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Farmer's Pride

Networking, partnerships and tools to enhance *in situ* conservation of European plant genetic resources

Community Seed Bank management guidelines along four network showcases

Citation

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Contents

Executive summary

Community Seed Banks (CSBs) started their activities as intimate social networks where plant genetic resources (PGR) were maintained and exchanged. The size of the network defines the amount of PGR that are maintained, whereas monitoring and quality management systems define the quality of the conserved plant material. To strengthen evolutionary steps of CSBs, national collaborative platforms should be developed. This will sharpen the complementarities between national stakeholders as genebanks, research institutes, governmental institutions and regional operating CSBs will improve their efficiency and profit from each stakeholder's skills. In order to tackle challenges connected to climate change, and to improve biodiversity used and maintained in agro-ecological systems, international structures and platforms can also help to develop and foster national initiatives and networks to become more efficient in these contexts.

Decision makers must help to develop inclusive national strategies, provided with long term finances, that are adapted and able to reach out to bottom-up structures. CSBs on the other hand must be ready and open to collaborate and to be transparent in their activities. A legal framework that provides enough space to operate for all stakeholders involved is a precondition sine qua non.

1. Introduction/method

In the last decade of EU-supported projects dealing with plant genetic resources (PGR) some considerable progress has been made to include a broader range of stakeholders like social scientists, organic breeders and NGOs in several research consortia (e.g. Solibam, Diverseeds, DIVERSIFOOD). European PGR-networks like ECPGR have provided opportunities for NGOs to join their networks as observers or actors in specific working groups e.g. the in-situ/on-farm working group. Collaboration between PGR-managing NGOs and genebank managers, as well as breeders, has never been easy though due to the lack of mutual interest or understanding. There are also considerable gaps between purely scientific and more civil society and praxis-oriented research in addition to a weak infrastructure and no continuous funding on the NGO-side.

Although we will not succeed in solving the financial and infrastructural deficits of many NGOs in Europe with this report, it should provide a clearer picture of the NGOs working with PGR in very different contexts and realities by analysing four existing examples. Another aim was to improve the collaboration of the different stakeholders mainly with genebanks by identifying the differences and complementarities between them. We are convinced that collaboration will become much easier when every party knows what they can and can't expect from each other and what their specificities are.

Another additional value of this report should be that emerging, or less experienced, NGOs dealing with PGR can use it as guidance to help them to make decisions during their own development. They will also be able to understand some mechanisms and factors that influenced other NGOs decision-making processes.

In the annex of this report, ProSpecieRara has compiled some information about how ProSpecieRara structured its database to organize its collections, how it organizes the network of seed savers and custodian farmers and monitors the quality and flow of PGR within its PGR-management system.

This report aims to strengthen the movement of NGOs managing PGR in a dynamic way and to intensify interaction between them. In chapter 4 we look at some challenges NGOs should tackle to foster adaptation and evolutionary processes in different agro-ecological contexts and to improve their monitoring of dynamic flow of PGR within their large networks. In this context, intense collaboration between research and genebank managers would be welcomed by the NGO community.

Definition of "Community Seed Banks" (CSB)

In the next chapter we would like to specify the community of NGOs by introducing the term Community Seed Banks (CSB). The first Community Seed Banks were created in Europe in the 1980s. Since then, the idea of sharing, exchanging and developing plant genetic resources (PGR) of cultivated plants has become very popular all over Europe (1).

After the experiences of the Horizon 2020 project (DIVERSIFOOD), when a group of NGOs and researchers examined the issue of CSBs by evaluating the existing CSB community in Europe, it was stated that the diversity of organization structures and national legal, formal, social and economic realities are so diverse that it wouldn't be appropriate to have one definition for CSB (1; 2). To describe their similarities could be an approach to get closer to a definition of CSB.

What CSBs have in common is that the different stakeholders – farmers, gardeners and citizens – work in decentralised networks, share diverse seed management experiences and try to provide easy access to plant genetic resources within their networks (3; 4). All of them want to work against the loss of local and regional diversity of cultivated plants, which are adapted to their environmental conditions and farming or gardening systems (2; 4; 5). Many CSBs are also increasing the genetic diversity of cultivated plants through breeding activities (6; 7). They share knowledge and experience by providing training and try to communicate to a broader public to raise awareness against the loss of biodiversity of cultivated plants to improve resilience and sustainability of local and regional food systems. (1; 2; 4).

In the framework of the Horizon 2020 Farmers Pride project we shifted our focus from the characterisation of CSBs (that has already been done in the Horizon 2020 project DIVERSIFOOD) to the process of how existing or developing CSBs have evolved and could evolve. We will describe how they cope with diverse local and regional conditions and how they solve, or might solve social, financial, practical and legal challenges within the organization. As the DIVERSIFOOD survey (2) of CSBs has shown, there are CSBs that have existed for more than 30 years, which have provided a strong resilience against all kind of challenges over the years. They have helped to improve organization structures, professionalise management tools and capacities, enlarge networks and found different ways to guarantee sustainable sources to finance their activities. Some organizations are still in the pioneer phase and others are transitioning towards a more structured and established organization.

This document addresses the following groups of interest:

CSB Managers

Providing a source of inspiration and a blueprint for managers to develop their own CSB. The first chapter details the model development process that NGOs generally follow. There are ideas and examples from four organizations, describing their own situations and organizational development processes. To be able to compare the different examples, ProSpecieRara provided some guidelines that lead the managers along their story telling line (see article "Methods" p.6).

Ex-situ genebank managers

Providing the specifics of the CSB on-farm management systems and techniques and practices that will complement their own ex-situ management system. This report positions the two plant genetic resources (PGR) management systems side-by-side to avoid too many overlaps by respecting each other's roles. How

to foster and intensify collaboration is a next step and will evolve out of different opportunities that enhance mutual recognition and information exchange.

Decision makers

Sharing the development processes of the four different CSBs is strongly related to the legal and strategic biodiversity frameworks and how they promote or block the framework that the countries they are operating in provides. Promoting and supporting biodiversity management of plant genetic resources for food and agriculture (PGRFA) must include the support of CSB structures and efforts. This report gives insights into how CSBs cope or struggle with their national conditions.

E.g. in Hungary the policy environment is rather restrictive; on one hand the country has a very strong seed industry, thus the legislation is very strictly implemented, but on the other hand civil society movements are not supported and are generally considered a "threat" at a governmental level. Meanwhile Magház, the Hungarian seed saver network, has a very strong collaboration with the National Genebank (National Center for Biodiversity and Gene Conservation).

Link between the two Horizon 2020 partner projects – Farmers Pride and DYNAVERSITY

As the European network "Let's liberate diversity" (www.liberatediversity.org) is involved in the partner project of Farmer's Pride called DYNAVERSITY (www.dynaversity.eu) and the four project partners involved in this report – as a task of Farmer's Pride – are linked to the EU-CSB-network "Let's liberate diversity" as well, they will form a link between the two Horizon 2020 projects. In DYNAVERSITY the focus is on the linkages between and characterisation of CSB, whereas in Farmer's Pride we are concentrating on the links between CSB-networks and initially the formal sector of all the national genebanks. At the same time, the CSB-partners of Farmer's Pride are helping the consortium partners involved to describe the role of CSBs and a European CSB-network within a European umbrella organization. This new European network will not only involve landraces and obsolete varieties, but crop wild relatives as well and the institutional or organizational entities linked to these specific PGR's.

Structure of the report

- The first chapter characterises and presents four different organizations: Danish Seed Savers, Magház, ProSpecieRara and Arche Noah and. It also evaluates the present situation.
- The second chapter analyses their diversity management systems and compares these with the formalised national genebank systems
- The third chapter looks to the future at how, and in which direction, exemplary CSBs would like to develop their networks.

Method

Due to the diversity of organizations, and based on the work that has already been done in DIVERSIFOOD, we decided to develop some portraits of the four CSBs involved in the Farmers Pride consortium along a structured story telling line. E.g. in the first chapter we have chosen the organization development model after Glasl/Livegoed (21) that gives some guidelines to define the development phase in which the organization finds itself at the moment. The CSB managers should be able to compare these with their own organizations. This is followed by examples and stories that detail decisions that have to be taken, for example, when positioning their organization with respect to their national conservation management system. The showcase reveals the action taken and the consequences that the decision has had for the further development of the organization as well. At the end, it is anticipated that the reader will be able to ask the right questions and make some decisions based on the experiences expressed, and be able to consider some of the consequences it might have for the ongoing development process of their organizations (CSBs). Technical aspects, such as database structures and monitoring methods are included in an Annex. They should be a source of inspiration, but not be "copy pasted" as they show specific examples, which are not likely to be an exact fit for others.

2. Present situation – four organisations

2.1 Portraits

Name	**Danish Seed Savers (DSS)**
Date of founding	1987
Webpage	www.froesamlerne.dk
Legal structure	Association
Board, staff	5 board members, 4 actively working deputies. A part time secretary
Members	1,000 members, gardeners and farmers, permaculture-activists, breeders, horticulturists, researchers etc.
Mission	DSS works for the conservation of, and wide access to, diversity of domesticated plants through on-farm, in-garden maintenance.
Main collections	23 crop groups, 120 varieties (adoptants) for long-term conservation and around 450 varieties exchanged within the network
Main facilities	No central storage, no office. Central webpage for seed exchange and as a link between members
Main network activities	Seed saving, seed swaps, awareness-raising, market stands and seed distribution, providing data and seeds of our varieties. Educating seed savers.
Main projects running	Danish pulse project, Rediscover and conserve old varieties of our vegetables, Reintroduction of artisanal seed production, Web portal of Danish food plants. Education seed savers in the Baltic region Nordplus. Establishing seed production of outcrossing vegetable species aimed at the seed market. Nordic collaborations. Farmer's Pride

Name	Magház
Date of founding	2012
Webpage	www.maghaz.hu
Legal structure	Association
Board, staff	8 active members,
Members	450 registered members, hobby gardeners, farmers, city-gardeners, permaculture activists, researchers
Mission	Conservation and distribution of agro-biodiversity, sustainable agricultural systems and related knowledge through building a network
Main collections	750 cultivars conserved and propagated in order to exchange in the network
Main facilities	No central storage, no office. Central webpage for seed exchange and as a link between members
Main network activities	Conservation, multiplication, distribution and exchange of landraces and obsolete varieties, collection of information about varieties, Webpage and database management, seeds saving workshops, awareness-raising
Main projects running	On-farm trials Seed-saving guide (book) Seed saving courses/workshops

Name	ProSpecieRara
Date of founding	1982
Webpage	www.prospecierara.ch
Legal structure	Foundation
Board, staff	9 foundation board members, 30 employees (20 full time)
Members	11,000 donors and 3,500 active seed savers and rare breed holders. Farmers, breeders, gardeners, researchers, etc.
Mission	To maintain and promote the genetic and cultural diversity of plants and animals.
Main collections	4,700 cultivated plants (including fruits) and 32 rare breeds
Main facilities	Central seed storage (climatic chamber and freezer), tuber storage facility (climatic chamber), nursery, greenhouse and tunnel. Webpage for seed and breeds exchange. Database for dynamic on-farm management
Main network activities	Seed saving, knowledge exchange, courses, markets, collection holders, data collection,
Main projects running	72 different projects. Label for ProSpecieRara-products. Horizon 2020 projects. Projects within the frame of the national action plan for PGRFA.

Name	**Arche Noah**
Date of founding	1990
Webpage	www.arche-noah.at
Legal structure	Association
Board, staff	6 board members, 50 employees (35 full time equivalents)
Members	15,000 members and 6,000 extra donors
Mission	Conservation and development of the diversity of cultivated plants; raise awareness about crop biodiversity
Main collections	5,500 seed accessions and 700 fruit cultivars
Main facilities	Central seed storage (incl. freezer), one visitor's garden, one multiplication garden including tunnels. Online seed catalogue. Online shop.
Main network activities	Seed saving and regular multiplication including data collection, courses, markets, political campaigning, farmers' and collaborative plant breeding networks
Main projects running	No patent on seeds-campaign, Horizon 2020 projects, Participatory tomato breeding, Regional project about promoting pulses, Community Seed Banks Academy, Balkan Beets – Promoting Crop Biodiversity in South East Europe

2.2 Phases of organization development

Every organization travels through different phases during its development (Figure 1) Here we define the four CSBs and look at where they would currently position themselves in this process.

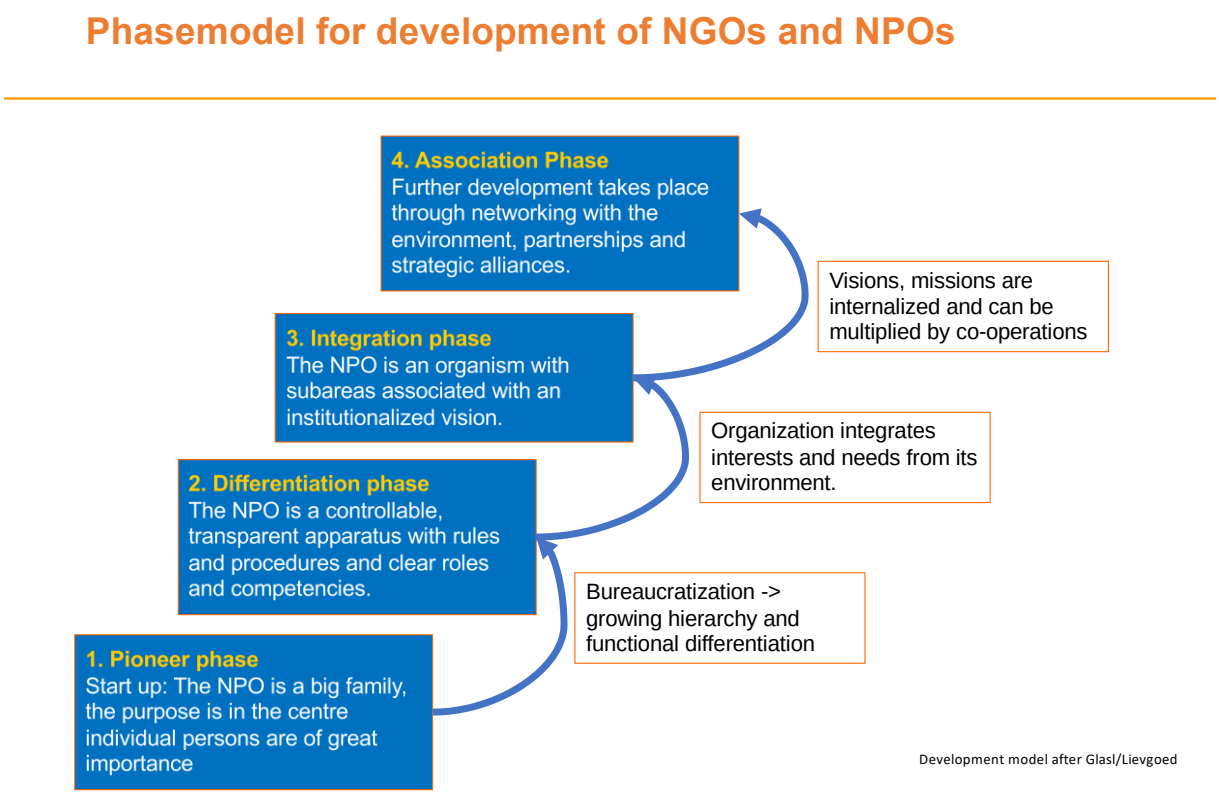


Figure 1: Phasemodel for development of NGOs

2.2.1. ProSpecieRara

ProSpecieRara considers that it has gone through all the four phases, but the process has not come to an end yet. In particular Phase 4 is still (or again) in process. The shift from the pioneer to the differentiation phase was a clear step whereas the other phases can't be separated from each other so clearly. It is rather a back and forth process. Perhaps it would be better not to talk about phases but about moves that don't always build on each other or follow each other in a logical step-by-step way. But they describe duties you have to fulfil to make progress within the whole organization or network. On the other hand, you can't predict how quickly the phases will be travelled through. For ProSpecieRara the first step was quite long, whereas the next steps went quite fast and many steps or processes occurred in parallel. Some of the developmental steps were not intrinsic processes, but pushed from outside and the organization had to adapt itself to challenges coming from its environment. In summary, the development of ProSpecieRara shifted from an "outside in" perspective (fulfiling needs coming from society) to a more "inside out" perspective when the organization started to promote and communicate strategies to tell its environment what they want to achieve. In the end, ProSpecieRara is now aiming to bring these two interactions with society – "what do we want" and "what can we do for"– into a kind of equilibrium.

The following milestones act as a a short résumé for the development of ProSpecieRara:

End of Pioneer Phase

After 10 years, the first employee with a fixed salary started work at ProSpecieRara, strengthening the centre by establishing a seed library with a central seed conservation facility. Developing a strong database to manage the organization and the network. The founders of the organization started to withdraw from the organization. The organization has about 1,500 donors supporting ProSpecieRara financially.

Differentiation phase

More decisions shifted from the foundation board to the operational entity. Operational and strategic activities were strictly separated and the board followed more controlling, but fewer decision-making, processes (besides strategic decisions). This had an impact on the composition of the board itself where fewer people with very specific knowledge e.g. conservation of specific breeds, fruits and vegetables were represented on the board and more people with good relations in the agricultural community and people with legal or economic background, etc. People who were able to put the organization in a bigger context and cover knowledge that was less-represented within the management board of the organization. The general principles of the foundation were developed and written down.

Integration phase

In 2002, ProSpecieRara had to completely reorganize its relationship with the different breeders associations. The position of the foundation overarching the different associations wasn't accepted anymore and there were strong centrifugal forces to leave the "mother organization" to become more independent and self-determined.

Within the CSB part of ProSpecieRara, the movement, was completely different. The network with 300 seed savers was managed from one centre and seed exchange was managed by a central seed-catalogue that was sent out to all donors who were interested in propagating seeds. The CSB started to differentiate between volunteers who wanted to multiply and conserve varieties and were willing to follow propagation trainings led by experts of ProSpecieRara, and people who wanted to get the seeds from ProSpecieRara, but had no interest in becoming part of the conservation management system. This way the CSB network became divided in seed savers that want to grow, propagate and send back seeds to the central seed library, seed savers that act today as seed providers for others and offer their seeds in the ProSpecieRara seed catalogue ("Sortenfinder") as "private seed providers" and gardeners, farmers etc. who order seeds from them and donate a fee per year but don't do any conservation work.

Linked to the different stakeholders of the CSB-system, ProSpecieRara established specific activities for them (specialised courses, training, workshops, field visits, etc.). New employees were engaged to develop those services and with the growing public awareness of the organization a new stakeholder group emerged. Professional and commercial seed, plant and product producers were addressing ProSpecieRara to get seeds. To involve this interesting stakeholder group and link them to the CSB, ProSpecieRara started to develop marketing activities and a brand that later became a label. This label worked as an incentive to the commercial partners to link themselves to the CSB ProSpecieRara. In the meantime the seed and seedling markets that ProSpecieRara developed and established all over the country became a very successful platform for the commercial partners to sell their products under the label ProSpecieRara. Only commercial

partners who accepted the label-criteria were allowed to sell their products to ProSpecieRara markets.

Association phase

As already mentioned, as the organization developed there was pressure from third parties, such as the national program for the conservation and management of PGRFA and from the commercial food chain. So, in parallel with processes belonging to the "integration phase" action had to be undertaken that belonged to this phase – especially to initiate new strategic alliances. Here the most challenging was the co-operation with the biggest supermarket chain in Switzerland for organic food Coop. When this collaboration was set to begin, ProSpecieRara had to speed up its corporate policy process, which normally belongs in the "Integration phase". Workshops to clarify and implement the mission and visions within the organization were reinitiated and implemented (this had already occurred in the differentiation phase, but with a different context). To underline the agreed policy and strategic focus, ProSpecieRara started to work on its corporate identity and developed a new logo, accompanied with a completely new design for all media. Guidelines were issued to partners to ensure the organization keeps control of its ideals and mission by sharing what it means to work with the ProSpecieRara-label. The guidelines were closely linked to the application and use of the logo.

Strategic alliances have also been contracted with the state (department of agriculture) to fulfil the national action plan on plant genetic resources of Switzerland for food and agriculture (NAP-PGREL). The collaboration is now based on conservation management strategies, defined roles of the different stakeholders and concrete projects.

2.2.2 Arche Noah

Pioneer phase

Arche Noah was founded in 1990, initiated by farmers and gardeners. In 1994, the visitor's and multiplication garden were started. In the 1990s, several trips were taken within Austria and to the former Yugoslavia and Romania, to collect endangered crop varieties. Fruit and berry varieties were also collected in co-operation with the federal state of Lower Austria and tree nurseries.

Differentiation phase

As the collection grew, so did the number of employees and services. In 1997, a "limited company" was founded, making the marketing activities of the association possible.

Integration phase

Arche Noah started to co-operate more and more with gardeners, building a network for rare varieties. On the one hand this was with home gardeners for seed exchange within the community, and on the other hand this was with commercial gardeners and farmers to market the seeds and products through different channels (spring markets, Arche Noah shop, farmers markets). In 2003, the organic seed breeding company Reinsaat started to co-operate with Arche Noah to market varieties from the Arche Noah seed archive (while investing in selection). Through this initiative, the varieties spread all over Austria, reaching many more citizens. With the book by Andrea Heistinger, *Handbook seed gardening*, and participation in spring markets, Arche Noah gained even more publicity. In 2006, the seed archive moved to the central building, and in 2008, the course programme was extended.

Association phase

From 2010 on, the political and international co-operations expanded. Arche Noah hosted several international policy workshops and lobbied on seed law issues. In 2015, the co-operation with "No-patent-on-seeds" started.

In 2010, Arche Noah started taking part in an Austrian participatory breeding network of tomatoes, and started selection and breeding activities in co-operation with farmers, research stations and advisory services. Suitable fundraising models were developed, so-called "tomato-sponsorships" (focused on on-farm breeding), in addition to the "fruit-sponsorships" (focused on in-situ fruit cultivar conservation). In addition more research activities and participation in European projects occurred.

2.2.3 Magház

Magház is a typical inside out initiative, where awareness-raising, education and bringing back diversity in cultivation were the main goals. This is realised in the form of seed saving workshops and seed-swaps all over the country in Hungary.

Magház is currently somewhere between the pioneer phase and the integration phase. The pioneer phase in particular because of the small size of the core group, with strong bonds among the people, and a big family feeling. However, at the same time there is differentiation and specialization, with paid employees establishing working groups led by a coordinator. There is co-operation with other organisations (national genebank, ESSRG, ÖMKi, permaculture association). A decision has also been made to have a legal background, thus Magház is becoming an association. Not a new association (as these are very difficult to establish in Hungary), but Bese, which has given the legal background for Magház since 2014, will be renamed and re-established as Magház, with a partly-new board.

