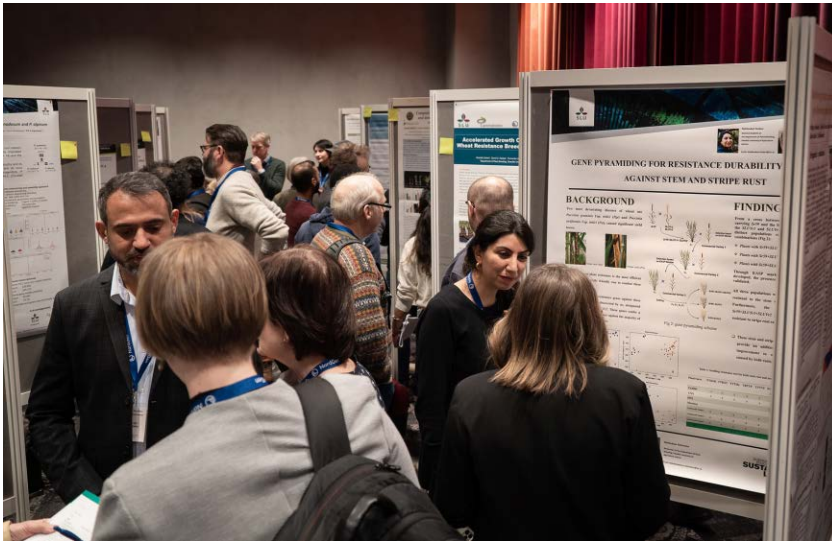
#### The NordGen PPP Conference

The PPP secretariat had a busy start of the year with the organization of [The NordGen PPP Conference](#) that was arranged in Malmö, Sweden. On 1-2 February, researchers, students and professionals working with genetic resources and plant breeding gathered to attend the conference entitled "Use of Genetic Resources in Breeding for Climate Change in the Nordic Region – Why Research and Innovation Do Matter".

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*Together we are stronger. That's the very essence of the Nordic Public-Private Partnership (PPP) for pre-breeding.*





*Posters displayed during the NordGen PPP Conference.*

About 120 persons participated on site and approximately 30 online to follow 20 speakers that gave presentations during five sessions. The program also included a panel discussion and a poster session where 21 young researchers got the opportunity to present their work.

### New Projects Granted

During 2023, the PPP partnership opened a call for proposals "to fund plant pre-breeding projects, that through utilization of diverse plant genetic resources focus on traits important for future sustainable production of climate resilient crops in the Nordic region." In December, four PPP projects were granted a total funding of 34,7 million SEK during 2024 to 2026:

- "BERRIES – Development of Germplasm for Berry Crops"
- "RobOat – Robustness of Oats for the Nordic Region"
- "CResWheat – Pre-breeding for Nordic climate-resilient spring wheat II"
- "SustainPotato – PPP Collaboration to Advance Nordic Potato Variety Development With Enhanced Resistance to Diseases by Pre-breeding Phase II"



*One of the four project will focus on Oats.*

A new agreement between the Nordic Council of Ministers and the Nordic Public-Private Partnership for pre-breeding regarding the project period 2024-2026 enabled the projects to begin as planned.

## PPP Projects Active during 2021-2023

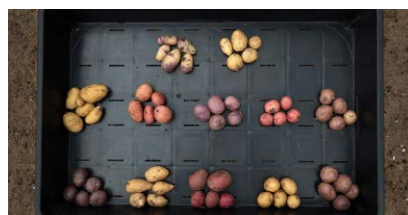
### Phenotyping Project Phase 3 (6P3)

6P3 will focus on operationalization of technologies and methods developed during the previous two project phases. Phenotypic data will be combined with a plant-soil-climate model to understand interactions between genotypes, local environments, climate and management. The aim is to provide Nordic plant breeders with the latest drone and imaging technologies, efficient data management tools, and a climate and stress response model to predict and breed genotypes resilient to climate change and environmental stresses.



### SustainPotato

SustainPotato will bring the potato breeding programs in Sweden, Denmark and Norway together with scientists from the Nordic universities to develop and implement new genetic resources and molecular tools for effective disease resistance breeding. This new initiative is expected to provide Nordic potato breeders, growers and retailers with new competitive potato cultivars and improve research into new high-throughput phenotyping and genotype methods that will be needed for future genomic-led potato breeding.