Pioneer phase

Magház was founded in 2012 as an informal initiative. Six farmers and gardeners began with a decent collection (about 500 accessions partly collected by themselves and partly accessions requested from the genebank or collected via seed exchange). Magház planned to establish a countrywide network of like-minded people to raise awareness, develop knowledge and share and multiply seeds.

Differentiation phase

The number of active members and projects were growing (mainly due to the Farmer's Pride project, which created the opportunity to bring people together and start working on these goals. In the framework of Framer's Pride one of the founders is employed part-time and has economic support for meetings. The new institutional and networking opportunities with the support of ÖMKi, have made it much easier to involve/engage other organisations, policy makers, etc. The activities and active members reached a level where a more organised structure was required with coordinators and a decision-making system. The latter is still under development.

2.2.4 Danish Seed Savers

Danish Seed Savers (DSS) is an association with its roots in the grass roots. On its establishment 30 years ago, its aim was to prevent germplasm from becoming extinct. It is still the aim today, but this has expanded to encompass the developments in the seed industry with patenting, huge capital concentrations and a

constant decrease in plant diversity. There have been few attempts to stop this oblique development. DSS is not an obvious partner to collaborate with for many commercial companies. They do not perceive it as their Corporate Social Responsibility. DSS is developing slowly, which is discussed a lot. The DSS perspective is inside out.

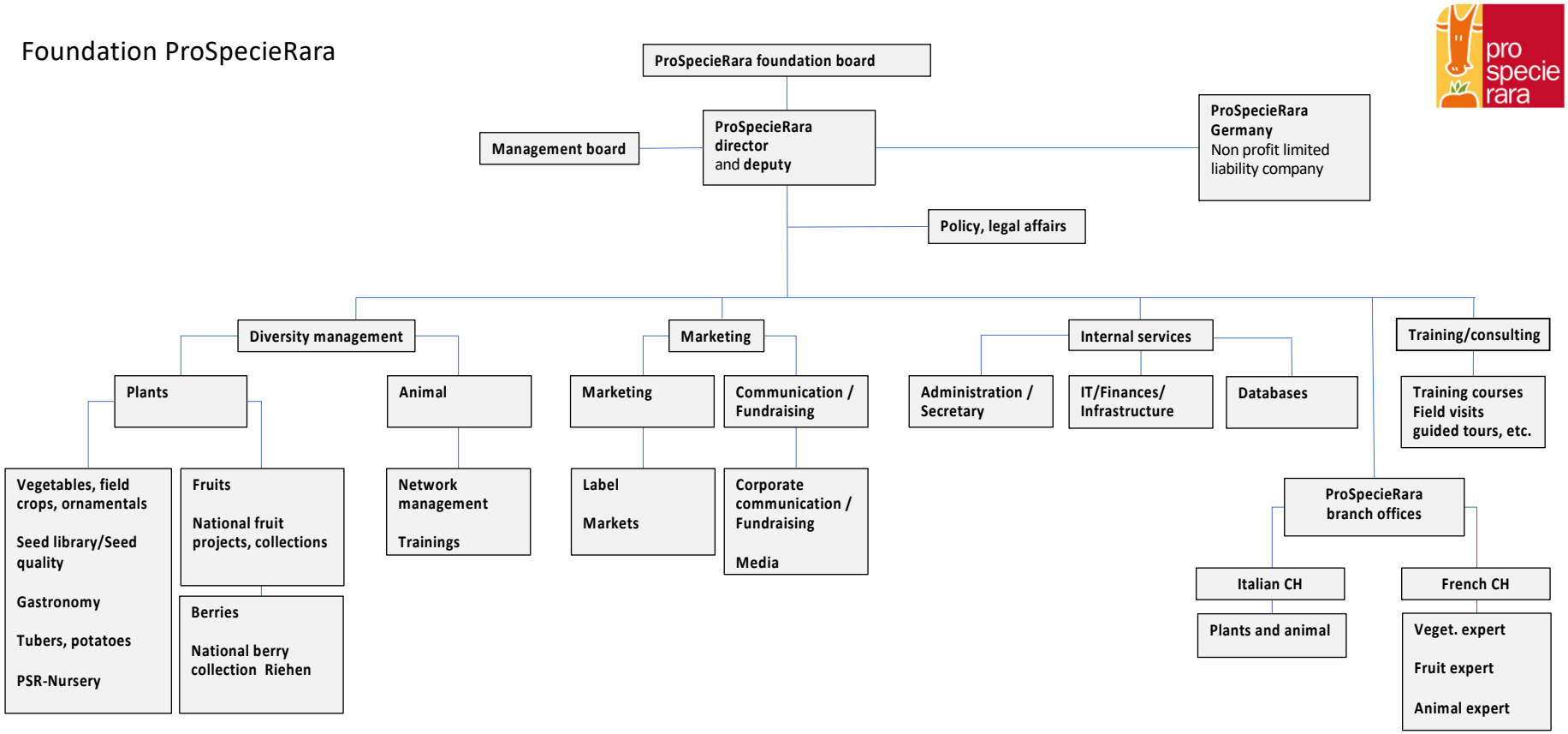
To date, most administration has been carried out within the association. A part-time bookkeeper and a part-time secretary are now employed, releasing more time for strategic and organisational tasks. The website homepage and database have been reconstructed and are being improved to facilitate the provision of information, member services, administration and other tasks.

Differentiation has not taken place in the sense that decisions and initiatives are delegated from the board to specialists. Most initiatives come from the board. This does not infer that these are few. DSS work covers the following areas: members, knowledge, administration, seeds (conservation), information, communication, markets, seed policy and fundraising. These areas engage some parts of the membership.

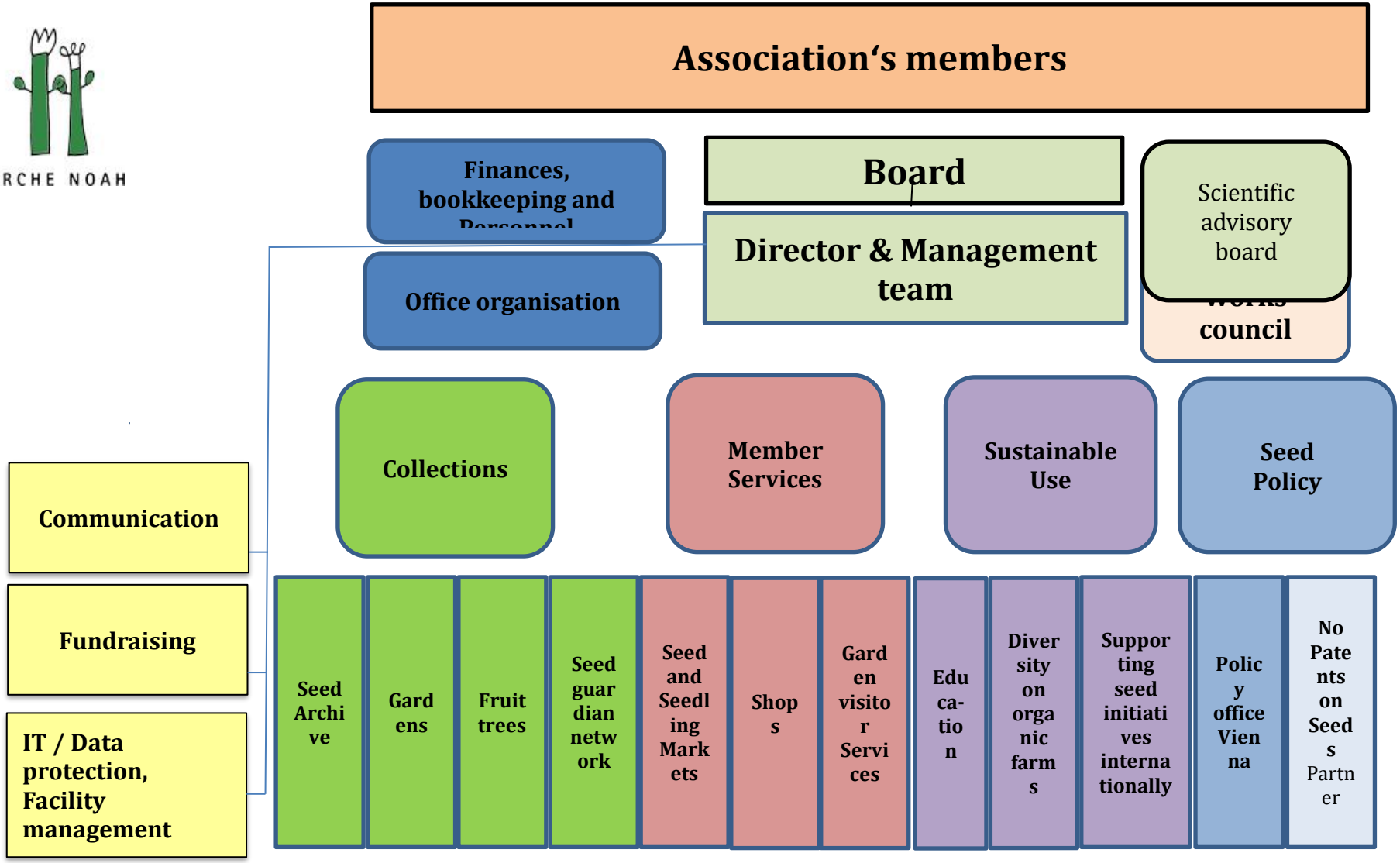
Most external association is currently one way. More work is needed for the organisation to be given greater consideration by its primary counterparts. They receive seeds and advice, but there is currently no further development. One reason for DSS being organisationally further behind when compared to CSBs in other countries may be the absence of a strong national programme in Denmark. Establishing a strong national programme is recommended in the Global Plan of Actions, which is part of the foundation of the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA). This implies that DSS is not officially involved in the national PGR work and not recognized for it. There are no incentives or support, which results in a low level of participation on a voluntary basis. Furthermore, the *in situ* priorities in the ITPGRFA are not implemented in Denmark – article 5.1 c & d. DSS is working with *in situ* conservation – on-farm and in-garden, which marginalises DSS further.

2.3 Organization structures

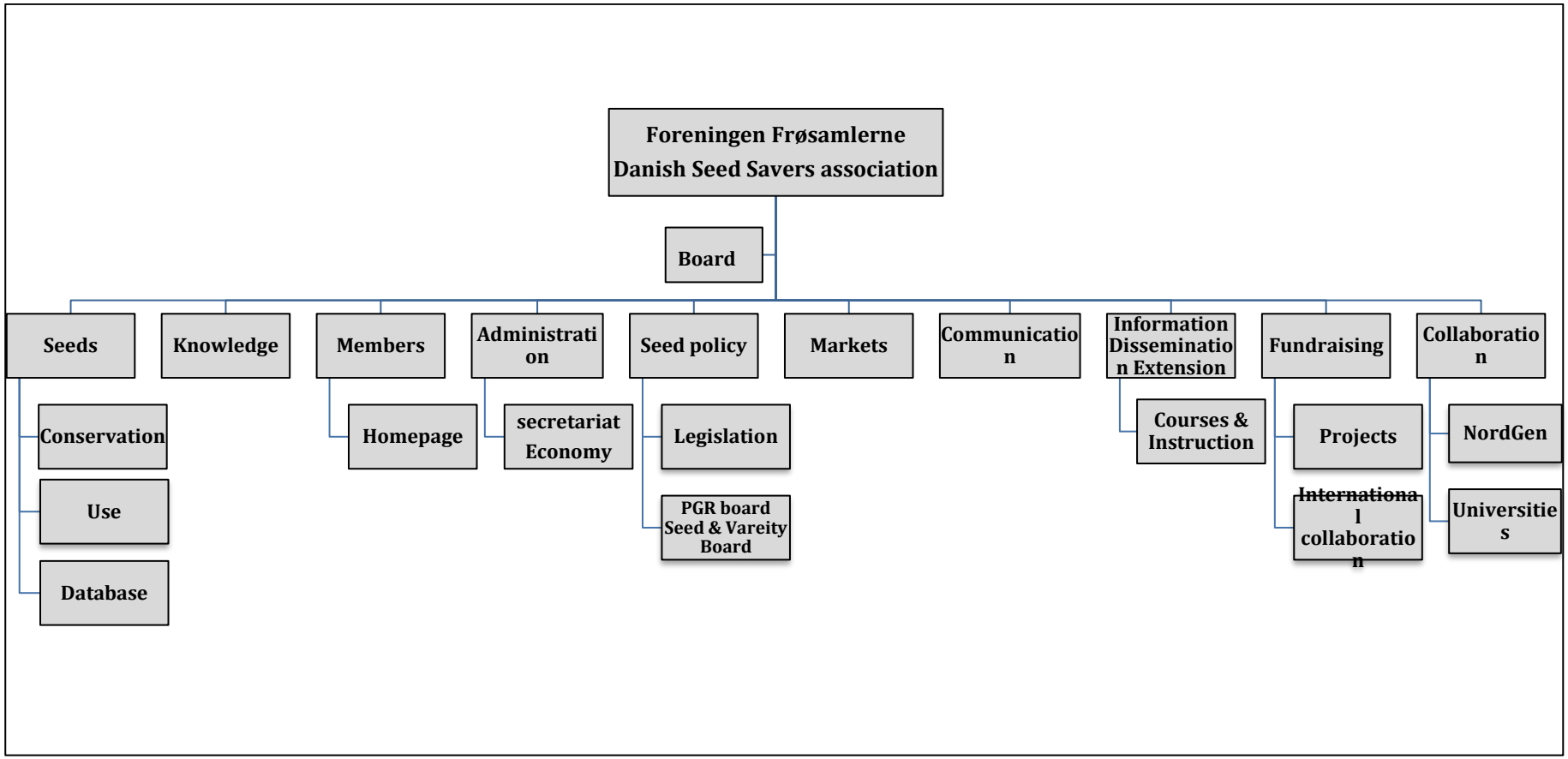
Organization Structure ProSpecieRara



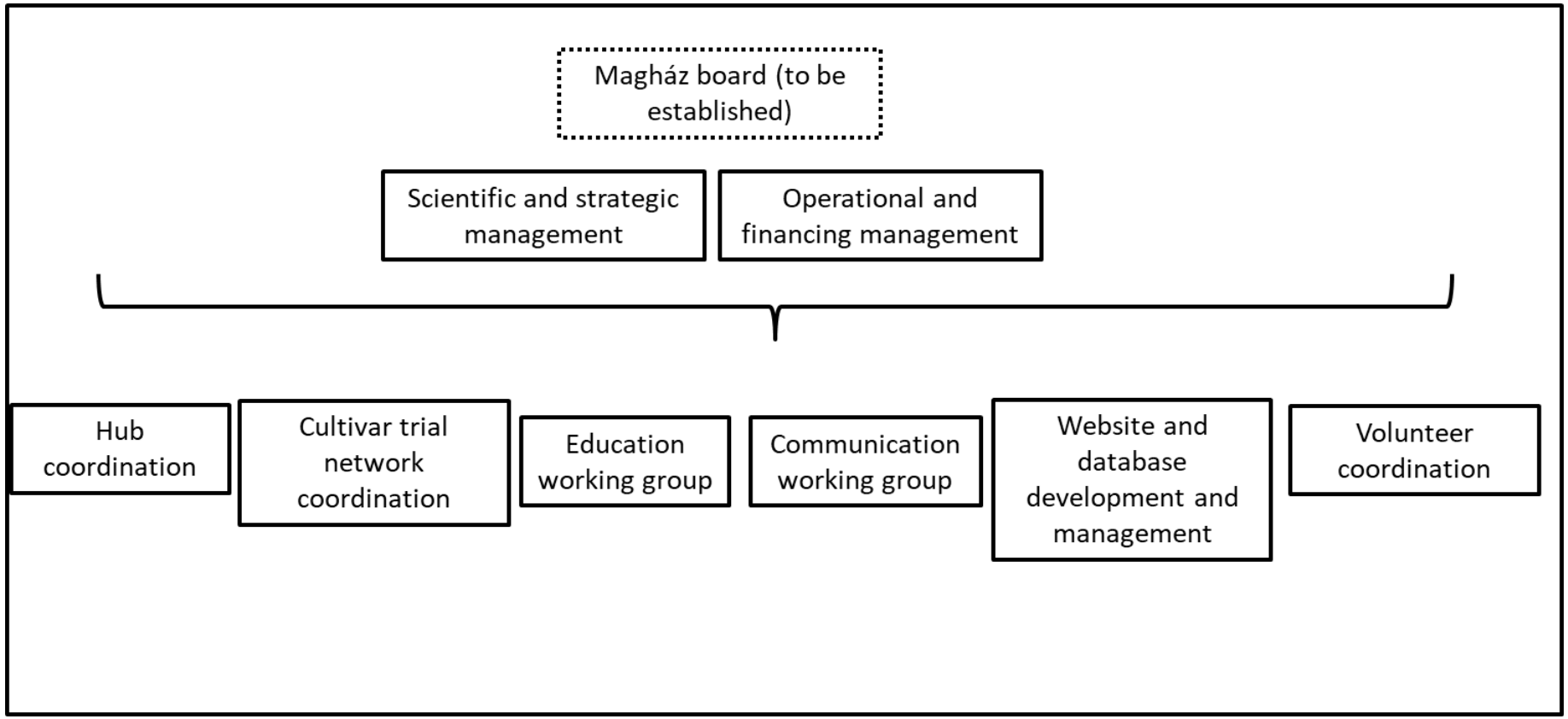
Organization structure Archeh



Organization structure Danish Seed Savers



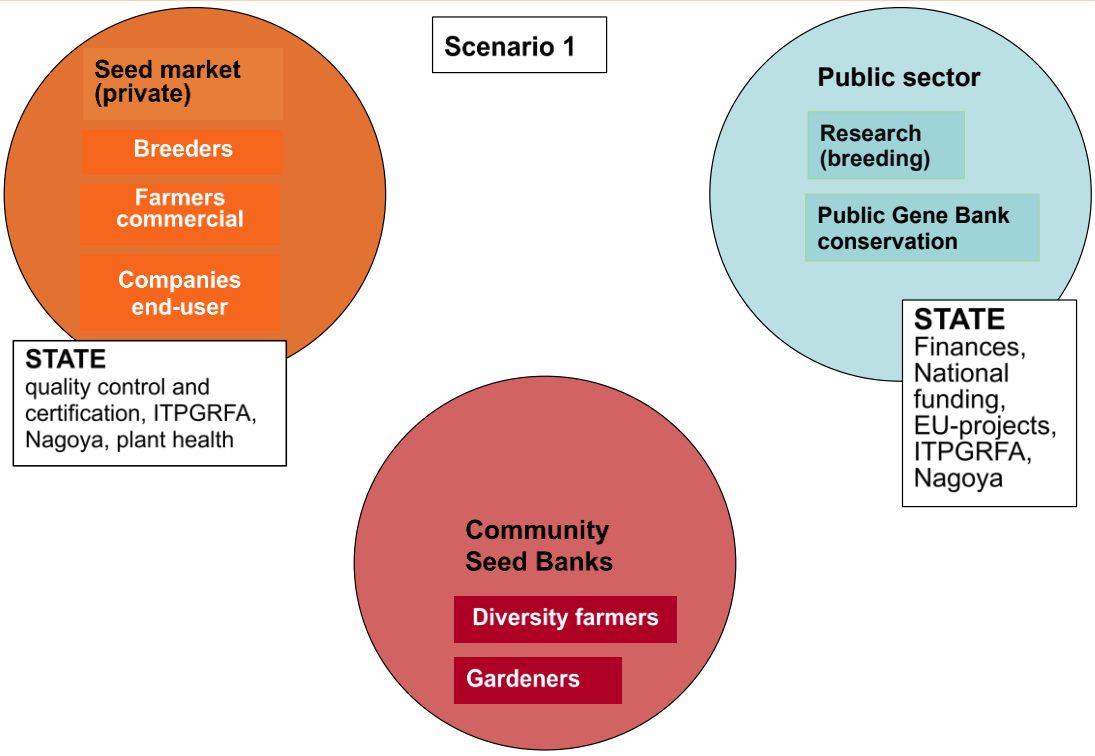
Organization Structure Magház



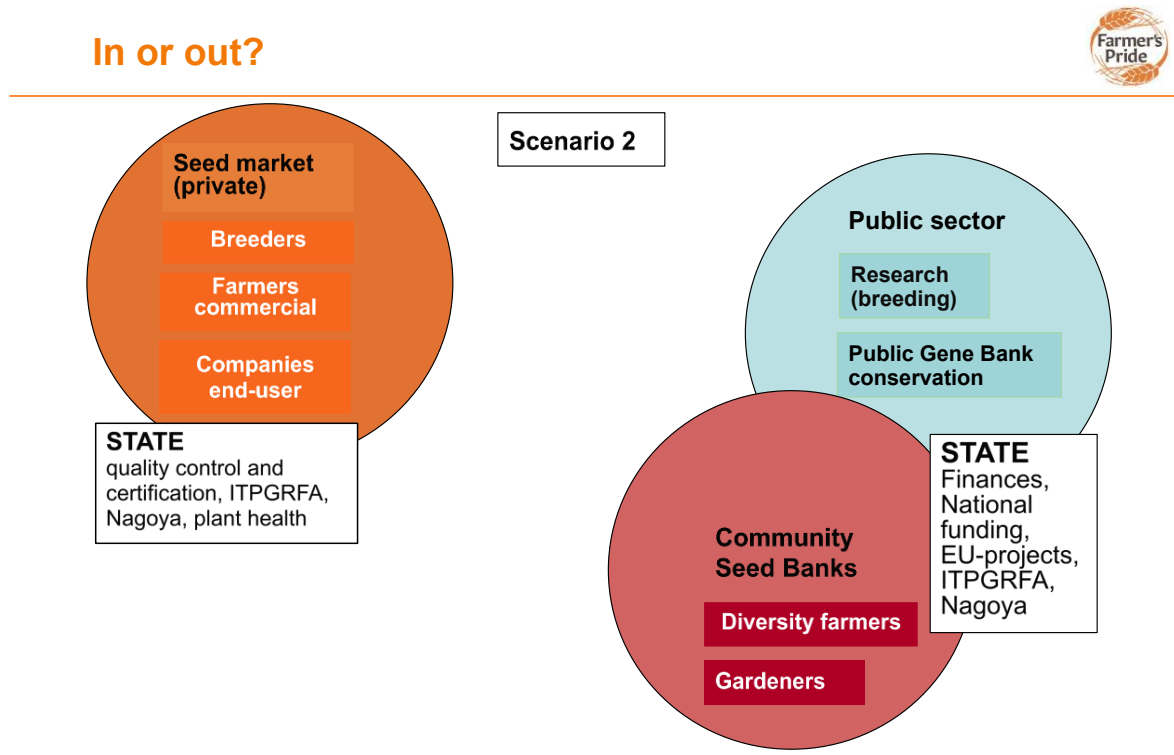
As a very small and decentralised organisation, Magház's organisation structure has special features. Two management groups carry out the functional scientific and financial co-ordination. The main activities (education, variety trials, etc.) are co-ordinated by 1-1 core members. In the long-term, the aim is to develop a decentralised system by establishing and supporting civil genebank units (hubs) all over the country, which will function as seed and information centres and will hold theoretical and practical seed-saving related educational events (e.g. seed swaps and training). Some of them would produce the seeds for commercial purposes as well. At the moment there are six hubs, co-ordinated by core members.

2.4 CSB activities in the national diversity management context

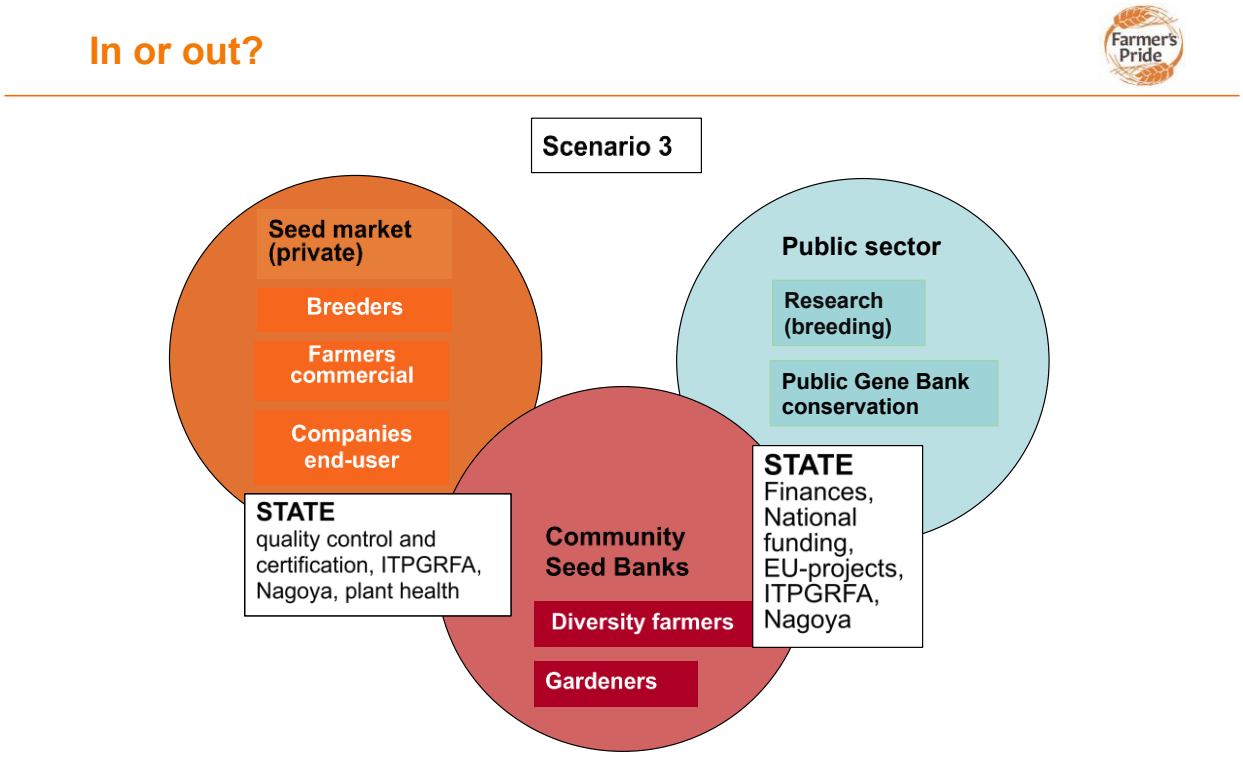
One task of the Farmer's Pride project is to give some examples of how CSB-networks are positioned with respect to the national PGR management system.
The spectrum ranges from organizations that are more or less disconnected from national and private seed management systems, to CSBs that are closely-integrated into the national seed diversity management system. Normally the public *ex situ* conservation system (national genebanks) have established links with the private seed sector. Here we describe different showcases, which detail different scenarios and describe why decisions were made not to link to the public sector or to the private company sector. Policies related to CSB activities have already been described in the DIVERSIFOOD project H2020 – Research and Innovation Action D4.1 Report on local seed production systems p.27–41.



Scenario 1 – developmental stage



Scenario 2 developmental stage



Scenario 3 developmental stage

2.4.1 Showcase ProSpecieRara

During its organizational development ProSpecieRara passed all the three scenario stages to end up at scenario three in Switzerland. During its pioneer phase, ProSpecieRara needed to develop a proper conservation management network. Loose links already existed to the national genebank during this phase without any concrete collaboration with institutional partners. This changed due to a genebank initiative that brought to life the Swiss Commission for the Conservation of Cultivated Plants (SKEK). All the stakeholders: NGOs, agriculture research centres, universities, little seed companies and policy makers connected to or interested in the conservation management of PGR gathered on this platform with the agreed mission to safeguard PGR *ex situ* and on-farm in Switzerland. This was in 1985 and the network was organized in thematic working groups and collaborated until 1998 without any public funding. For ProSpecieRara this was the **first shift from scenario 1 to scenario 2.** When the Swiss state started to involve the platform to realise the National Action Plan on Plant Genetic Resources for Food and Agriculture (NAP-PGRFA), based on the Global Action Plan agreed on in 1996 in Leipzig, the platform had to become a legal entity and it became an association with a managing board. This was the precondition for the Swiss department of agriculture to be able to implement the NAP-PGRFA in the Swiss Agricultural and "Heimatschutz" law and to be able to finance the NAP. For ProSpecieRara it was the first step to link its activities to the ministry of agriculture and to develop project support from the state to fulfil the tasks that have been described in the national action for PGRFA. This was the first step to accept that all the PGR that had been collected by ProSpecieRara and were profiting from the support of the ministry had to be integrated in the multilateral system of Switzerland.

The next **shift from scenario 2 to scenario 3** happened in 2002 when ProSpecieRara signed the first contract with Coop, the biggest supermarket chain for organic products. This was the first attempt to connect the diversity conservation management to marketing activities. In 2003 the first products were launched and collaboration projects with the organic seed company Sativa Rheinau AG and St. Gallische Saatzuchtgenossenschaft were established. The marketing activities of ProSpecieRara and its partners had an impact on Swiss seed law that actually forbade the marketing of unregistered crops in Switzerland. In 2009, ProSpecieRara and the Swiss department of agriculture agreed on a specific change to the seed law and the seed directive. A new category called "niche variety" was created that allowed the marketing of ProSpecieRara-varieties.

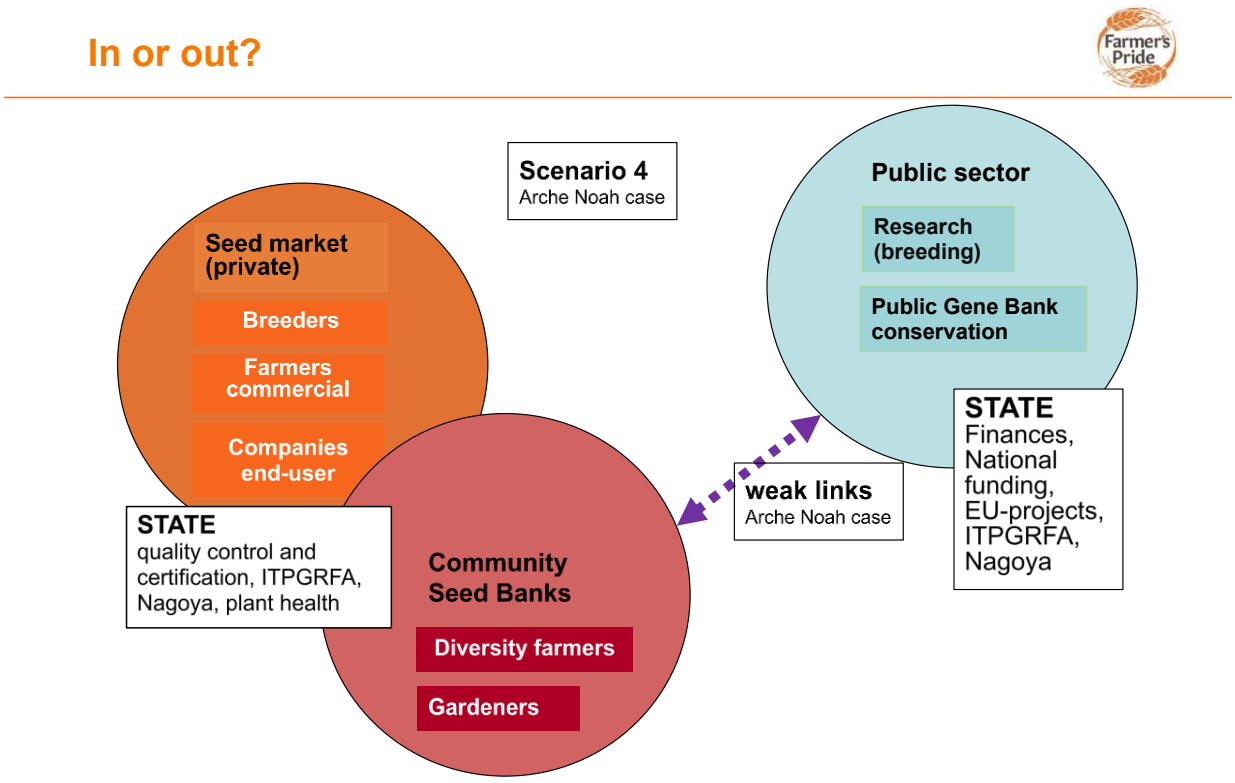
When we look back to that **stepwise shift from scenario 1 to scenario 3** we can conclude that private and public initiatives came first, followed by interactions and collaboration efforts with governmental and public authorities. Based on the willingness of the public sector to recognize and support private efforts and the willingness of the private initiative to collaborate, a legal framework to promote sustainable use of PGR on-farm could be developed and implemented.

2.4.2 Showcase Arche Noah

The situation of Arche Noah is rather Scenario 4. There are definitely more links to the private seed market than to the public sector. The most important co-operation is with Reinsaat, a private breeding company specialising in organic vegetable varieties. There are further co-operations with private companies: with Spar (a supermarket chain), with Bellaflora (a garden market chain), and with Egger (a brewery and fruit juice producer), who advertise products with an Arche Noah-label, which helps to get more public visibility. The contacts with national genebanks and authorities are quite loose. There are no regular meetings between ministries and Arche Noah, but Arche Noah tries to communicate its political and technical positions. In the region where the association is located, Arche Noah succeeds in getting attention and also funding for certain projects (Leader region Kamptal). Arche Noah is a well-recognised partner for some departments of

Austrian universities (BOKU, Uni Graz) and research stations (Versuchsstation für Spezialkulturen Wies, HBLFA Schönbrunn), describing and examining varieties of the Arche Noah seed archive, and participating in breeding activities.

Scenarion 4 – developmental stage.



2.4.3 Showcase Magház

Some background information: The PGR management in Hungary is based on the activities of the national genebank and some universities and botanic gardens. The main activity is the remarkable *ex situ* conservation. The national genebank has a large collection (almost 70.000 accessions, landraces of Hungary collected from the '60s, but also many breeding lines and crop wild relatives). Each year the genebank gives out samples at the request of citizens. (Since its second year they have also organized seed swaps [likely influenced by Magház]).

Hungary has a national PGR council, which gives recommendations on the distribution of *ex situ* conservation subsidies, legislation (national seed laws, directives, etc.), landrace registration and international treaty and protocol implementation. Lobbying of the civil society has not been necessary until now, because the registration (free of charge, somewhat bureaucratic) and marketing directive of landraces and obsolete varieties are quite permissively implemented in Hungary, although there are no incentives for landrace cultivation.

Magház is a very young and small initiative, playing a limited role in PGR management in Hungary. Its main strengths are: on-farm management, education and awareness-raising. Magház is an example for scenario 2,

it's more connected to the public sector (the national genebank and research institutes) and has no connection yet with seed companies or other private sector organisations.
.In 2015 when the civil agro-biodiversity conservation sector could delegate a member in the PGR council, this delegate was one of the founders of Magház. The connection with the national genebank strengthened in 2019: the genebank started to develop an on-farm trial network, and they looked for participants among Magház members. They also support the education and knowledge share activities e.g. website development and seed saving book. Based on personal relations there is a co-operation with some research institutes (ÖMKi and ESSRG).

In Hungary conventional agriculture and seed production (mostly arable, greening and forage crops) are very strong. Breeding was also supported and flourished before the democratic era. This led to a situation from the '60s where people abandoned traditional varieties and landraces as they were offered good selections/varieties (pre-hybrid era). Many of these are still listed and commercialised, customers are used to them and satisfied, (this is slowly changing, mainly in the younger generation, who are interested in trying "new" things, like landraces). For bread wheat this happened even earlier, right after the Second World War, which is why there are no winter wheat landraces in Hungary. Because the seed sector is so important, it is strictly regulated, making it difficult to get seeds commercialised. That's why Magház has focused on education, awareness-raising and seed swaps (reintroduction of landraces) instead of marketing.

A business model is slowly being built with support from ÖMKi (ÖMKi already has tomato landraces [at the moment only seedlings] on the market) to commercialise landrace seeds.

2.4.4 Showcase DSS – Denmark

The preconditions in Denmark are different to those in other countries. The commercial agricultural sector is industrialised (cereals, animals and few vegetables). Even the organic sector is following this route. Occasionally there is a good dialogue with the authorities, primarily serving the agro-industry and the industry association for agriculture. The metaphor is used that the agricultural sector is a motorway and the conservation sector and CSB is a cycle path, following the motorway. There are no longer any vegetable breeders in Denmark, only a few cereal breeders, who have now re-initiated breeding grain legumes for feeding animals/pork production.

The collaboration opportunities are therefore very limited and for seed saving, conservation and the alternative seed sector the aim is to secure a positive co-existence where agricultural and horticultural diversity can be maintained without conflicts with the dominating direction of the commercial sector. The DSS is sceptical about the main course of Danish agriculture, but has no intentions to harm it. However, there is strong opposition to the work of DSS and some would like diversity work forbidden. Some members of the agricultural sector and central administration do not take the organization seriously, so, the metaphor of the motorway and cycle path is still appropriate.

On the cycle path, however, many stakeholders do collaborate with DSS, whose current activity is:

- DSS is still in the pioneer phase as defined above.
- DSS do not collaborate with breeders, seed companies, commercial farmers or end-user companies.
- DSS communicate with public sector research and the public genebank.

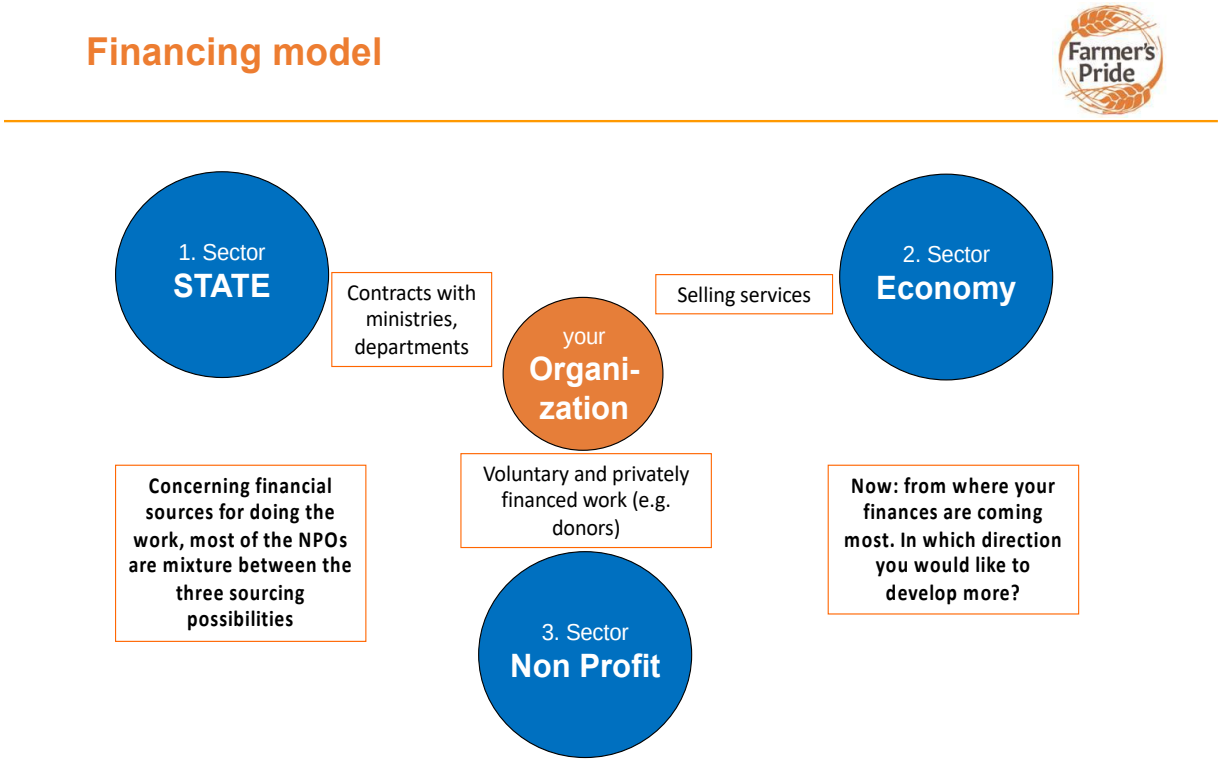
In the summer of 2019, DSS and the association for the conservation of domesticated animals developed a mutual policy paper aimed at being heard by the politicians.

DSS is not part of the national conservation and management system. The current PGR strategy from 2018 does not comprise *in situ* and on-farm conservation, and this is exactly what DSS is doing. Crop wild relatives are not stored *in situ* in Denmark. DSS is represented on the National PGR board, where it has a voice, but is it heard? Some funding was received for a description and information project of former Danish pulses and additionally for web publication of results from previous vegetable evaluations. A general perception in Denmark is that PGR are old-fashioned and belong to a museum, rather than something alive offering solutions to challenges in the future like food security and climatic changes.

There is collaboration with the national Nordic Genetic Resources Centre (NordGen), largely due to personal contacts. DSS donates conservation material to NordGen and is planning to establish a safety duplication of material. DSS is also represented on some crop working groups. No regular or formal funding is provided as it is in the animal sector. DSS is oscillating between Scenario 1 and Scenario 2.

2.5 Funding structure

In most of the cases NGOs start as a network of enthusiasts doing their work on a voluntary basis without any source of finance. Over time this situation can change. In the diagram below funding situations are characterized with an indication of what CSB funding looks like at the moment and how it could evolve in future.



Financing model demonstrating the sectors and their interactions.

ProSpecieRara has tried to diversify its funding strategy to make it as broad as possible. Most of the funding still comes from private sponsors and fundraising activities (3. Sector). Since the development of the label and the co-operation with Coop, ProSpecieRara offers more financed services to partners. The use of the label is linked to a basic fee until the labelled product achieves a certain level of turnover for the marketer. Above a certain amount the fee reaches about 2% of the turnover. The collaboration between ProSpecieRara and the state is managed by two different systems of contracts. One is a service contract, where ProSpecieRara takes over the co-ordination of collections for the state (time frame of eight years). In this case the money coming from the state is for a service (2. Sector). The other is a public sponsoring contract that is linked to specific projects like evaluation, breeding, propagation of plant genetic material and animal genetic resources (1. Sector). Allocating the percentages of the received funding to the three sectors gives the following results in 2019:

1. Sector 23%,
2. Sector 17%,
3. Sector 60%.

Although ProSpecieRara has grown considerably over the last 20 years, the percentages between the three sectors haven't changed much during this time. Perhaps there was a small shift from the 1. Sector to the 2.

Sector. It is hard to tell in which direction it will go in the future. ProSpecieRara tries to invest energy into all of them. Compared to other NPOs the 23% coming from the 1. Sector is quite low and the percentage for an NPO of 17% isn't so bad.

Arche Noah gets most of its funding from private sponsors (30 % from membership fees and 30% from other donations). The remaining 40% is divided between public funds (15 %), sponsorship from private companies (10%) and revenues from seed sales and entrance fees to the visitor's garden (15%). Public financing comes from both European funds and regional funds. To date, there is no support from the general government.

Regarding the future, Arche Noah is putting more energy into fundraising activities as the average age of the members is quite high and new formats have to be developed (e.g. special sponsorships for fruit trees). Co-operation between private companies and Arche Noah are seen as necessary by the management to reach a broad audience (e.g. Arche Noah seeds are sold in the supermarkets, selected products are labelled Arche Noah), but this attracts criticism from some members. Public funds are important to finance research and education activities and it is hoped these will be consistently raised in the future. Regarding political and breeding activities, foundations are seen as suitable sponsors. Since there isn't a tradition of foundations in Austria, links to German foundations were established only recently.

Magház is to become a formal organisation when the Bese Association, that was giving Magház its formal basis, changes its name, together with a board renewal. This will make it possible to develop membership opportunities and collect member fees. Magház has a very small income from donations (approx. 1%).

At present Magház is funded by projects, has one-one paid part-time employee via Farmer's Pride (ÖMKi), Dynaversity (ESSRG) and, from June, via Salvia Foundation ("Spreading and sowing the seeds" project). The rest of the core member team work voluntarily and part-time employees do voluntary work as well. Via co-operation and a contract with the national genebank there is funding for website and database development, seed-swap organisation/participation costs and a seed saving book.

The plan is to become a formal organisation, to develop a membership structure and collect member fees and donations (aim is ca. 20–30% income from 2021). The intention is also to develop selling services: education (workshops, courses, books) and seeds/other propagation material. Project-based work continues and the aim in future is to have the opportunity to join as a partner in consortiums.

DSS is an association primarily funded by membership fees. Additional support is received for being a public information society. DSS sells its own seeds to markets and information is provided about the association, plant genetic resources and associated subjects. The development and information projects participated in are funded, but seldom up to 100%. A large part of the daily work, projects and maintenance tasks are carried out voluntarily without funding. DSS is working to set the organisation on a more professional footing, selling seeds to increase impact on the public perception and estimation of PGR and on the conservation and use of PGR in Denmark. Reliance on volunteers makes progress slow. DSS wants to sell seed to reach a broader audience and hopefully raise money to enhance and increase its work.

2.6 Some aspects of how to setup and develop a CSB

This compilation is based on a structure provided by Seed Savers Exchange, Decorah IA 52101 www.seedsavers.org/site/pdf/Start-Seed-Bank.pdf. Some changes and additional points have been made to add the experiences of the organizations involved.