### CResWheat

Spring wheat is currently cultivated at the northernmost limit for the crop where it faces several challenges linked to climate change. The project aims to increase the spring wheat yield potential and self-sufficiency in the Nordic region. This requires extensive pre-breeding activities and collaboration between breeders and researchers across borders. The project focuses on the identification of germplasm, genes, and genetic markers associated with disease resistance pre-harvest sprouting, and early maturity. Special attention will be paid to drought tolerance and diseases expected to be of future relevance to spring wheat in northern Europe.



**The Nordic Public-Private Partnership (PPP)** for pre-breeding is a cooperation intended to strengthen plant breeding in the Nordic countries and through its work promote sustainable exploitation of genetic resources in the Nordic region with its unique climate, temperature, and daylight. The PPP is funded by the Nordic countries and plant breeding entities. The PPP Secretariat at NordGen is responsible for the administration of the Nordic PPP. The PPP Secretariat facilitates project management in cooperation with the PPP Steering Committee.

# FINANCIAL STATEMENT

The Financial Statement for the year ending 31 December 2023 was prepared in accordance with Swedish National Financial Reporting Standards and audited by the Swedish National Audit Office.

(TSEK)	Budget 2023	Result 2023
<b>Income</b>		
Nordic Council of Ministers ordinary budget	34.676	34.676
National contributions	7.574	7.437
Other income	400	196
Financial income	0	0
Project funds, Nordic Council of Ministers	4.378	6.310
Other external project funding	7.783	9.643
<b>Total income</b>	<b>54.811</b>	<b>58.262</b>
<b>Costs</b>		
Staff costs	27.528	26.242
Goods and services	12.936	12.882
Contribution to external projects	110	110
Financial costs	50	560
Other costs	15.108	13.784
<b>Total costs</b>	<b>55.732</b>	<b>53.578</b>
<b>Result year</b>	<b>-921</b>	<b>4.684</b>

# BOARD

The Board of NordGen meets three times a year to address issues of substantial importance to NordGen. The members and their alternates are appointed by the Nordic Council of Ministers and the executive committee for Fisheries and Aquaculture, Agriculture, Food and Forestry. The list below shows those who were active on the board 31/12/2023.

BOARD MEMBERS	ALTERNATES
<b>Finland</b>	
Tove Jern Ministry of Agriculture and Forestry	Kati Lassi Ministry of Agriculture and Forestry
<b>Sweden</b>	
Mette Kjøbek Petersen, Chair Ministry for Rural Affairs and Infrastructure	Ulrika Tjälldén Ministry of Climate and Enterprise
<b>Denmark</b>	
Anne-Mette Hjortberg Lund The Danish Agricultural Agency	Trine Brander Christensen Ministry of Environment and Food
<b>Iceland</b>	
Hrannar Smari Hilmarsson – Vice Chair Agricultural University of Iceland	Ólöf Ósk Guðmundsdóttir Agricultural University of Iceland
<b>Norway</b>	
Geir Dalholt Ministry of Agriculture and Food	Vacant
OBSERVERS	
<b>Greenland</b>	
Birgitte Jacobsen Ministry of Fisheries, Hunting and Agriculture	<b>The Faroe Islands</b>
	Tróndur Gilli Leivsson The Agricultural Agency
<b>Staff Representative</b>	
Ulrika Carlson-Nilsson NordGen	<b>The Environmental Sector</b>
	Katilleena Lohtander-Buckbee The Finnish Environment Institute (Syke), FI



## NordGen Annual Review 2023

NordGen Publication Series: 2024:03

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The publication is available at NordGen's website or at [www.norden.org/nordpub](http://www.norden.org/nordpub).

Cover photo: A workshop in Reykjavík was arranged during 2023 as a part of the project "See, sow and taste", photo by Sara Landqvist/NordGen.

Layout: Jonatan Jacobson/NordGen.

Other photos: NordGen if not otherwise stated.

### NordGen

The Nordic Genetic Resource Centre (NordGen) is the Nordic countries' gene bank and knowledge center for genetic resources. NordGen is an organisation under the Nordic Council of Minister and works with the mission of conserving and facilitating the sustainable use of genetic resources linked to food, agriculture and forestry.

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