- Define your goals and target group (professional/market farmers, hobby gardeners, farmers growing vegetables and/or cereals-arable crops and/or fruits). This target group can vary over time.
- Develop partnership (garden clubs, permaculture groups, community garden groups, national genebank, but also try to think out of the box and invite people/organisations who are not yet engaged in agro-biodiversity management, but can be a potential partner for certain steps.)
- Develop projects with your members and partners (fit these projects to your goals, target group and financial capacities)
- Set up a structure, site and inventory with data management and seed quality system as well as a tracking system (from whom/where did we get the seeds and to whom did we send seeds).
- Document your activities and collect as much information about your accessions/your collection as possible. Provide feedback templates to your network members.
- Find solutions to finance your maintenance costs and projects (member fee/donation in case of formal organisations, marketing of seeds/seedlings (check the national PGR regulations), "marketing" your knowledge and experience via courses/workshops, co-operation with a research institute or national genebank being involved in national or EU projects, co-operate with other more established organisations, participating in their work/projects).
- Find an advanced CSB in your neighbourhood (www.communityseedbanks.org/), contact them and learn from them.
- Organise regular meetings (at least twice a year) with partners and stakeholders in order to strengthen trust, engagement and personal relationships, to get inspired and find new opportunities/solutions together.

3. Analysing four CSB diversity management systems

We have analysed the different PGR diversity management systems using the following points:

- Choice of crops. What kind of PGR we have in our collections and how we decide what we want to integrate in our PGR diversity management network.
- The description of our diversity management systems: data-collection and management, infrastructure (storage, cleaning), stakeholders (and their roles in the network), seed-quality management (health, germination rate), monitoring systems (PGR-flow/status in the network)
- Promotion activities for PGR – commercial activities, labelling, markets, seed quantity, information sharing.
- Main differences between CSB and "formal" genebanks.

3.1 Crop choice

Local varieties (specific locality [village, farm] sometimes very specific and narrow genetic), landrace ([region] broad genetic, population), obsolete varieties, former commercialised variety (never had or lost variety protection), "exotic" species (e.g. physalis, basella, yacon etc.), crops with a certain phenotype, or with interesting color, shape, taste, size. Under-utilised crops (definition see: www.diversifood.eu/wp-content/uploads/2017/04/Diversifood_IF4_UPR-definition.pdf)

Criteria to include or not include PGR in CSB-collections

Criterium	PSR	Arche Noah	Magház	DSS
Positive criteria				
Local origin	**X**	**x**	**X**	**x**
Known history:	**X**	**x**	**X**	**x**
"Exotic" species	**X**	**x**	**X**	
Negative criteria				
GMO	**X**	**x**	**X**	**x**
Invasive plant	**X**	**x**		
F1-Hybrids	**x (see additional explanation below)**		**X**	**x**
Variety is very susceptible to quarantine diseases	**X**			
Variety protection (variety still protected and official seed propagator defined in the European catalogue)	**X**	**x backup stored, but no regeneration**	**X**	

Some additional thoughts/explanations related to the decision scheme to include or not include PGR in CSB-collections

ProSpecieRara positive criteria

- Is of traditional and cultural value for the country (mentioned in literature or several older seed-or plant material-catalogues)
- The variety protection will expire soon and it is recommended to integrate it in the collection to save the genetic and good quality seeds while monitoring the variety on the market
- ProSpecieRara defined a specific set of species they prioritise for integration in the existing collection
- Variety "old enough" to have a certain cultural value in the region (introduced, reintroduced or originated in the country). The criteria "old" depends on the species.
- If introduced – we have to know when and if the time was long enough that the species/variety could adapt to our conditions. At the Farmer's Pride meeting it was decided that a PGR has to have been grown for at least 15 years at a specific locality (site) to be accepted as a conservation variety
- If reintroduced: Does this variety look like or act the same as an older or traditional type that was grown in the past?
- If originated in Switzerland: besides being an approved local variety or landrace, is the variety the result of a Swiss national breeding programme or has it been created by a well-known Swiss breeder and now has a certain cultural value?
- Breeders information is available to judge the value of the variety within the breeding process

("milestone-variety").

- Switzerland established a national positive list for PGR that are under national "protection". ProSpecieRara accepts all varieties that are on this national positive list: www.bdn.ch/lists/poslist/all/
- Local variety/landrace of the place/region where the network-member is located
- Culinary (special variety for a traditional recipe) and agricultural value (different tolerances)
- Accession is not on the official variety list.
- Stable population and nevertheless a high genetic diversity for outbreeding species
- ProSpecieRara already accepted Hybrids when the access to seeds or plant material of the parental generation was provided.

Arche Noah additional information:

The seeds come from private donations, former seed companies, public seed banks and collection missions. There have been two collecting missions to Croatia and one collecting mission to Romania. Recently, some of the seeds were returned to their native country, e.g. through the CSB "Casa Semintelor" in Romania, and the CSB "ZMAG" in Croatia. There has been no official decision and no scheme to include or not include PGR in the Arche Noah collection. The focus is not on including more accessions, but on conserving the existing accessions.

Magház additional information:

Magház has no central collection, the members are building up their own collections based on the above mentioned criteria.

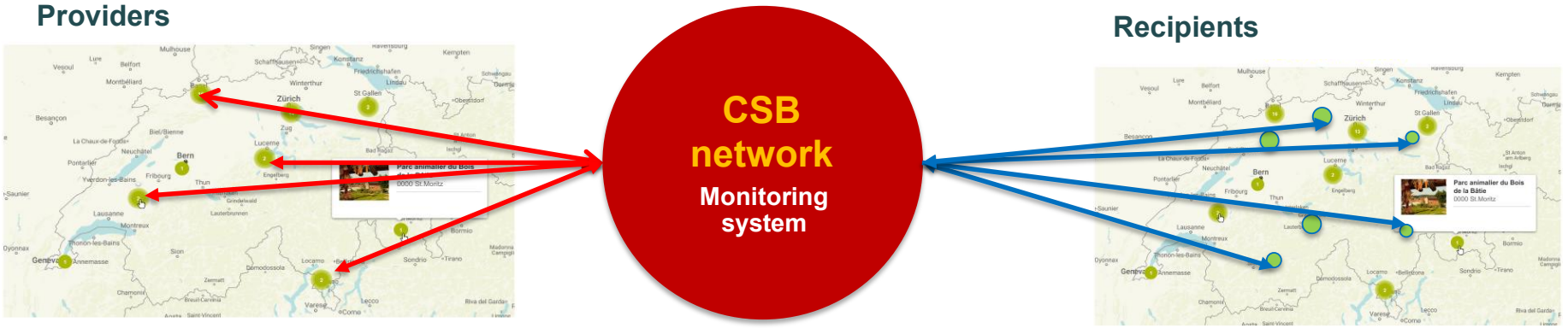
The seeds are usually provided by:

- Gardeners/farmers (usually from the older generation)
- Genebank
- Seed exchange participants

Danish Seed Savers:

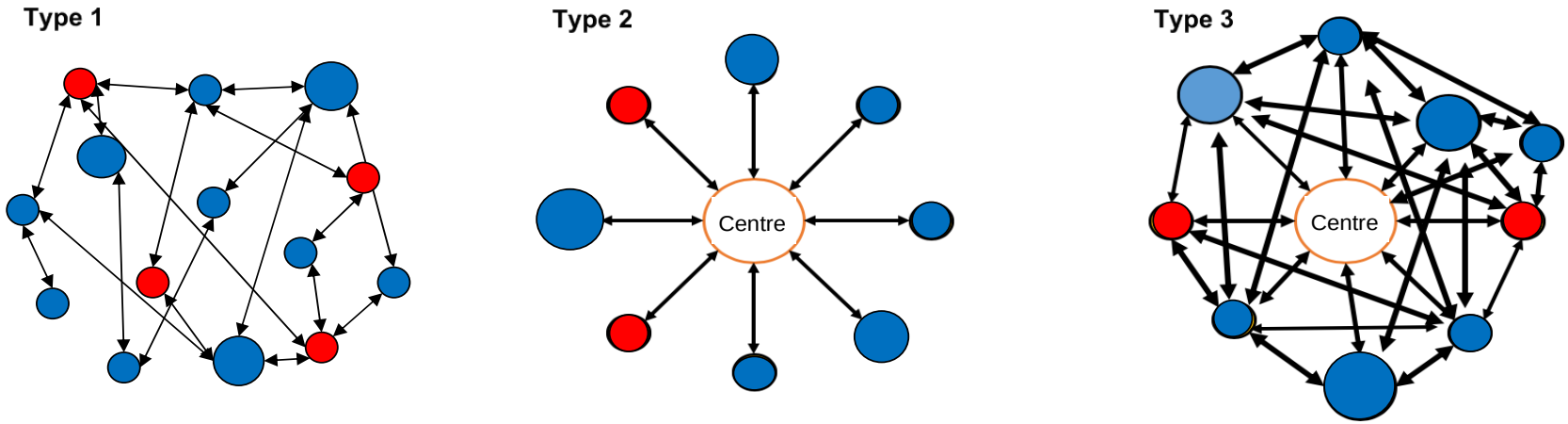
In Denmark there are very few landraces and local varieties that has survived and passed directly from cultivation into conservation. Some heritage varieties with a personal history have been collected by chance and adopted in the system. Most accessions have been requested from official genebanks. Obsolete varieties are currently included. Nowadays commercial seed companies reintroduce old varieties for a few years and withdraw them again. DSS tries to absorb them. Repatriation of old Danish material from foreign genebanks (VIR, USDA, IPK) is becoming more common. The material is found in connection to other activities like research projects and then requested and reintroduced. Sometimes the documentation of authenticity is deficient.

3.2 Diversity management systems



One of the main specificities of the CSB system is the involvement of both the providers and the recipients of the seeds in the diversity management system. As long as the providers are alive and willing to be a part of the network, they stay within it and fulfil their propagation activities for the network. At the same time the network is looking for new members who are willing to share their knowledge, skills and propagation work for the sake of the whole network. Those people (see stakeholder-list below) will become recipients of PGR and will take over the responsibility for a PGR. This way the network will grow constantly and more and more people will take over the responsibility for more and more varieties. Every member of the network can become a recipient or provider of PGR. Exchange of PGR between the network members will be promoted.

After the final discussion within the EC-PGR project “Linkages” it became clear that the genebank managers were not interested in integrating the recipients of their PGR in their PGR-conservation management system, because many recipients wouldn’t fulfil their quality management standards and the genebank managers would not have the capacity to establish training workshops. They don’t have an established system to control, monitor and trace the flow of PGR within a broader network. The system they have that they are monitoring and documenting systematically is shown above with the red arrows. CSBs combine both providers and recipients in their networks and could provide complementary services within national PGR management systems (see chapter 3). Looking at the CSB-networks we can identify three types through the ways that recipients and providers are linked and how the exchange of PGR between them occurs (as shown below). But there are many intermediate types as well.



Type 1: The network could be an association but without a physical centre. Members of the network can be individuals or other networks. PGR are exchanged and the communication is established e.g. by a webpage. Exchange between the members of the network could be monitored or not.

Type 2: The network has an established professional centre. PGR are stored in a centralized seed bank and PGR are exchanged via the central seed bank. Seed exchange is documented. The centre is propagating seeds as well as holding them as a backup and to verify the integrity of the variety.

Type 3: The network combines both types but all the exchanges within the network are traced and documented in a central database. New thematic networks within the network are established. Adapted tools will be provided to the network members to interact and exchange knowhow with the centre, but between each other as well.

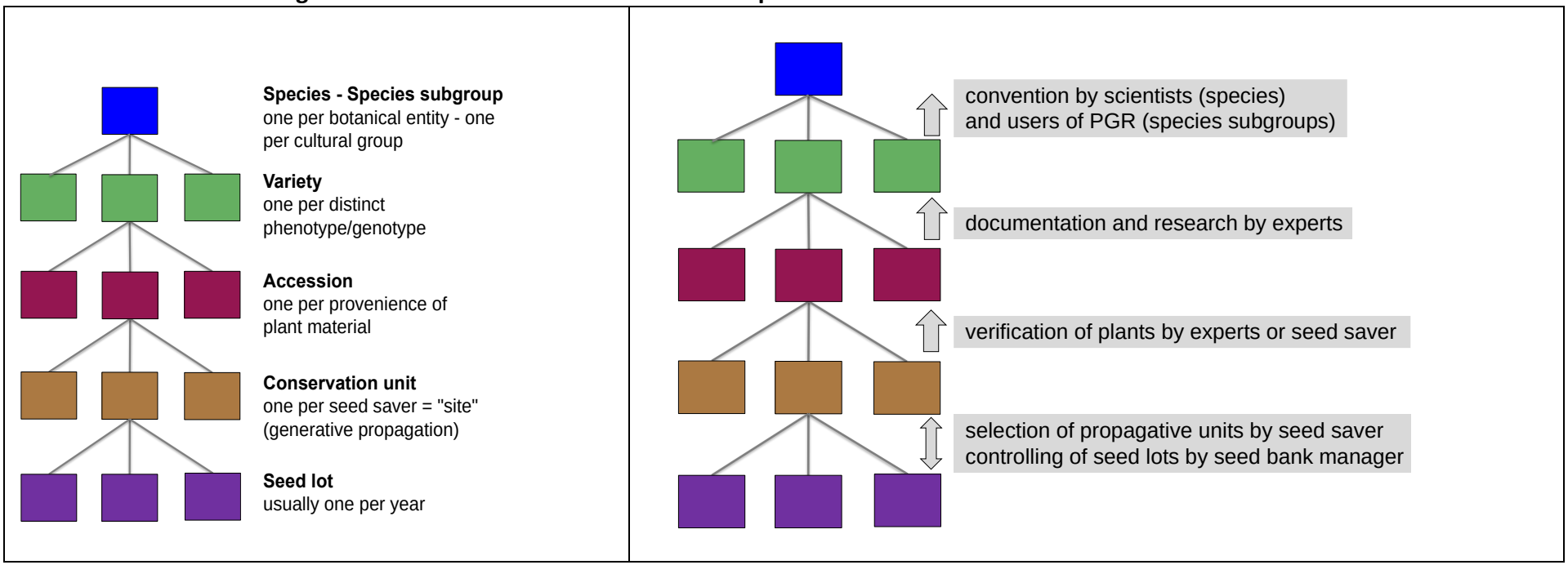
ProSpecieRara

The diversity management system of ProSpecieRara is a very inclusive system. It includes all the stakeholders that are involved in a broad range of activities that are connected to the use of plant genetic resources in different contexts like: gardening, farming, breeding, marketing and selling. All these activities together constitute the dynamic conservation management system for plant genetic resources.

Data collection and management	**Infrastructure (storage, cleaning, etc.)**	**Seed quality management, variety control**	**Monitoring system**
FileMaker based database (DB). The DB is the heart of the organization. Addresses, fundraising, accounts, label management, network management and conservation management, systematics, plant descriptors and evaluation data are managed by this DB. The DB is connected to the PSR-website – "seed catalogue" and the "map of diversity". There is a link to the national database (NDB) as well. The descriptors in NDB can be visualized in the PSR-DB too. See Annex: Data collection and management of PGR in the CSB-network. See on page 74	The ProSpecieRara CSB runs a climate-controlled seed storage with 30% humidity and 15^{0}C as a working collection. Duplicates for the base collection are stored in two freezers at -18^{0}C. Hand sieves are used to clean material. Two climate-controlled storing rooms are used for tubers and roots during the winter at the seed centre.	Seed quality control is carried out visually. Germination tests are only required for commercialized seeds used by the seed company Sativa Rheinau AG. ProSpecieRara runs three big public gardens and a little nursery where seeds coming from the seed savers can be tested and varieties can be controlled. Every year about 350 varieties are grown in these gardens and checked against diseases. In some cases seeds are frozen. No hot water or other seed treatment is applied for the CSB or for the non-commercial part of seed propagation. Decontamination processes against viruses have been carried out for potatoes, beans and strawberries and they have been supported by the state in collaboration with agricultural research institutions. Potatoes and strawberries are kept in isolated conditions and in vitro. See Annex: Chronological steps during the year. See on page 65	The database provides a monitoring system for each variety or accession. The DOI-system has only been partly implemented and PSR uses its own coding system. The PSR-data system is connected to the national database system and passport data are uploaded to the national database (NDB) regularly. Accession and variety status can be checked in real time and the inventory in the storage room. Controlling checks of the storage and freezer are done once a year. Every year accession lists (checklists) are sent out to collection holders, seed savers and farmers to check if they still have the variety, to ask if they want to commercialize the variety or to offer a variety to the ProSpecieRara network members. Changes in these lists are transferred to the database. As soon as dataset security problems are solved the network partners will be able to make these adjustments themselves. See Annex: Monitoring use of plant genetic resources. See on page 84

• **Stakeholders and their roles**	**Researchers and genebank managers**	PSR is involved in many different research programs for pheno- and genotyping of PGR and maintaining different collections such as potatoes, vines and berries in collaboration with agriculture research institutes in Switzerland and abroad. PSR has integrated most of its material in the multilateral system and the genebank stores duplicates as a backup in a black box system.
ProSpecieRara is a network with about 3,500 active members. Seed conservation is mainly carried out by 650 private and voluntary **seed savers**. The seed savers have to follow a four-day seed propagation course and they are invited every year for advanced training. A new project has been developed to establish different thematic working groups to strengthen the network and increase the know-how about PGR within the network.	**Farmer, breeder, seed company**	Farmers are involved mainly in commercial projects to evaluate PGR for the market and to produce fresh products for supermarkets and for direct sales. 250 varieties are propagated professionally by the organic seed company Sativa Rheinau AG. Special selection and improvement of varieties is carried out in collaboration with them. There are farmers that own their own nurseries who produce different products for direct marketing and propagate seeds.
	Nursery	Nurseries produce seedlings and keep some mother plants as well as fruit trees.
	End user gastronomy/ chefs, supermarket/farmers union co-operation	They buy, sell, re-sell and use products and generate a market for PGR. Feedback systems help to get information about the marketing and cooking qualities of the PGR.
	Propagating partners in the network	**New seed saver:** Has recently attended one of the seed propagation courses and has taken over the care of a variety. Depending on the course a self-pollinated (beginner course) or cross-pollinated variety (intensive course). **Experienced, long-time seed saver**: Loyal member of the network for many years, familiar with different crops, regularly sends seeds to the seed library. **On-and-off seed savers**: At the beginning very motivated, but soon traces get lost. They don't respond to checklist mailings and don't send back seeds. Are downgraded to only receive the checklist. **Contract seed savers**: A small number of seed savers who propagate seeds on our behalf. Either for the seed library (Hauser) or for the Swiss Genebank (NAP). They are compensated for their work. **Individual case**: PSR is planning seed propagation for the available area. City gardeners propagate seeds free of charge. **Show gardens:** Planning is partly done by PSR, some varieties suggested by PSR are propagated.

Data collection and management of PGR in the CSB-network of ProSpecieRara DB-Structure



The database of ProSpecieRara combines two main aspects for the dynamic management of plant genetic resources. On one hand it provides a tool for the description of genetic resources by compiling ongoing characterization of the PGR in the collections of ProSpecieRara with historical information. The figure above shows the main structure on the right and the competences or references in the process of characterization and monitoring on different systematic levels on the left, from seed lot to species level. In this stringently linear structure, every seed lot is linked to a defined conservation unit, which in turn is linked to a specific accession. On the other hand, the database allows PGR to be linked with its maintainers and the sites by dynamic monitoring of conservation activities. For generatively propagated PGR, the maintainers are an extensive network of seed savers, seed library managers and PGR-users. The database system not only traces the parental line of a given seed lot, but also who was involved in the management up to this point and the recipients of future descendant seed lots.

Although the core of the PGR-database follows a linear and hierarchical structure as depicted, there are other modules of documentation interlinked with it. Some examples, besides those mentioned, include contacts/sites at projects, field collections, cultural regions, literature, photos, descriptors, recipes, label management.

In Annex 7.1 ff the different management processes are described and steps that the seed library manager has to follow during the year and the different decision he has to take to guarantee quality of the seeds and of the data. Annex B describes how and where these steps and decisions are documented in the database structure and how the PGR flow within the dynamic conservation network is documented.

Mixing gene-pool (e.g. creating composite cross populations [CCPs]):

ProSpecieRara had an intense discussion about resolving the problem of inbreeding or losing "gene-material" during the on-farm conservation process. Two main strategies are documented in the database model to avoid inbreeding symptoms. These strategies are in addition to the horticulture, farming and propagation techniques that have to be applied for proper seed propagation.

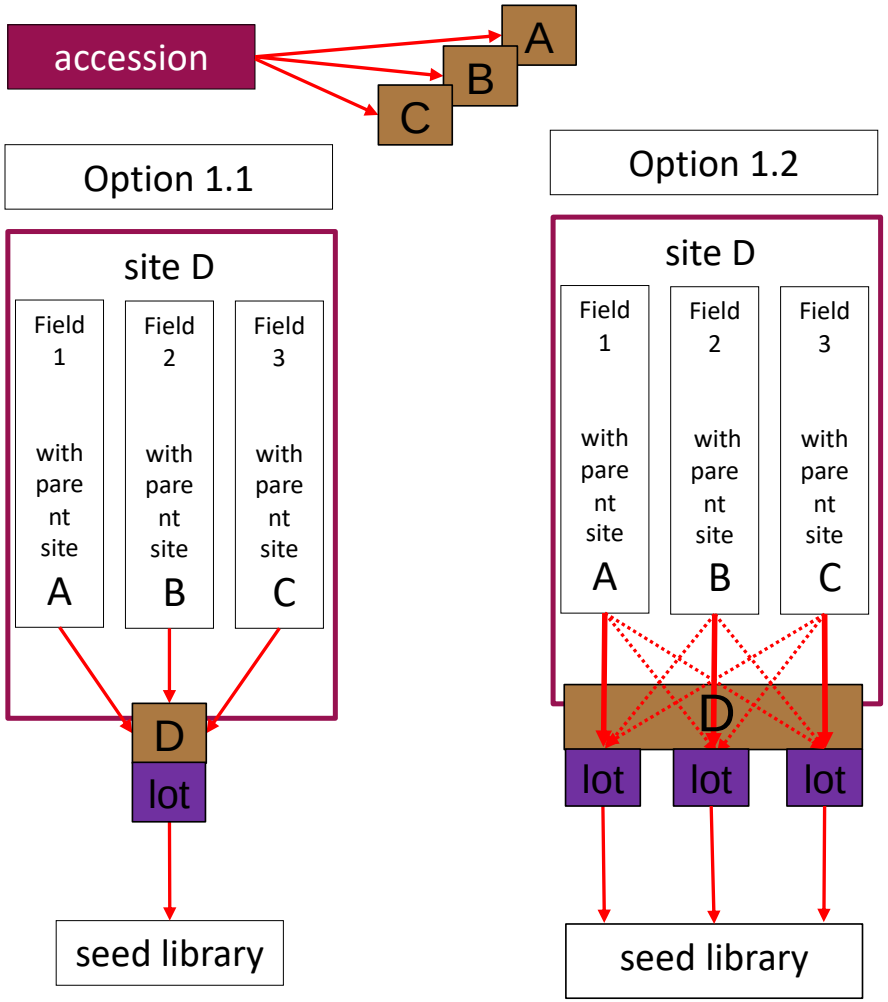
A: to mix the gene-pool of conservation units (different seed lots from different provenances) to improve vitality of an accession or a specific conservation unit in the field.
B: to mix the gene-pool by mixing the seeds of three different seed lots in the seed library by taking the same quantity of seeds from each seed lot. (For details see table below).

Before we start creating mixtures/population as a part of dynamic PG diversity management, we have to consider several questions/preconditions:

- You have to know the quality and purity of the propagation material of every lot you want to mix.
- You need to know the source (provenance, provider data, etc.), phenotype and genotype of the different PGR you want to mix.
- You need to keep the trace and link of every part/lot you use to create the new population.
- You need to store and monitor the history of every part.
- You need to describe what you have done (create metadata).
- You need to have enough seeds of every lot you use for the mixture.
- You have to decide if you want to keep the parental lots and propagate them in parallel to the mixture (create a new accession) to have the possibility of future comparison.

The procedure of mixing the gene-pool is an integrated part of managing diversity within the dynamic conservation management system. ProSpecieRara is drawing a line here between dynamic conservation management and breeding activities (see chapter 3).

Mixing genepool of an accession in field (cross pollinated)

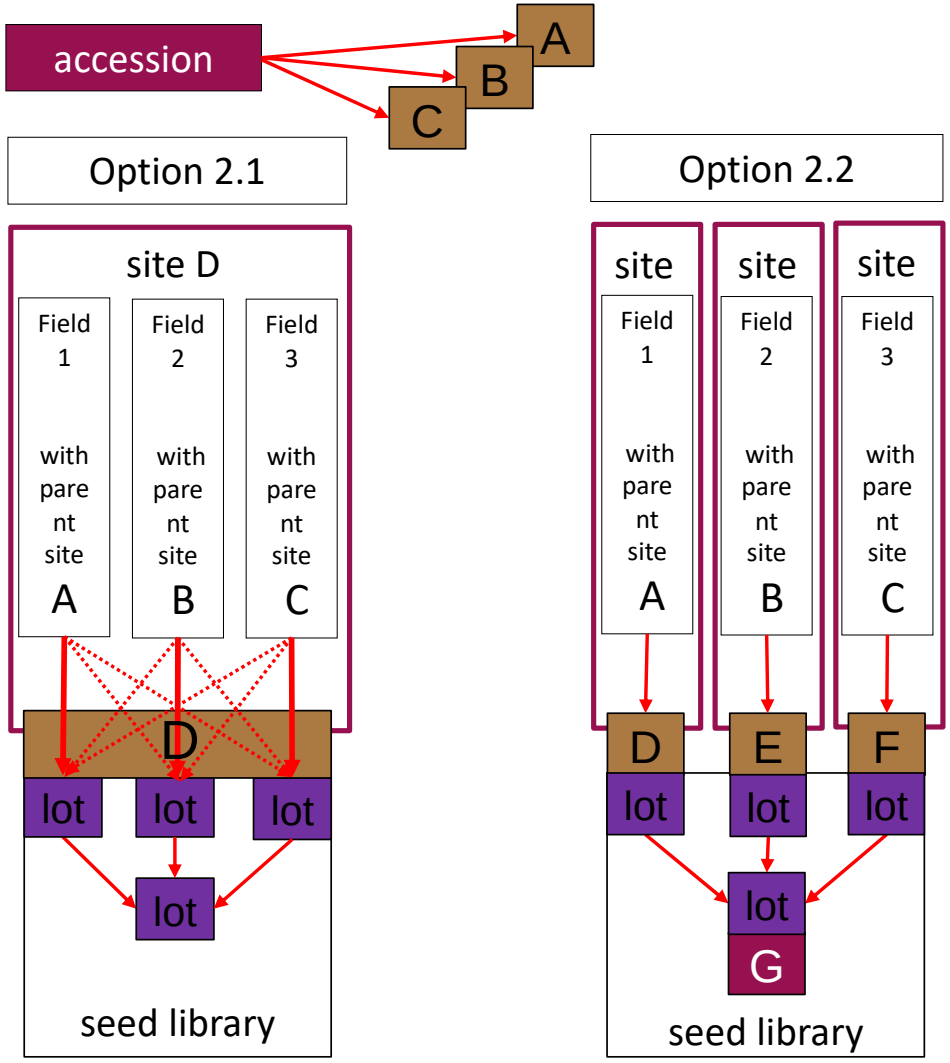


Option 1.1
Creating a new unit adapted to a specific site by letting the three parent units flower side by side and pollinate each other

Option 1.2
Improving genepool and vitality of three parent lines A,B,C by letting the three parent units flower side by side and pollinate each other. To store them in the library as three seed lots. To create three new accessions could be optional and could depend on how many times this process has been repeated.

fatherly inheritance

Mixing genepool of an accession in seed library



Option 2.1
Creating a new unit adapted to a specific site by letting the three parent units flower side by side and pollinate each other. Mix the lots in seed library.

Option 2.2
Creating a new accession (new mixture or population) by propagating the three parent units at three different sites (or under isolated conditions) and mixing the seeds in the seed library. Taking the same quantity of seed from each conservation unit.

fatherly inheritance

Arche Noah

Data collection and management	Infrastructure (storage, cleaning, etc.)	Seed quality management, variety control	Monitoring system
Data management currently comprises two systems: **The genebank database:** an offline system managing passport data, varietal information, storage and seed quality data. It also contains information on accessions/varieties from the collection managed by private seed savers. Centralised data is managed and edited by Arche Noah staff. **The seed savers database:** an online resource containing private collections and segments of the genebank that are currently available for distribution. Contains varietal information and basic data on the origin	The CSB Arche Noah's working collection is held in an **air-conditioned seed storage facility** with a 40–45% humidity, ambient temperature where seeds are stored for 5–10 years. Backups of the working collection and samples of short-lived seeds are stored in **freezers** at -18^{0}C. Threshing is done post-harvest with a stationary thresher. Fine cleaning is carried out manually applying a set of **hand-sieves and slotted sieves.** **Tubers and roots:** hardy species are managed in a field collection (e.g. garlic). Frost-sensitive species are stored in earth cellars (e.g. potatoes, yacon, biennial root crops) or in frost-free dry compartments (e.g. onions, shallots) or glasshouse.	Initially, seed quality control is carried out visually. Later on, accession samples are **tested for viability** after being returned to long-term storage. Beans are deep-frozen for two weeks shortly after harvest to eradicate bean weevils. Before sowing, major vegetable seeds are treated with hot water or hot steam treatments (e.g. Brassicaceae, carrots, celeriac, cucumber etc.). Approximately 500 varieties are grown in two gardens (demonstration garden and propagation garden). The potato collection is cultivated in a farmer's field. Regeneration of genebank accessions is under the attendance of genebank staff responsible for data collection, varietal control and quality control (diseases). Approximately 100 accessions (mainly annual, self-pollinating crops) are additionally managed by seed savers on a rotational basis. Seeds returning to the genebank undergo the same quality control as mentioned above. Standardised descriptor sheets contribute to data collection, guides field observations (homogeneity, varietal control, crop evaluation) and document the cultivation	The database provides basic data and queries for monitoring: ● Amount of seeds per compartment (medium-term, long-term facility) and harvest year. ● Results of germination tests. ● Basic data from field observations: population size (cross-pollinating crops), health status/disease symptoms, seed treatments, selections applied. As for seed savers, only data from annual regeneration of genebank material is documented. Other material from the seeds savers is only checked for the plausibility of the data provided (botanical information, no commercial varieties/variety names, etc.). This material is managed separately from the genebank as private collections.

of the material. Distributed data management; each seed saver edits their own data. Arche Noah does basic checks (botanical information, no commercial varieties allowed)		process.	

Stakeholders and their roles

Seed savers	There are approximately 300 active seed savers, a small share of the Arche Noah members. These engaged members choose if they want to be a “variety-tutor” or “seed archive gardener”. “Variety-tutors” choose one or more varieties, which they grow and return seeds to Arche Noah from time to time. “Seed archive gardener’s” are more flexible and propagate those varieties which need propagation most urgently. It is also possible to become a mentor. Mentors are contact points for certain regions and organize meetings for the members in those regions.
Researchers and genebank managers	Arche Noah co-operates with universities from time to time in different research programmes for pheno- and geno-typing of accessions. Arche Noah works closely with the public in specialised working groups and through non-university research stations. There is little to no exchange with other Austrian genebanks.
Farmers	There are farmers (“Vielfalterbetriebe”) who produce rare varieties, mainly for direct marketing. Some of them propagate seeds on behalf of Arche Noah. Some of them sell seedlings of rare varieties at seedling markets, which are organized by Arche Noah.
Breeders	There is loose contact with several breeders, mainly in Austria and Germany. e.g. Saatzucht Gleisdorf who support the screening of faba bean accessions and Culinaris (exchange and screening of varieties).
Seed companies	The seed and breeding company Reinsaat sells ~ 200 varieties which originate from the Arche Noah seed archive (~ 25 000 packages per year).
End users: gastronomy, supermarkets	Gastronomy is an important partner for “Vielfalterbetriebe” and in some cases they carry out marketing for Arche Noah varieties through their social media channels. One supermarket chain sells Arche Noah seeds and shares information to its customers about agrobiodiversity. One gardening market sells Arche Noah seeds and seedlings. One fruit producer sells the juice of rare apple varieties.

Magház:

Data collection and management	Infrastructure (storage, cleaning, etc.)	Stakeholders and their roles	Seed quality management, variety control	Monitoring system
Data is managed by the individual core members for their own collections. A central database is being worked on a to contain what is managed where with a description (including data from variety trials) about for example is there enough seed for marketing/exchange and other data (e.g. from which year is the given cultivar maintained on the spot, what's the source, was there any selection done, is it out-sown each year etc.)	The collection is managed decentralized by the individual growers, under various conditions, but it is suggested to store the seeds in glass jars at a 20–25% relative humidity and at a stable temperature, (preferably below 20˚C), avoiding direct sunlight for the working collection. Two members have a duplicate stored in their freezers at -20˚C (80% of the collection). Each hub gets a set of hand-sieves for cleaning. Tubers and roots are stored in cellars during the winter, or outside for hardy varieties. A black box safety duplication of the most valuable accessions at the National Genebank is planned.	There are about 1,000 people in the Magház Facebook-group. Most of them are loosely connected with the network, but some of them (40–50 people) can be engaged when there is a need for volunteers. Every year there are about 30 seed-swaps organized in the country, they are not Magház events, but inspired and sometimes supported by best practice and seeds from Magház. About 20 people participate in the variety trials, which were initiated in 2019.	There is currently no central quality and variety control management. 2–3 skilled, experienced members propagate the seeds for seed swaps. 2019/2020 internal education has been carried out for variety maintenance, ecological plant protection and seed quality control, especially for hub coordinators, to ensure everybody operates at the same level and to the same protocols.	A database and monitoring system is under development.

Danish Seed Savers (DSS)

Data collection and management	Infrastructure (storage, cleaning, etc.)	Stakeholders and their roles	Seed quality management, variety control	Monitoring system
Frøsamler databasen (DSS database) is the backbone of DSS plant material administration. It is compatible with the multi-crop passport data system and also contains specific DSS fields. It is used to make the biennial seed lists, by crop coordinators as a tool to manage the adoptions system and to secure continuous maintenance. It contains texts for the seed bags, etc. The plant description and evaluation data are stored in excel files, presently. A project assembling data from previous and current PGR projects is not integrated, but will be soon.	DSS material is stored decentralized on a daily basis by the individual growers, under various conditions. The prioritized material is included in the NordGen collection. Current plans are being developed for a black box safety duplication of the entire DSS collection every 10 – 15 years.	DSS has about 1,000 members. The stakeholder society comprises alternative crop producers, high-end restaurant chefs, farm shops, self-sufficiency growers, millers and bakers. In addition there are also other Agriculture NGOs, allotment gardens, Universities and other academic institutions, The Nordic Genetic Resources center and Museums among others.	DSS seeds are not commercial, yet, and there are no conservation varieties registered in Denmark. The seed industry is sitting hard on the market. However, some easing of the rigid seed and variety legislation implementation for non-commercial and organic seeds has been achieved. DSS is starting seed production to get into the market with more true/ authentic seeds than are currently available.	No monitoring system has been implemented. In the pipeline are: Queries to conservations farmers to confirm continued maintenance of conservation cultivars. Guidelines for a simple offspring test for outbreeders.

Structure variety	The aim is to have a minimum 2 – 3 maintainers, but this has not been achieved yet.

Accession	passport data, maintainers (seed savers)
conservation unit	Duplicates, safety duplicates.

3.3 Promotional activities

Commercial activities, labelling, markets, seed quantity, information sharing.

One of the main goals of community seed banks and similar plant diversity management systems is to provide easy access to the maintained plant genetic resources and to offer incentives to the PGR-holders to maintain and provide PGR-diversity to all stakeholders. Other crucial actions aim to attract new people to seed saving and other diversity management activities to keep the cultural heritage of seed saving and seed exchanging alive. By doing this, new technologies and new scientific findings should be tested and integrated as well, as long as they are easily accessible and adapted to the different diversity management systems. Below is an overview of the activities that the four examined organizations developed and applied to achieve these goals.

3.3.1 Awareness building

Publications, magazines, year reports:
www.prospecierara.ch/ueber-uns/publikationen.html interactivepdf.uniflip.com/2/1112/1110584/pub/html5.html#page/1
www.arche-noah.at/publikationen/arche-noah-magazine

Organization websites including microsites:
www.prospecierara.ch/erleben.html
https://interactivepdf.uniflip.com/2/1112/1110584/pub/html5.html#page/1
maghaz.hu/tudastar/letoltheto-kiadvanyaink
www.froesamlerne.dk/
https://maghaz.hu/
www.arche-noah.at/

Social media:
www.facebook.com/ProSpecieRara
www.instagram.com/prospecierara/
https://twitter.com/prospecierara
www.youtube.com/user/ProSpecieRara
www.youtube.com/watch?v=Tiyhs2HKxBo
https://ch.linkedin.com/company/prospecierara

www.facebook.com/MaghazHalozat/
www.youtube.com/channel/UCsYmBis
79baYMHBB4H60l8w?fbclid=IwAR2juVyN92IKOuvNtq-aOvFbrc-4jzq3ns-03SkK9bVtVMH3yJXu_0vbjHE
www.facebook.com/Froesamlerne.dk/
www.facebook.com/groups/froesamlerne/
www.facebook.com/pg/VereinArcheNoah/posts/

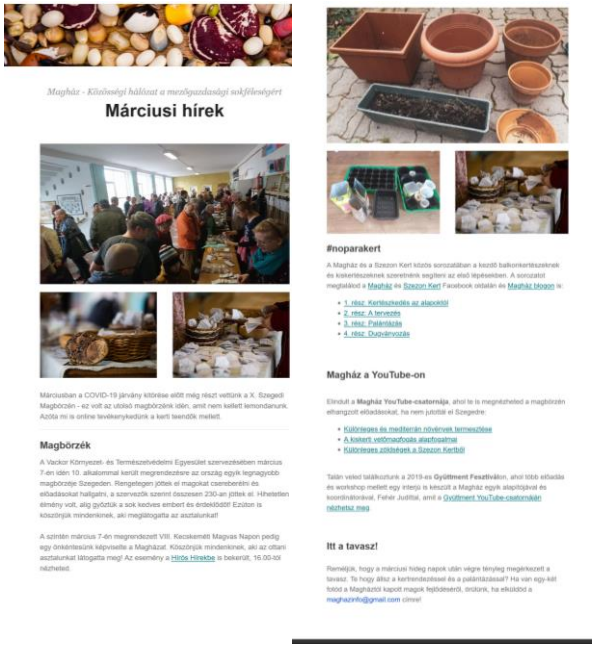
Seed swaps:

Seed swap at the ProSpecieRara centre in the Italian speaking part of Switzerland

Seed swap in Pécs, Hungary.
All seed swaps collected on a map (and listed as well) on Magház website: https://maghaz.hu/magborzek/aktualis-magborzek-es-esemenyek

Seed festival of Arche Noah in Vienna.

Newsletters:



Magház monthly newsletter
www.froesamlerne.dk/nyheder/froesamlernyt---vores-nye-magasin

Point of sale information (POS)

Infoscreen in Arche Noah Shop:
www.prospecierara.ch/saison-lieblinge.html

You tube
www.youtube.com/watch?v=Fy_i6viX6i4&t=14s
www.youtube.com/channel/UCGhF_W52If0EFZnyA-AhTQA
Magház Youtube channel: www.youtube.com/channel/UCsYmBis79baYMHBB4H60l8w
www.youtube.com/watch?v=1wzjtOIw3Rw

Exhibitions:

www.prospecierara.ch/erleben/veranstaltungen/veranstaltungen-detail/events/kuerbisland-liestal.html
"Vielfalt auftafeln": www.arche-noah.at/bohnen-vielfalt-auftafeln

Campaigning:
www.bioactualites.ch/actualites/nouvelle/vielfalt-fuer-alle-reicht-10000-unterschriften-ein.html
Magház joining global action with a commitment: www.cbd.int/actionagenda/contributions/action/?action-id=5e8343f711ea7a0001c4f655
"No patents on seeds": www.arche-noah.at/politik/kein-patent-auf-saatgut
Campaigning on the new Biodiversity strategy

Public media (radio, TV):
Ö1 – Vom Leben der Natur: Alte Getreidesorten - neue Ideen

Print media:
https://flipflashpages.uniflip.com/2/1112/352330/pub/html5.html
www.maghaz.hu/doksik/magfogasi_praktikum.pdf

Lobbying (national, international):
www.froesamlerne.dk/cgibin/uploads/media/Viden%20om/HUSDYRS_OG_DYRKEDE_PLANTERS_GENETISKE_RESSOURCER%20endelig%20version.pdf

Presentation /Guided tour/field trip:

3.3.2 Commercialisation and marketing

Fundraising activities: Calls for donations, calls for sponsorships, calls to engage as an active conservation gardener.

Pop-up shops and pop-up markets:

www.arche-noah.at/einkaufen/pop-up-store-wien

Online shops:
www.prospecierara.ch/loginnavigation/shop.html
https://shop.arche-noah.at

Reko-rings:

www.smabrukarlaget.no/norsk-bonde-ogsmabrukarlag/matnyttig/lokalmatringer/reko-network/

Marketing tools:

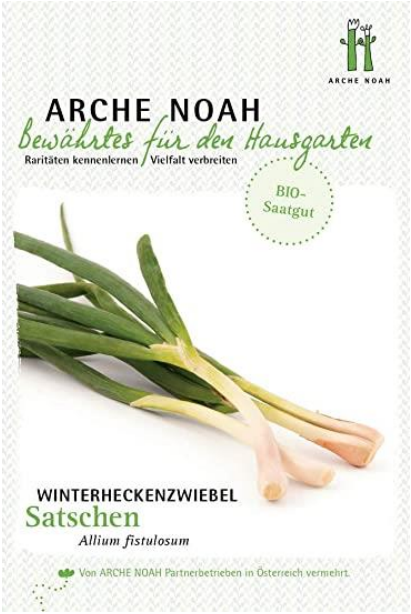
- Labelling

- Participatory guarantee systems
  www.ifoam.bio/en/organic-policy-guarantee/participatory-guarantee-systems-pgs
- Collective trademarks
  https://graniantichitoscani.com/it/
- PDO - Protected Designation of Origin, or
- PGI - Protected Geographical Indication
- www.prospecierara.ch/fileadmin/user_upload/prospecierara.ch/ueber_uns/Guetesiegel_PDFs/GS_Richtlinien_1.1.2020. pdf
- www.slowfood.de/biokulturelle_vielfalt/presidi/
- Literature: www. diversifood.eu/wp-content/uploads/2018/12/DIVERSIFOODD5.3_Communication-and-Label-Concept-for-Underutilized-Crops.pdf
- www.prospecierara.ch/erleben/karte-der-vielfalt.html

Gastronomy:
Co-operation with KochCampus: www.kochcampus.com/

Direct marketing:
"Vielfalterbetriebe": www.arche-noah.at/netzwerk/vielfalter-bauern:

Markets:
www.arche-noah.at/kalender/maerkte-oesterreichweiwww.froesamlerne.dk/markeder



Branding:
Branding example “Bewährtes für den Hausgarten” + Logo for the seed packages of Arche Noah

Farmer’s markets and shops:

Developing platforms where farmers can offer their products.

Artisanal seed companies:

Little seed companies with a network of farmers that produce heirloom seeds. The seed companies do the packaging and store the seeds.

Seed catalogues online:

www.froesamlerne.dk/sortsdatabasen
https://sortenhandbuch.arche-noah.at/
www.prospecierara.ch/pflanzen/sortenfinder.html

3.3.3 Know-how and transfer exchange

Know-how transfer and exchange, courses, workshops, expert meetings and lectures about hands-on seed saving at beginner and advanced levels.

Policy workshops:

Workshops and lectures in hands on seed saving at beginner and advanced levels. Workshops and courses on seed saving and environmentally-friendly gardening methods. (Magház).

Participation of Magház in the roundtable of Agroecology conference 27.11.2019.

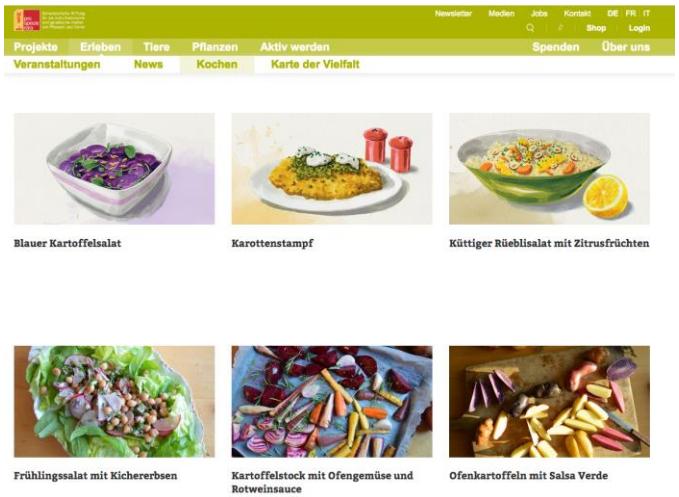
Public science activities:

www.prospecierara.ch/erleben/news/newsdetail/news/rueckblick-auf-diezukunftswerkstatt/detail/News.html

Participatory breeding activities:

[www.semirurali.net/attivita/?filter_tag[0]=](www.semirurali.net/attivita/?filter_tag[0]=)

www.arche-noah.at/sortenerhaltung/sorten-entwickeln/das-bauernparadeiser-projekt



Cooking and recipes

www.prospecierara.ch/erleben/kochen.html
Co-operation with KochCampus: www.kochcampus.com/
https://fooby.ch/de/suche.html?query=prospecierara&start=0&filters[treffertyp]=rezepte&y=0&x=0
https://www.arche-noah.at/bohnen-vielfalt-auftafeln/unsere-lieblingsrezepte-mit-bohnen

Forum (internet know-how exchange platforms) Wikipedia, Facebook groups etc:
https://forum.mein-schoener-garten.de
https://forum.charlesdowding.co.uk
www.hausgarten.net/gartenforum/

FAQ:
www.gardenorganic.org.uk/faqs

Live sessions/webinars for technical advice:
www.facebook.com/MaghazHalozat/videos/606603239937113/

TED-talks:

https://www.ted.com/talks/esther_meduna_why_our_future_relies_on_the_genetic_diversity_of_food/transcript

3.4 Main differences between CSB and "formal" genebanks

Main topics	"Formal" genebank	Community Seed Bank
Organizational structure	State institution	From single person initiatives to community based organizations (association, foundation, network without legal status, etc.).
	Centralized structure	Partly decentralized (network – structure)
Actors	Employees (scientists, practitioners), occasionally farmers and breeders (if project available)	Network member volunteers (gardeners, farmers, horticulturists, etc.), employees (scientists, practitioners).
Funding structure	State, Public Private Partnerships (PPP), projects	Private (members, sponsors, foundations, etc.), public (EC, state,

		region, municipality), commercial activities, NPO
Communication strategy – Knowhow transfer	Towards scientific and breeder community. Case by case policy makers too. Specific and science focused communication. Specific communication to farmers.	Broad public (sponsors, donator), practitioners (farmers, gardeners, horticulturists), governmental decision makers and politicians. Integrative and comprehensive communication.
Quality management for PGR	Aiming at a common and internationally agreed certification system based on protocols and standardized procedures. Monitoring only internal genebank activities. Support to on-farm conservation strategies.	Aiming at quality systems that are best adapted to the needs and actual situation (financial and structural) of the CSB. Monitoring of PGR can include the whole network (e.g. genebank plus PGR providers and recipients).

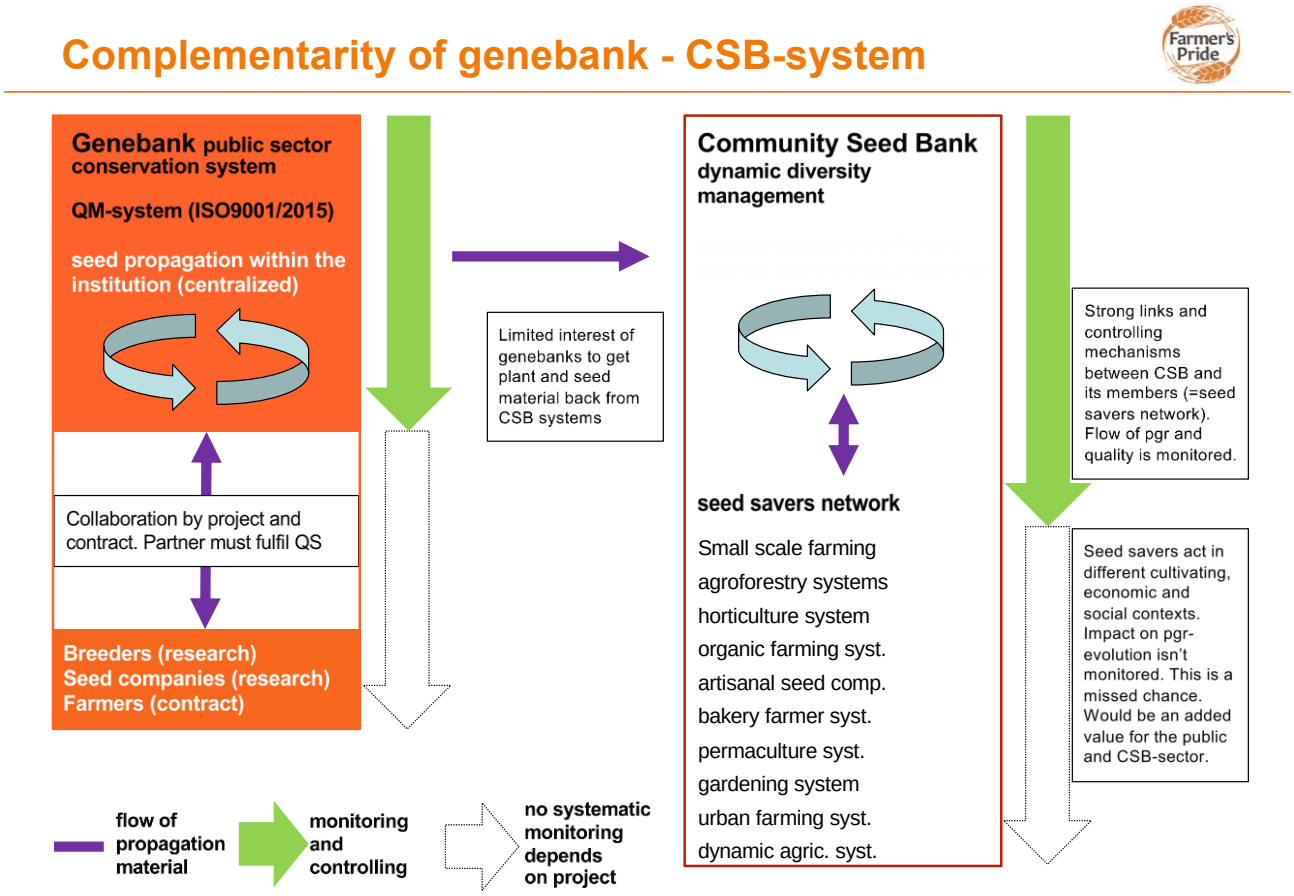
Choice of plant material	Due to national breeding programmes, genebank managers interest, national agrobiodiversity strategy (if existent). Only recently international coordination and sharing of responsibilities (e.g. AEGIS).	Based on CSB strategy developed by network members based on public or founder's interests as well as financial and network capacity. Often national or regional focus.
Breeding	Providing PGR for breeders for targeted breeding activities mostly for resistance. Aiming at specific and homogenous varieties. Varieties adapted to industrial agriculture.	Evolutionary breeding mostly aiming for tolerance. Varieties with a less homogenous calibration spectrum. Aiming at varieties that keep its adaptation capacity to different agricultural systems.
Governance	Public mission based on national and international law/agreements/protocols	Based on common agreed values, shared visions and missions and on agreed statutes and bylaws. Social aspects are key.
	Hierarchic, top down	From hierarchic to democratic structures, bottom up – top down
	Bound to governmental obligations	NGO, representing interests of the community

4. Tackling future challenges

In this chapter, three of the four CSBs give insight, analysis and ideas of where and how they want to invest more effort to tackle future challenges to fulfil their own missions and visions.

4.1 ProSpecieRara

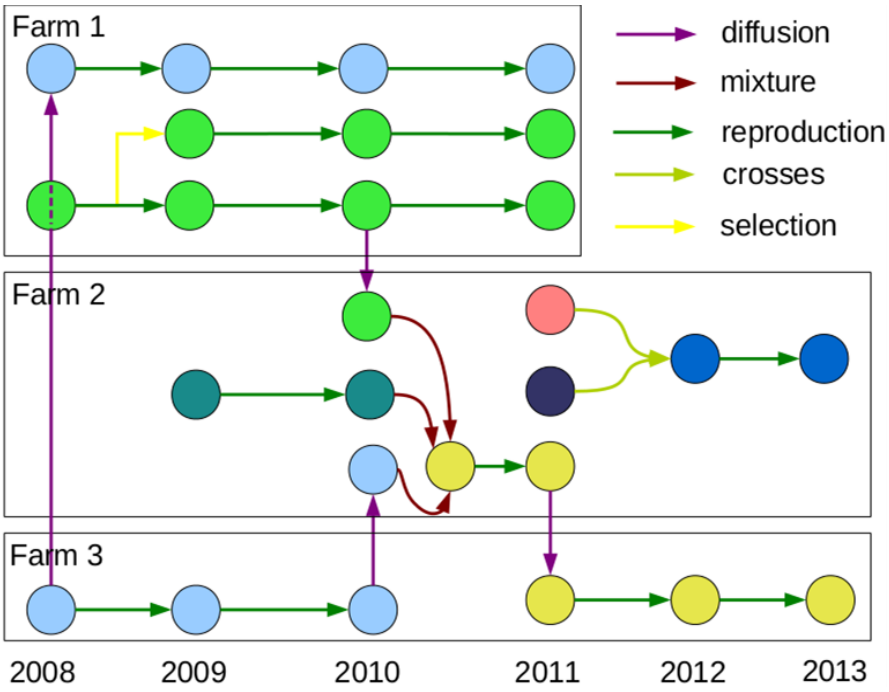
Combining PGR with use and agro-ecological and horticultural environment. In future, ProSpecieRara has to monitor its plant genetic resources in different contexts and focus on activities that are complementary to the genebank and *ex situ* tasks. The ProSpecieRara CSB manager, together with his networks, will promote, monitor and document activities that combine information about genetic resources with the people and the agro-ecological environment in which they operate.



Demarcation between dynamic conservation management and breeding activities in the case of ProSpecieRara: At the moment the population and PGR diversity management system of ProSpecieRara is a linear system (see table Farm 1) and concentrates its monitoring capacities on a dynamic conservation strategy. Dynamic population management activities, like developing new diversity by mixing gene-pools and fostering adaptation processes on different sites, have recently been integrated in the monitoring system (Farm 3).

If breeding activities like conscious and targeted crossing of accessions or varieties and conscious selecting of new pheno- and geno-types will become a task of the diversity management system of ProSpecieRara (Farm

2) we will have to collaborate with complementary systems like the one “Réseau semences paysannes” or “Rete semi rurali” (developed in collaboration with INRA) are using for their participatory breeding activities with cereals. How to link ProScpecieRara information to the data management and statistical analysis tools is not yet solved, but it would be an added value and complete the dynamic PGR diversity management system of ProSpecieRara. At the moment ProSpecieRara is to provide mixtures/populations and to accept new material coming from breeding activities with those populations by creating a new accession. The documentation of the breeding process that has ended up in the creation of the new accession will be lodged with its passport data.



Goldringer I., Rivière P. 2018: Methods and tools for decentralized on-farm breeding. Booklet#3.

RSP/INRA data bases and R packages can answer most of the needs regarding data management and analysis of Diversifood partners.

- http://moulon.inra.fr/index.php/en/tranverse-team/atelier-de-bioinformatique/projects/181
- https://github.com/priviere/shinemas2R
- https://github.com/priviere/PPBstats_web_site

4.2 Arche Noah

Arche Noah wants to improve its Community Seed Bank activities in many different areas in the future. Beyond necessary professionalization, changes are driven by the needs of the seed archive (quality control: limiting diseases, ensuring seed vigour, maintaining varietal purity, avoiding genetic bottlenecks) and by the limitations of finances and by the needs and capacities of the seed savers.

- Emphasis will be shifted from seed archive gardeners (described in chapter 2 – seeds are returned each season to the seed archive – similar to type 2 model) to variety tutors (similar to type 3 model – seeds remain with the seed saver, who can distribute them to other people in the network). Small amounts will be stored in the active collection of the seed bank as well as sufficient samples in long-term storage, but the main distributor should be the seed tutors via the seed handbook (formerly printed list, now online portal for seed exchange), and only occasionally the seed bank itself. Type 2 Model has had its drawbacks in that the seed amount and quality received from seed archive gardeners has often been

insufficient recently, due to seeds being sometimes rather old and tricky to germinate and not necessarily adapted to the respective sites The type 3 model emphasizes the continuous cultivation of varieties in locations, provided suitable varieties have been identified, and allowing for progressive adaption, diffusion and establishment in the particular areas. In any case, both seed archive gardeners and variety tutors will need training to improve conservation and seed quality.

- The show and propagation garden shall not be a location of tourism, aiming at high visitors numbers, but rather focus on communicating seed saving knowledge and crop biodiversity to the visitors. Regeneration of valuable plant material will be the main emphasis.
- The genebank database is currently unified and will be developed further by combining the databases on fruits and seeds.
- The seed handbook will be developed into a tool for monitoring of in-garden and on-farm conservation.
- We want to develop a monitoring system for on-farm conservation, which is not possible at the moment due to a lack of financial means and support from the Austrian authorities.
- One step towards on-farm management will be carried out in the near future by introducing variety conservation or dynamic management as a criterion for the distinction of the Arche Noah Vielfaltsbetriebe (diversity farms).
- Gaps between Arche Noah's conservation and breeding activities must be closed. Currently, use of collection material in the participatory breeding activities is limited due to available amounts (esp. cereals), partly insufficient description and resistance by Arche Noah members (against the use by breeding companies).
- Through different international projects, Arche Noah has re-established connections to CSBs in countries where parts of its collections derive from and has partially repatriated this material. The CSBs in those regions could be seen as hubs of *in situ* conservation in the future, giving back information on the seeds to Arche Noah.

4.3 Magház

There is a plan under development to create a database. This database is intended to contain the datasheets of the varieties in the collection, which would serve as a data management system at the same time. Furthermore the users will be able to list the varieties from the database, creating a catalogue.
The database will be organised in libraries of species/families.
The different varieties within a species have a datasheet, containing:

1. botanical features/description (self-pollinating/cross pollinating, perennial/annual etc.)
2. description of the variety (based on the variety trials in 5–6 locations all over the country)
3. photos of the variety
4. suggestions for cultivation (based on species needs and feedback from variety trial partners) and use (e.g. fresh, dried, canned tomatoes, recipes).
5. Information about availability (limited amount for members only/can be purchased/not available etc.)

The catalogue will be updated once a year, in winter, after collecting the results of the variety trials and collecting information about the volume of seeds harvested in the given year.

5. Conclusions/recommendations

Conclusion

CSBs are civil society networks (8) where plant genetic resources – mainly seeds – are intermediaries that support social relations. e.g. the exchange of seeds is not only a material exchange but also a way of making intimate connections between people and creating and supporting social relations.

The collections maintained by CSBs and the quantity of seeds can only grow when the network and the number of its members grows as well. If CSBs want to become successful and sustainable they have to manage and foster the quality of PGR and the social relationships between people at the same time (9). The diversity of communication tools and incentives CSBs have developed for their members to keep and promote PGR provide the evidence for this strong link. The need to link the PGR to its propagator and maintainer also has to be realised in the database management (10), as the example of ProSpecieRara and other CSBs show.

Defining and respecting the roles of the different stakeholders within the national network for PGR management.

To improve the effectiveness of the management of plant genetic resources in the national and international context, every stakeholder group should become aware of its specificities to enable it to foster its strengths (11; 12). In the report we have shown the complementarity of the CSB and genebank work. A complete and effective national conservation and diversity management system has to combine and support both strategies and methods. Genebanks will have to provide services not only to breeders, but to CSBs as well (13). The collaboration between the Hungarian genebank and the CSB Magház is a positive example. In the example of Switzerland, the genebank manager is a member of the Swiss commission for the conservation of PGRFA (www.cpc-skek.ch/der-skek-verein.html) that coordinates the national action plan for PGRFA and provides services to all 48 members (CSBs, NGOs, national research institutions, breeders and representatives of the department of agriculture, etc.) and is supported by the government.

Genebanks will have to support CSB activities in a way that they will be able to concentrate on maintaining broad genetic diversity, fostering adaptation processes and creating new diversity as an interesting source for different users. Exemplary work has been carried out in this sense and documented by CSBs for cereals and tomatoes (14; 15), but not for any other crop and most of the neglected crops still remain neglected. It would be helpful if CSBs and genebanks could come together, analyse the gaps and develop some projects to fill them. Complementary strategies for *ex situ* and *in situ* conservation should also be promoted.

Monitoring and data management systems

This report makes it evident that many CSBs have databases, but they need to improve their monitoring systems to be better able to document and conduct their diversity and seed quality management (10; 15). The database has to be a tool that's fit for the environment CSBs are operating in and to their organizational evolutionary state. For example, for ProSpecieRara the functionalities that their database had to fulfil were linked to the question as to whether the database had to be used as a tool for breeding activities (targeted crossing of traits) or to be able to monitor population management activities on a specific site (see pages 34–36 and 52).

The monitoring processes should be able to collect and analyse data that will be able to create a picture of the conservation status of a variety/PGR at a specific site. To validate the status of a PGR we have to differentiate between different stakeholders that keep it. For example, it makes a difference if the PGR is kept by a professional seed company, or in a family garden of a seed saver, or in a farmer's field, etc. By collecting this data the CSB manager gets a picture of the conservation management status of a specific PGR.

Based on this information, decisions can be taken on the next conservation management steps to take to improve the status and conservation status. The ProSpecieRara database is a first attempt to reach this goal.

Although many CSBs have their own data management system (10), very few efforts have been undertaken to improve data exchange between the organizations. The data model of ProSpecieRara is linked to the national database for PGRFA, which is in turn linked to EURISCO. Perhaps this model could be used as a structure to ease data exchange between the different European CSBs. The national authorities are interested in integrating information coming from CSB networks, but national programmes don't provide financial support to the CSB managers to develop their own database structures that could be linked to the national database, nor do national programmes provide resources to create, format or integrate data in a systematic way and based on a national biodiversity strategy.

International structures that support CSB activities in different countries

If we want to harmonize CSB activities in a way to improve data-exchange, knowledge exchange, policy work and exchange of PGR among them, CSBs need to collaborate at least at a European level. For Europe, the network of CSBs "Let's liberate diversity" that began in 2012 with a seat in Brussels and its headquarters in Scandicci, near Florence, is a European CSB network that has the capacity and the knowledge to coordinate international activities together with the national CSBs, and provide services for its members to offer solutions for the needs described above (https://liberatediversity.org).

CSBs and climate change

Methods to create more diversity on farms by mixing gene pools and fostering adaptation processes will become more and more important to create more diversity to offer more options for farmers, gardeners and breeders to react to climate change risks (16; 17). CSBs can play a very important role here by using and offering their networks as fields to experiment with how to cope with climate change challenges (18). International collaboration, allowing e.g. easy PGR exchange across national borders and regions, will become a precondition sine qua non. All these facts underline the efforts to improve international collaboration. Legal frameworks, like the International Treaty on PGRFA (19), can help to ease the exchange of PGR between countries, whereas phyto-sanitary restrictions can be a threat to the easy exchange of seeds and plant material across national borders and block any further development.

Link and examine PGR in different agricultural environments and systems

The existing monitoring systems in CSBs focus on the description of the PGR itself and its environmental and climatic needs but there are very few examples where you can find descriptions of the agricultural system in which a specific PGR has been grown, propagated and perhaps adapted too. As many landraces don't fit to the established mainstream agricultural system, but would be interesting for a specialized and local niche market, it would be interesting to know more about the adaptation and production potential of a landrace or population related to the agriculture system applied in a certain area. As we know that our PGR diversity is the result of manifold farmers' activities in very diverse agricultural environments over time, and that one of the reasons for the loss of diversity is the homogeneousness of the dominant agricultural system of today, it could be an interesting strategy to use more diversity by e.g. introducing it into alternative agricultural systems that exist beside the mainstream. Those local and specific agricultural systems would need PG diversity and have the capacity to create value chains that can absorb more diversity in a sustainable way (7).

5.1 Recommendation to decision makers:

Integration of CSB on-farm management activities in national biodiversity strategies, based on the global plan of action

Most national strategies content themselves by establishing a financed and formalized *ex situ* strategy. On-farm management strategies of PGR remain very vague, lacking any long-term support strategy. Integrating sustainable use and not only conservation in agriculture development concepts and national agricultural policies would complete the picture of national PGR management strategies (20). Short-term project-hopping performed by CSB-managers is a very common "sporty activity". But it makes it very difficult for them to develop a long-term collaboration strategy e.g. together with *ex situ* partners. Perhaps this report can provide a positive input by having tried to elaborate the complementarities of the *ex and in situ*/on-farm systems (see p. 55 and 56) and emphasized some actions that have to be implemented for the further development of national CSB to become a reliable and valuable national strategic partner.

Provide legal space for on farm management activities: Chapter 1. Point 4 shows that if the CSB network decides to foster sustainable use they have to cope with a national legal framework that is often an obstacle for small organizations that don't have the knowledge or the resources to cope with the administrative burdens that are often linked to them. E.g. registration of "conservation varieties" and payment of registration fees (sometimes to be repeated every year). This as an example for legal implications that don't make any sense if we consider small marketing activities as an integrative and important part of a long-term conservation strategy that wants to foster sustainable use.

Developing national negotiation and discussion platforms: National forums could avoid collateral damage when new restrictive laws (e.g. phytosanitary laws), originally meant to provide a legal framework to large industrial and internationally operating production systems, are going to be implemented but have a strong and negative impact on little national entities. We do need a legal framework that guaranties the CSB networks a space for their activities large enough to operate for the sake of maintaining, promoting and managing the diversity of PGRFA in Europe.

Lacking interest of national authorities to integrate and substantially support CSB activities has been mentioned several times. This is contradictory to the public interest for biodiversity of PGR that people have stated in several countries. e.g. 30% of the Austrian and CH-population know and can name organizations like Arche Noah or ProSpecieRara that work in this arena and they express their willingness to support related activities e.g. by buying products linked to the safeguard of agrobiodiversity.

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7. Annex

Plant genetic diversity management in community seed banks (=seed library)

7.1 Chronological steps during the year

January – March

- Last plans for cultivation spring/summer
- Sending trial set to interested parties for an introduction to seed cultivation
- Sending "Red list" of very rare varieties to selected propagators
- Sending checklists to control if seed savers still maintain their variety
- Sending various seeds to propagators (reasons: change variety, have no more seeds etc.)
- Sending seeds to contractors
- Sending seeds to show-garden owners
- Sending seeds for seedling production for markets
- Processing returned checklists

March, April, May

- Start seedling courses for beginner and seedling courses advanced seed savers
- Planting of overwintered tubers and roots for seed production (middle of March)
- Various seedling markets (end of April/beginning of May)
- Planning of second planting phase for show gardens (April)
- Sowing and planting of crops in gardens and nurseries

May - August

- Observation and documentation of the evaluation and propagation of varieties
- Visits to propagation partners
- Tastings
- Continuous seed harvest until September
- Active meeting and expert days for professional exchange
- Seed growing courses, guided tours in show gardens

September / October

- Completion of the seed harvest
- Ongoing seed cleaning, seed storage, data in database
- threshing day with volunteers. The seeds harvested in Wildegg and Basel are threshed.
- Seeds are returned to the seed library by active members. Control and storage, upload data in DB (Oct-Feb).
- To treat returns of trial sets, send information for seed courses

November / December

- Storage of the annual seed carriers to be overwintered (middle of Nov)
- Control of stored crops (Nov-March)
- Cultivation planning for show gardens
- General planning for propagation and evaluation
- Propagation planning with propagation partner (NAP, Hauser, seed nursery, projects)
- Applying for new projects, project reports.

Steps during the year	Process descriptions	Decision making processes
Springtime January – March Process description: For gardens where the partnership with the local managers is contractually regulated, ProSpecieRara often takes over the planning. If ProSpecieRara is in charge of the planning, ProSpecieRara can take the following criteria into account:	Planning of crops to be propagated urgently for criteria See page: **Error! Bookmark not defined.**	• only few seeds (< 10 port.) still available in the seed library • only old seed is still present in the seed library (duration of germination varies according to species) • only few, old seed available, no variety seed saver* available
	Characterization of new variety/accessions: fill in descriptors, taking photos, first propagation. Afterwards final decision about the integration into the conservation managing system. See page 78 and 27	• Is it an existing variety or a new variety? • Is the new entrance a better accession than the existing accessions? • Does the new variety meet the conservation criteria of PSR? • Does it make sense for PSR to accept the new variety in the context of the PSR collection strategy and the agricultural and horticultural environment?
	Comparative cultivation of two possibly identical varieties	• Are they two different types? (-> possibly separate description, see above for characterization) • Or two different accessions of the same variety? (-> accept both accessions, or just one?) • Or hardly distinguishable accessions? (-> describe only one accession, or mix both accessions?)
	Evaluation of the crop with regard to possible marketing, culinary potential including tasting. (these may be new varieties or varieties that have been preserved for a long time; ideally, this assessment is also made in the above-mentioned characterizations)	See p. 80 Assess the potential of this variety for various niche applications: Is the variety recommended or not (score 9-1) for: ...supermarket ...specialty trade ...system gastronomy, canteens ...good plain cooking

		...top gastronomy ...processing products ...seeds ...seedling offers in garden centres ...seedling offers with direct marketers (There are more detailed descriptors defined by ProSpecieRara on the BLW-DB of the NAP-PGREL)
Mailing "trial set" to interested parties for an introduction to seed propagation. **Anyone who becomes a ProSpecieRara patron has the opportunity to order the trial set. By means of two easy to propagate species (self-pollinators), first experiences in seed production can be gained (space requirements, time required). This is the first step towards becoming a "seed saver".**	• The trial set consists of a letter (appendix 1), cultivation instructions (appendix 2), a feedback card (appendix 3) and the seed. • Cultivation instructions: Depending on the crop, a detailed cultivation instruction is enclosed • In October, the reply cards and seeds from the trial set growers start to arrive. On the card you can indicate whether the grower(s) would like to take the next step towards becoming a "seed saver" and wants to attend one of the seed propagation courses or not. If so, the grower will receive a letter with information about the courses (Appendix 4). If not, a short e-mail of thanks (appendix 5). The information on the reply card will be recorded in the database. The seeds (if i.o) are collected separately from the seed library and are given for different purposes like seed donations, seed swaps etc.	• The choice of crop species needs to be well considered: crops easy to propagate (-> self-pollinated, annuals), different species with different propagation demands (-> e.g. fruit vegetables, leafy vegetables, ornamental plants), accessions with sufficient seed on stock
Mailing very rare varieties of the "red list" to experienced seed savers		**When does a variety get on the red list:** • < than 10 seed lots are stored in the seed library • and this variety isn't maintained by an assigned seed saver • and this variety is not maintained in one of the contracting partners gardens (show gardens).
	Who receives the red list varieties and what is expected of them?	The selection of potential Red List "seed savers" needs an annual update and a closer collaboration between the seed

	Approx. 60 experienced seed savers (with the note 'Red List' in DB) who are reliable and propagate these varieties and send back seeds. 1. The “Red List” is sent out with an accompanying letter (Annex 6), and an additional information sheet (Annex 7). 2. 60 seed savers choose their favoured variety from the red list. 3. The seeds are sent with a letter (Annex 8) and another information sheet (Annex 7). (Outlook) So far, there is no monitoring, e.g. asking how things are going during the season or whether seed has been received at the end of the season.	library manager and them. Regular assessment of their seed growing experience (special courses).
Mailing “checklist” and processing of the “checklists” See page 85	**What's the checklist?** The checklist regularly (once a year) collects and updates various areas of “seed savers activities” (propagation success, maintained varieties/accession, private offer, marketing activities…). The information received from the checklist are registered and deliver decision guidance for the approval of the PSR-label.	As the system compiles information of different PGR management activities as seed supply, seed marketing, seed propagation, etc. it needs to be constantly monitored.
	What must be taken into account when processing the checklist? PSR has defined many different cases that trigger different processes in the team.	**In the future** it should be analysed how the checklist feedback is developing, increase/decrease of mutations, increase/decrease of seed savers, etc.
Recipients of mailings	Short portrait of the different types of propagators (seed savers, contract propagators, show garden owners, market suppliers, etc.) see page 33	
What data are recorded in the database about the seed savers? **See page 84**	All inputs and outputs are visible in the address database. The “checklist” indicates which varieties are propagated, offered privately or marketed commercially. In the comments field to the right of the address, a note is made if a propagator is a professional, does a very good job, etc. Under History the attended courses and events are noted.	Often the seed savers are willing to propagate varieties that have been suggested by the seed library manager at PSR. Proposals from PSR take into account various factors in addition to the urgency of propagation: to complete lacking descriptors of cultivars and varieties, assessment of the experience of the seed savers, assessment of the suitability

		of an accession to local and regional environment, cultural and historical aspects, adaptation to specific cultivation methods, etc. These factors are prioritized differently from seed saver to seed saver and it needs additional plausibility checks by experts. Experts meet regularly in specific working groups representing the marketing chain (coordinated by PSR) or coordinated by the department of agriculture to fulfil the objectives of the national plan of action for PGRFA.
March - May **Planting of overwintered tubers and roots for seed production (middle of March)**	**What has to be observed in particular? How many tubers do we need?** Biennial cultures overwinter either in winter bed or a cellar or in a conditioned cell. Around mid-March, the cultures wintered in the bed are dug up, selected and replanted. Cultures wintered in the cellar/conditioned cell are also selected and planted. Biennial cultures are cross-pollinated. At least 60, preferably more roots or tubers should be planted.	Were overwintered tubers or roots are the same as the edible part of the plant, it is recommended to choose those with good storage capacity. Top priority is always to have a sufficient number of seed carriers, which sometimes means to take tubers or roots of minor quality as well.
Sowing and planting of crops	**What has to be considered in particular when it comes to sowing and planting crops for propagation and not for production?** Sowing for seed production is often done earlier in the year in a way that the growing season is long enough for the seeds to ripen (e.g. annual, summer flower). For this reason plants often have to be pre germinated. For very small amounts of seed, the plants should also be pre germinated, even for crops that are otherwise directly sown (root vegetables). Planting is done with a larger distance between the individuals so that they can develop well and vigorous. Biennial species are sown and planted rather late, not to grow too large and “over-developed”. This way hibernation will be more successful.	Some species can be propagated biennially or annually, some biennials are spring crops but should not be planted too early for propagation. In such cases, the biological reproduction cycle and the desired growing season may conflict with each other and a balance must be found between good reproduction and selection criteria. If necessary, use alternating propagation cycles/methods. **Reference to literature** Heistinger A., Handbook of Seed Gardening, Ulmer Verlag, ISBN 978-3-8001-6991-7

	How many plants for self-pollinators and how many for cross-pollinators? Varies by species. Cross-pollinator at least 60, self-pollinator 6-12 plants, field plants such as cereals etc. at least 2 m^2. (Appendix 9) **Isolation distances** Depending on pollination type: (Appendix 9) **Technical isolation** The seed growing course provides intensive information on the various possibilities of technical isolation. Together, an isolation tunnel with insect protection net is built and information about the use of pollinator insects is provided.	
May - August **Observing and documenting the description and propagation of accessions during the summer months**	**How is documented and what is documented (how often)** Especially with new admissions we have little or no information about the appearance or growth characteristics. The appearance is recorded with photos for the DB, growth characteristics are recorded with descriptors and text.	
	Selection measures In most cases, negative selection is used, since only in rare cases a large stock of seeds is available to make a positive selection.	For those plants that allow selection only after flowering, it is necessary to decide which selection makes sense and whether the remaining plants might have been pollinated by the dismissed plants. In the case of indeterminate plants, all flowers/fruits of the remaining plants should be eliminated after selection. This way a proper propagation can still be achieved. In other cases, where this is not possible, selection progress is inevitably slower.
	Selection of seed productive plant parts? Care is taken to ensure that the minimum number of seed producing plant parts can be maintained as long as possible. Plants that do not correspond to the variety type, weak or diseased plants will be eliminated.	Top priority is always given to a sufficient number of healthy seed producing plant, which in some cases may result in adding weaker plants not to undergo the minimum quantity of plants.

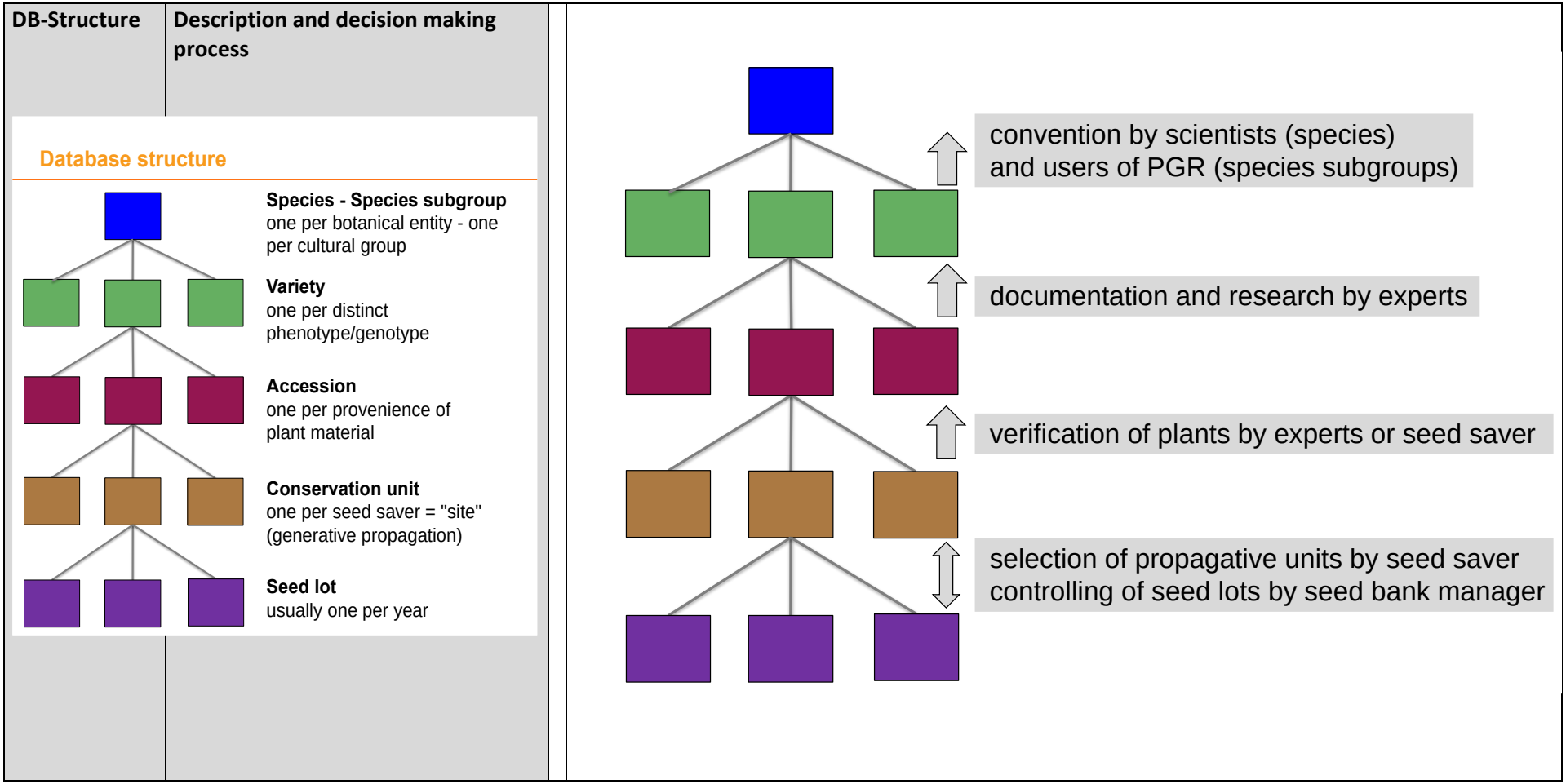
Meetings of experienced seed savers and expert day for professional exchange	There is the meeting for very interested hobbyist seed savers and the knowledge exchange day for very experienced and rather professional seed savers The hobbyist seed saver meeting promotes the exchange of knowledge and seeds between participants, whereas the professional day is a further education day with input from experts of ProSpecieRara and others. About 40 people take part in the seed savers meeting, often the core group and interested new seed savers who have already passed the seed propagation courses of PSR. Together we visit a place that is connected to our work, e.g. a professional business like the Gartenbauschule Hünibach or a private garden of an active person. The company/garden will be introduced in a guided tour. There is also enough time for exchanging knowledge and seeds. The programme includes a rich buffet to which each participant is contributing. Often plants from the own garden are cooked for this meeting.	The exchange of seeds, but also of knowledge among the participants is an important factor at these meetings. The individual needs and interests of the participants will be taken into account, and the expert have to tackle those in an appropriate way.
	The expert day will also take place at a location that is in contact with us, e.g. Sativa, Solodaris or the ZHAW. During the whole day there will be various guided tours and workshops that can be attended and which are related (e.g. beneficial insects) or more closely related (e.g. propagation of biennial crops) to variety conservation	It is important to assess the participants' experience and knowledge and to determine the agenda items and the expert presentations according to this topic and the needs of the participants, but also the needs of PSR. Often the meetings are attended by the same seed savers repeatedly and a further development of the know-how can be expected. On the other hand, there are always new propagators and the public is quite heterogenous. An offer of different topic-blocks, from which each participant has to make his choice, can resolve this. (Outlook) New forms are emerging - network meeting
September - October **Seed quality management: seed cleaning, seed storage, inclusion of**	**Testing the seed** ● The seed is only checked visually. ● Only very clean seed should be stored. Other particles such as soil residues, dust, plant material can carry	Was it harvested at the right time or too early? Is it well dried? Did it smell good? Are there signs of any seed-borne diseases such as burn marks? Seeds that have not been cleaned properly are cleaned afterwards. Seeds of

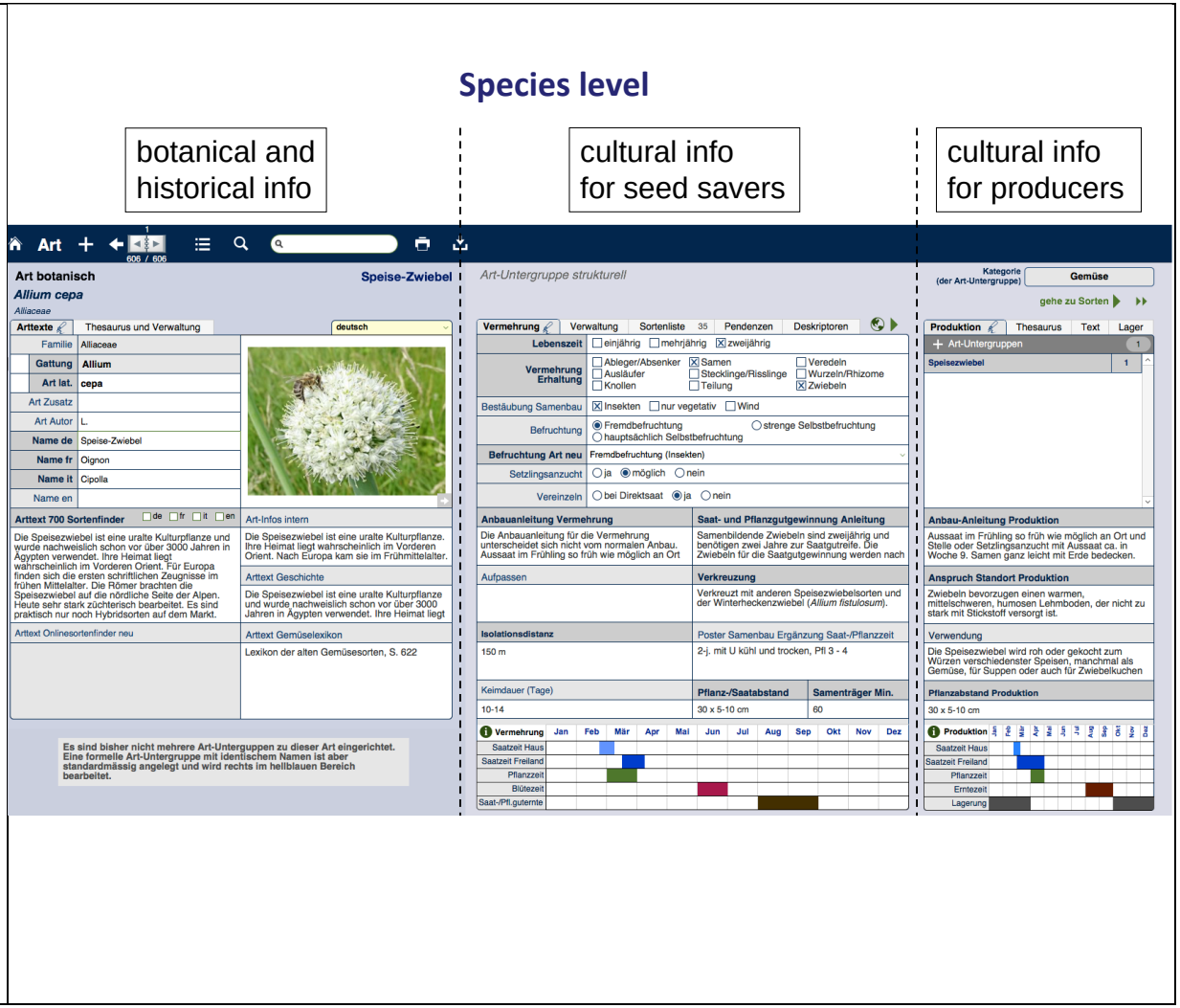
new varieties, data management **For details see page 81**	germs and falsify the weight of the seed lot. Clean seeds sent to propagators is also a reference how we would like to receive the seeds (as clean as we would like to send them we would like to get them back). • We cannot do any germination tests. On one hand we lack the infrastructure (germination cabinet etc.), on the other hand we receive many, often smaller lots, which are too small for a reliable germination test. For representative results a larger amount of seeds, at least 800 grains, is needed. • In Some special cases germination tests are organized with partner institutes that offered the service. E.g. if new seeds have to be stored in the long-term storage (freezer -18^{0}C = base collection and backup) the germination rate is evaluated before. **Which data must be recorded in this step:** Seed saver, variety, weight. If available, additional information such as germination rate in %, elite seed, quality defects, if seed still has to be stored because we cannot do without it.	insufficient quality are not transferred to the seed library if possible.
Returns of seeds from seed savers to the seed library. Control and storage, input of data in DB (Oct-Feb).	An immediate, easy-to-trigger standard feedback via email to the seed propagator should enable quality improvement and appreciation for his work. (Not yet implemented)	A quality assessment with standard, possible values must be determined. In case of negative feedback, it should be possible to attach tips and individual recommendations.
November – December **Overwintering of reproductive plant parts**	The plant parts used for seed production are carefully dug out as late as possible but before the first frost. At this time, no selection is made, only specimens that clearly do not correspond to the type of variety are discarded. The seed productive plant parts are stored in slightly humid sand or slightly humid sawdust so that they do not touch each other. Regular inspection and continuous removal of rotting plant parts during the winter.	

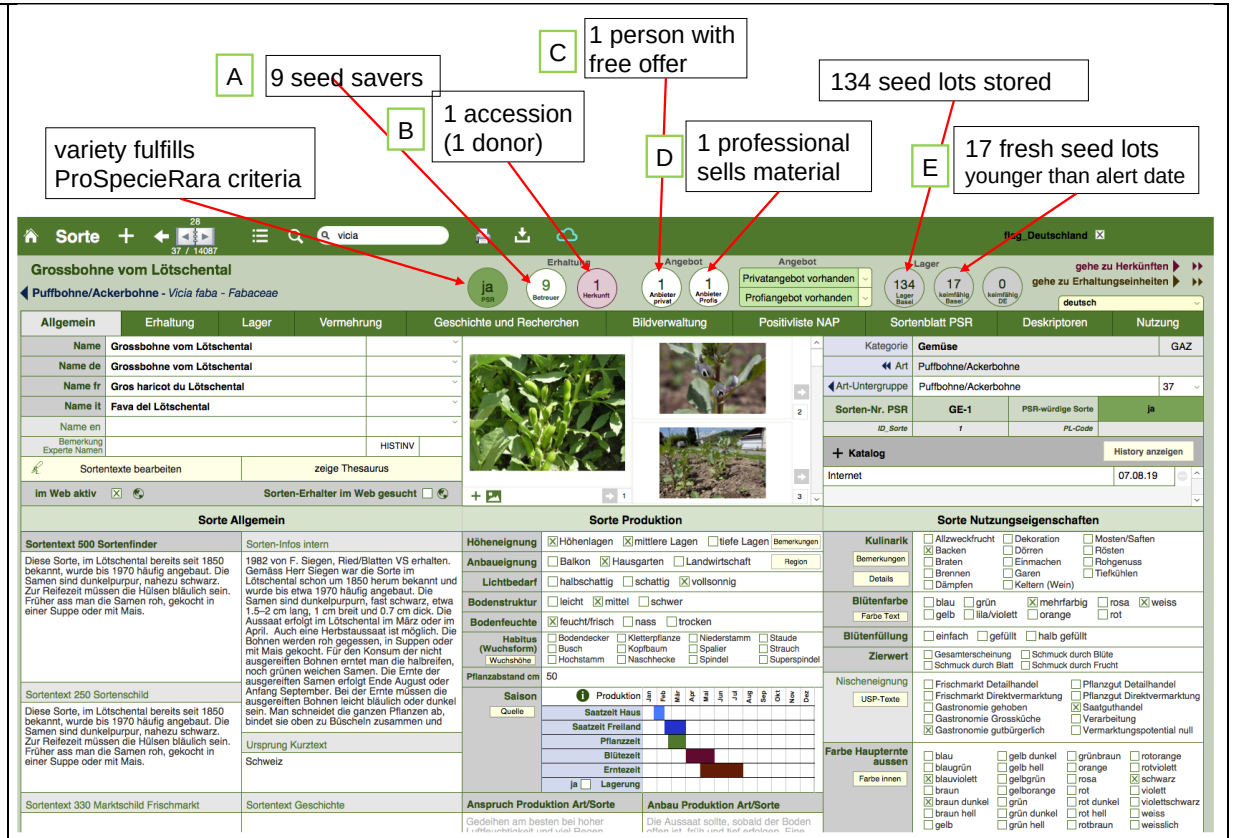
Are stored seed-bearing plants included in the inventory?	The seed productive plant parts are stored for a maximum of four months during winter. These plants are not part of an inventory.

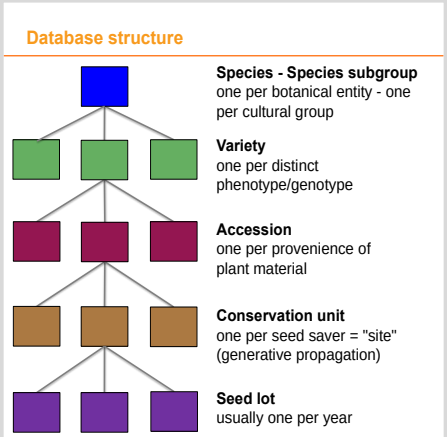
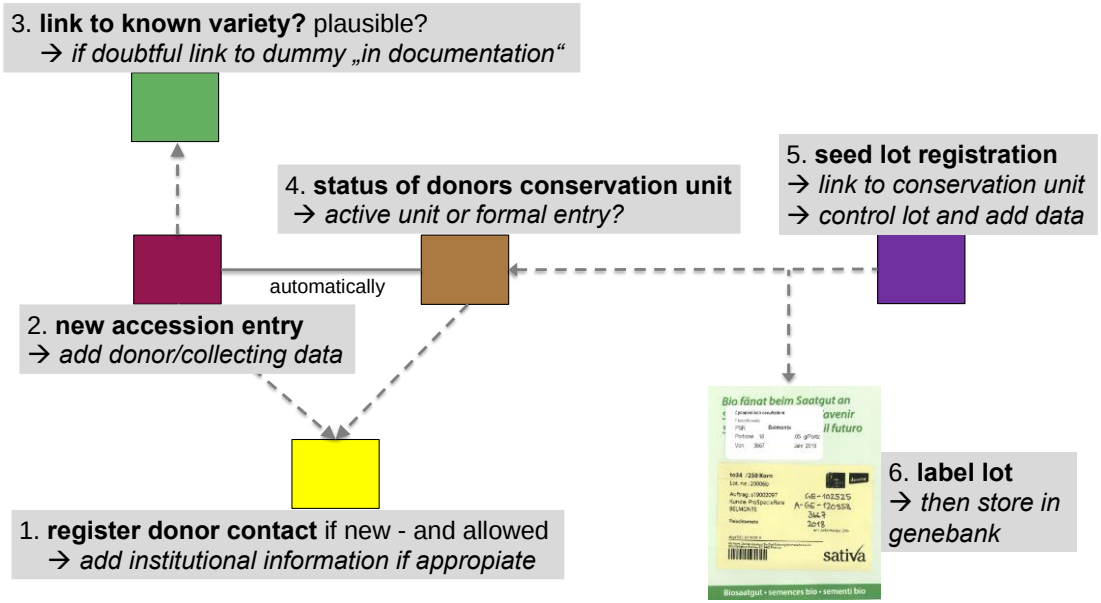
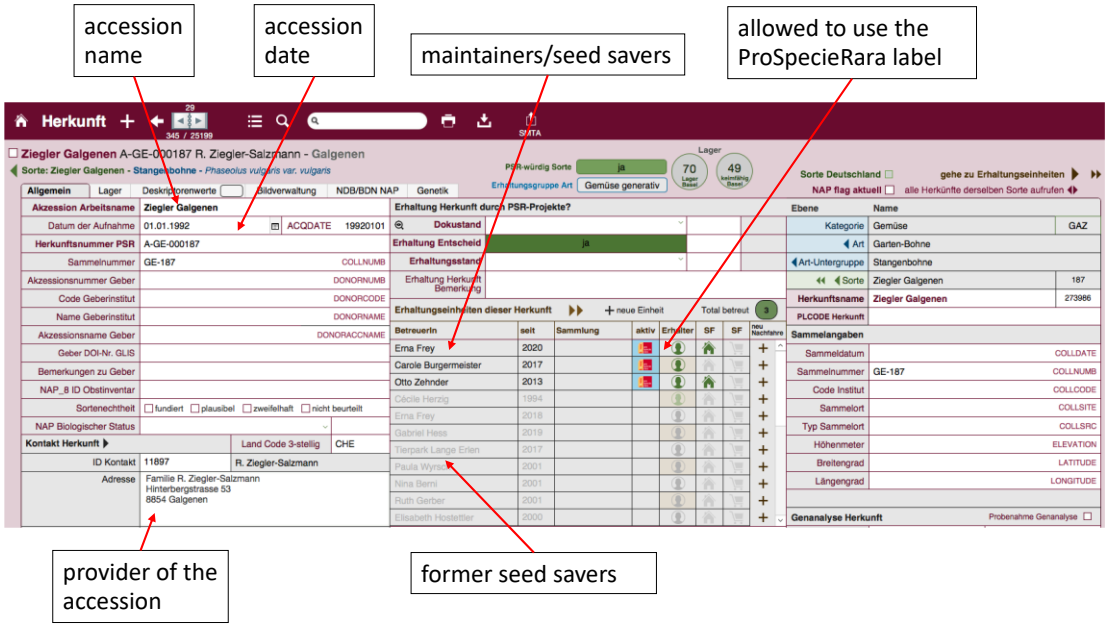
7. 2 Plant genetic diversity management in community seed banks (=seed library)

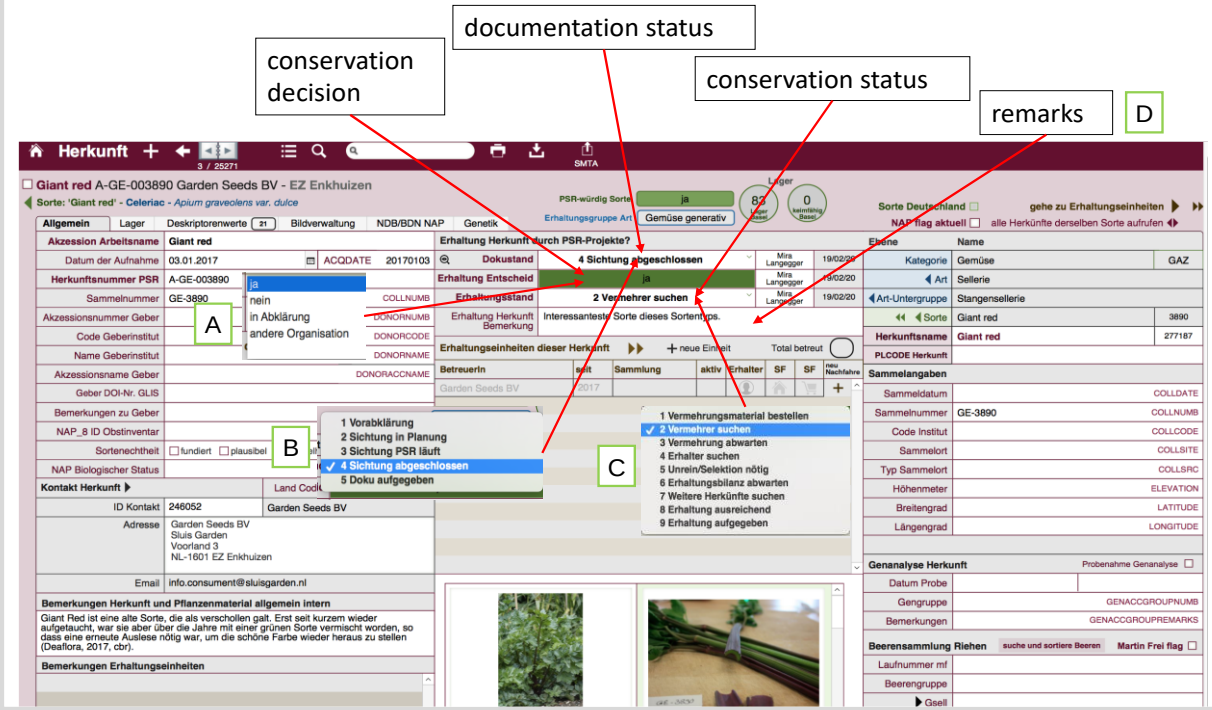
7.2.1 Data collection and management of PGR in the CSB-network



Species	Description	
	The species is the highest category to which we have assigned an own set of descriptors like pollination, living cycle, propagation, etc.	

Variety	Description	
	Variety level: research and documentation → info for network user on web PSR has defined what a variety is. In many cases it is impossible to assign an accession to a specific variety **(see annex)** conservation status: a compilation of numbers of accessions, "seed savers", stored samples, professional propagators and marketers is presented at this level. In this layout all information are compiled that will be published in the catalogue that is available on the website. **Decision making processes for conservation and utilization actions** • Ideally at least three, if less find more seed savers • If more than one available, make sure which ones to conserve in the long term • If no offer, and the variety is deemed interesting for gardeners, invite seed savers to offer • If no offer, and the variety is deemed interesting for the market, invite professionals to offer • If less than 10 initiate propagation		

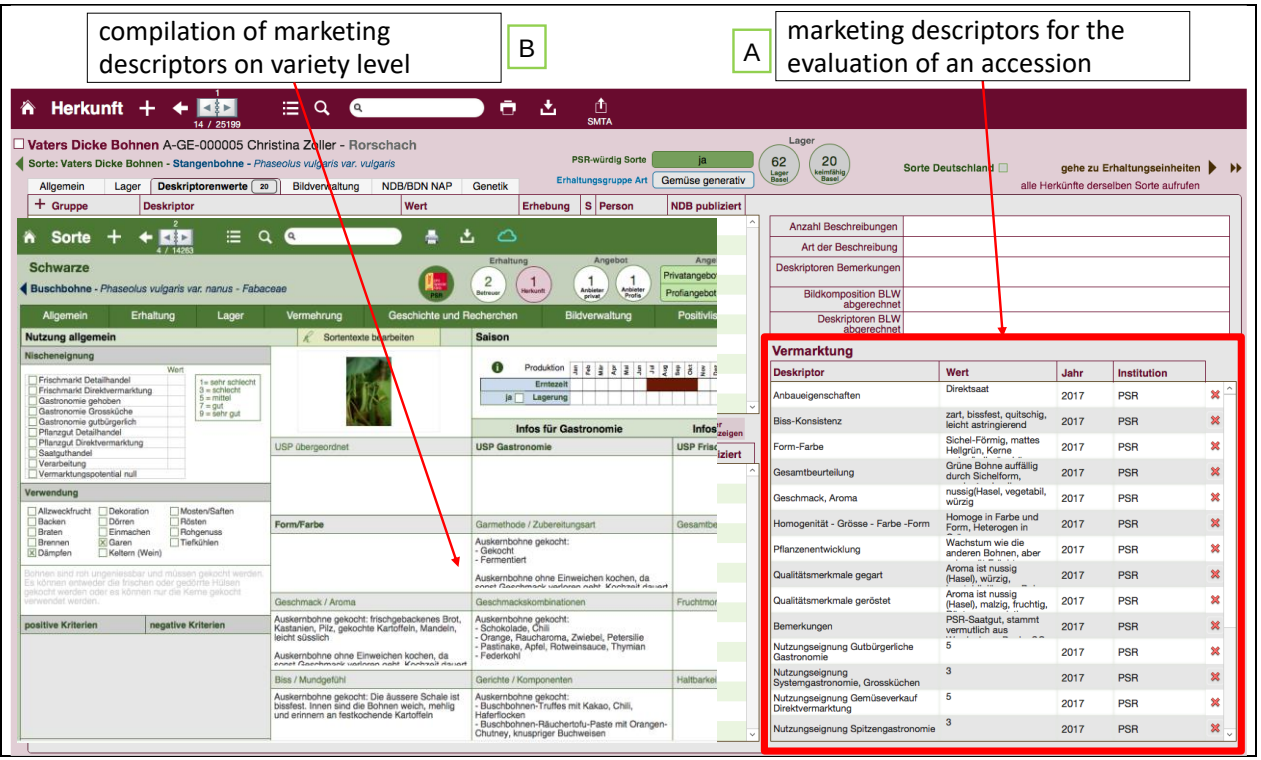
Accession	**Description:** **Registration process of new material from outside the core network** 	
Accession	**Description** Passport data, donor/provider, maintainers (seed savers)	

Accession	**Decision making processes to define and monitor conservation status of an accession** **Popup menus:** **A. conservation decision** - Yes - No - Cons. by other organisation - Clarification needed **B. documentation status** **«First clarification»** is not often used, as it is normally done before a variety/accession is considered for tests. For perennials it is crucial to ensure conservation before any further clarification is done. **«Evaluation in preparation»** is still without any practical action, but the decision is taken that evaluation is worth it, and should be done asap. **«Evaluation ongoing»** is for «just wait for the results, before further decisions are taken» **«Evaluation complete»** should ideally be the final state of any accession, and it hints that at the moment the basic evaluation and pictures are available. Note: this includes only the most important impressions of the accessions. Further agronomic evaluations and scientific analysis might be done for implementation in the market **«Evaluation abandoned»** is often chosen due to unsuccessful cultivation. Other reasons will be documented as well.	 **C. Conservation status** **«Propagation material need to be ordered»** if there's no material left or has not yet arrived. If possible this should be avoided if the accession was already received and evaluated, e.g. better in the beginning order enough material for evaluation AND propagation if they can't be combined or, for non-perennials, if they are timely separated from each other. **«Propagation needed»** is an important reminder to look for a propagation as soon as possible. It is chosen, when the material is running low (< 10 seed lots) AND if there is no seed saver or an ongoing propagation established. **«Propagation ongoing»** is for «just wait for the propagation harvest» **«Seed savers needed»** is set, when the conservation efforts currently are sufficient for the accession's saving, that is, enough fresh seeds are available, but there is no seed saver yet for this accession, OR there are still too few seed savers (Ideally we'd like to have an accession kept by at least 3 seed savers). **«Crossed material/selection needed»** implicates an effort is needed by experienced seed growers, often this task is mandated to professional partners.

	D. Remarks Specification about the decision for conservation. Various reasons are taken into consideration: • Are there other (better/worse) accessions of the same variety? • Are there seed propagators of this accession with which PSR is in contact? • Is the variety/accession an important addition and has to be maintained in the PSR network? • Does PSR have special responsibility for this variety/accession? • Is the accession difficult to propagate for network, and is it already very well conserved by other organisations (like genebankgenebanks) It is difficult to create a decision-making scheme, as hard facts are often lacking. Many decisions are based on expert experience and knowledge. In the case of doubts conservation comes first.		**«Wait for seed savers feedback»** is chosen after «Seed savers needed» can be neglected for the time being, because efforts were successful to find enough new seed savers; but it is not yet clear, if those are successful with their conservation efforts. **«Current conservation sufficient»** is chosen if the project responsible first wants to get a clear sign of the conservation success, before it is deemed sufficient. Note: It is probably rather chosen with perennials, as these sometimes need serveral years until the conservation efforts can be deemed successful in the long term. **«Other accessions needed»** is set, if this accession available is not correct due to the variety's description, or has a growing problem, or just anything wrong that prohibits to propagate and conserve this accession. ***(Action to be taken)*** Note: this item actually doesn't fitt in this list, as it should be rather an information taken on the variety level. PSR should consider to create a new status to discribe the conservation quality of the current accessions with regard to a given variety, and include this valuation item there. **«Current conservation sufficient»** is set when enough seeds are at stock, and when there are enough seed savers for this accession. **«Conservation abandoned»** could be set basically in one of two cases: 1. there is no material left of this accession, be it at the PSR stock, be it with seed savers, or be it with any third party that used to provide this accession, and it is very unlikely to find this accession at unknown sources. 2. It is decided to no longer pursue this accession, be it because of growing problems, be it because of available better accessions of this variety, be it because the variety is deemed not sufficient for the label criteria, etc. This valuation should always result in the item «No» in the «conservation decision» field **(Action to be taken**): PSR needs yet to find a good checking system to regularly and continuously update these validations. Some items could probably be generated automatically, e.g. «Current conservation sufficient» could be set for all accessions with enough seeds at stock and enough seed savers, but others need to be manually checked.

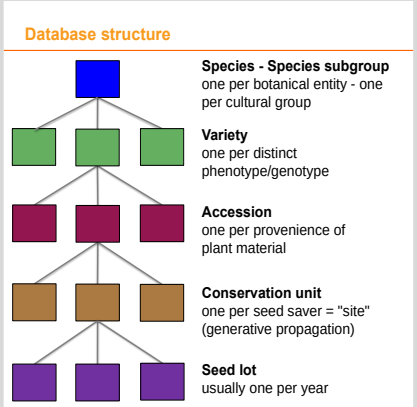
7.3 Registration of returned and sent out plant material

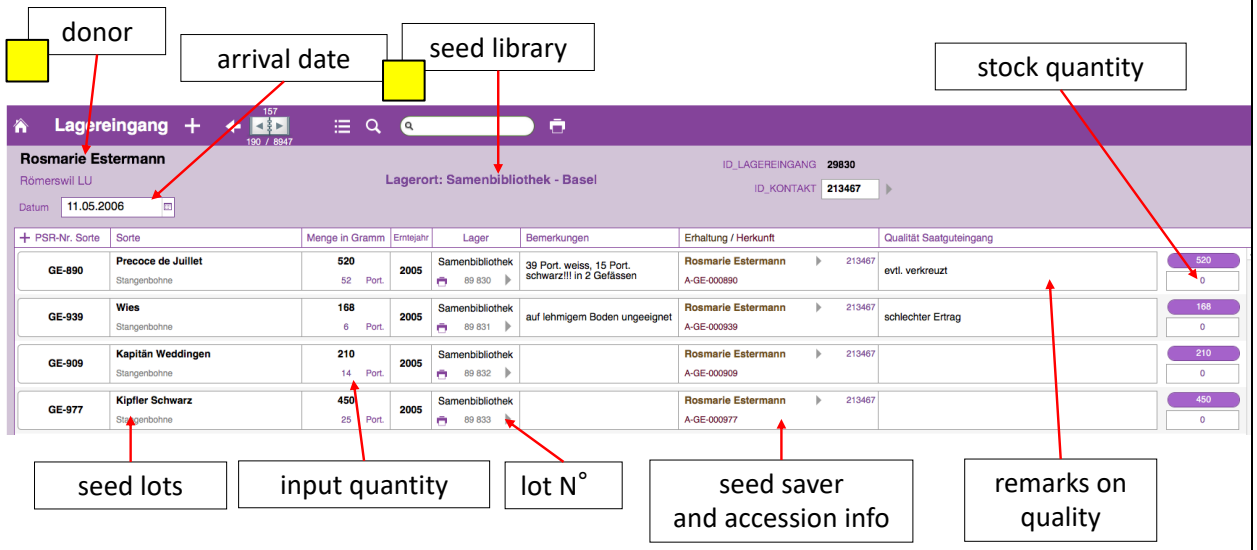
Accession	Descriptors to evaluate an accession
	• To evaluate marketing potential and values of an accession. • The results and descriptions can be collected from several years, and with several accessions of one variety. These observations should finally be summarised and concluded in the appropriate fields on the variety level. This will result in a universally valid description of the variety.



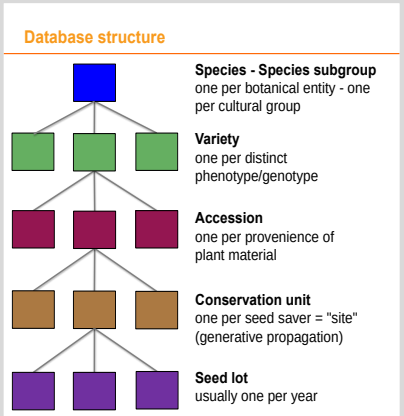
Input seed lot will be linked to conservation unit and registered in data base

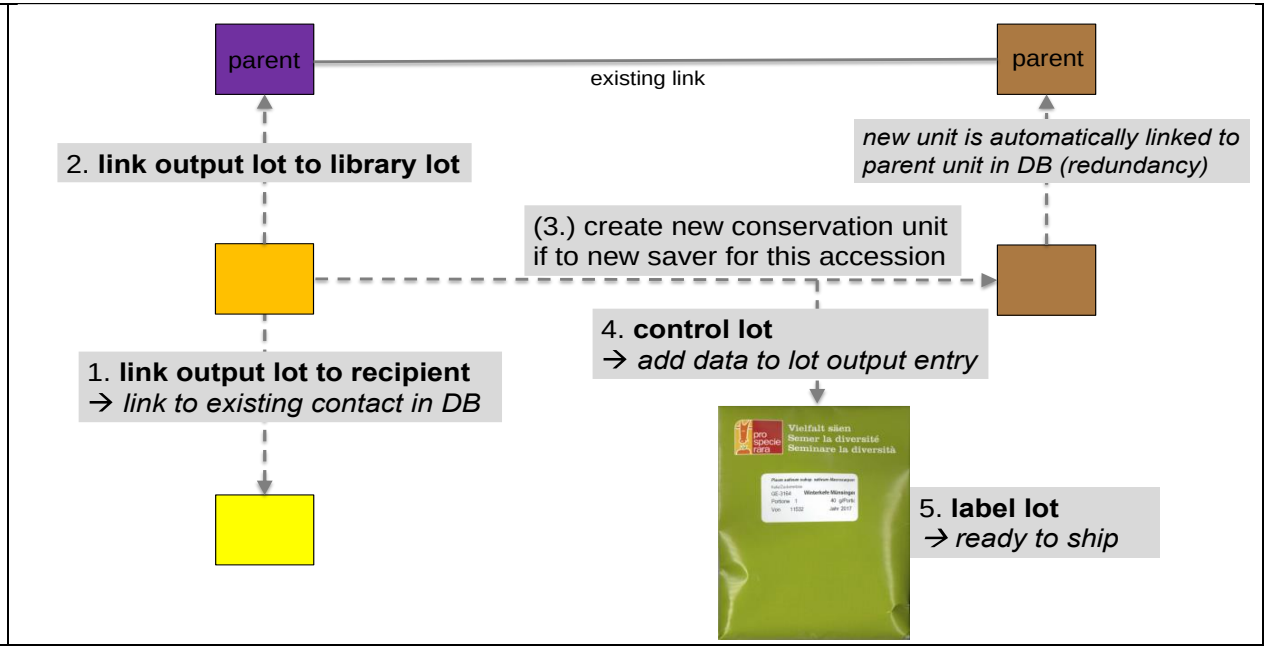
- **Registration of returned material from seed saver (donor)**

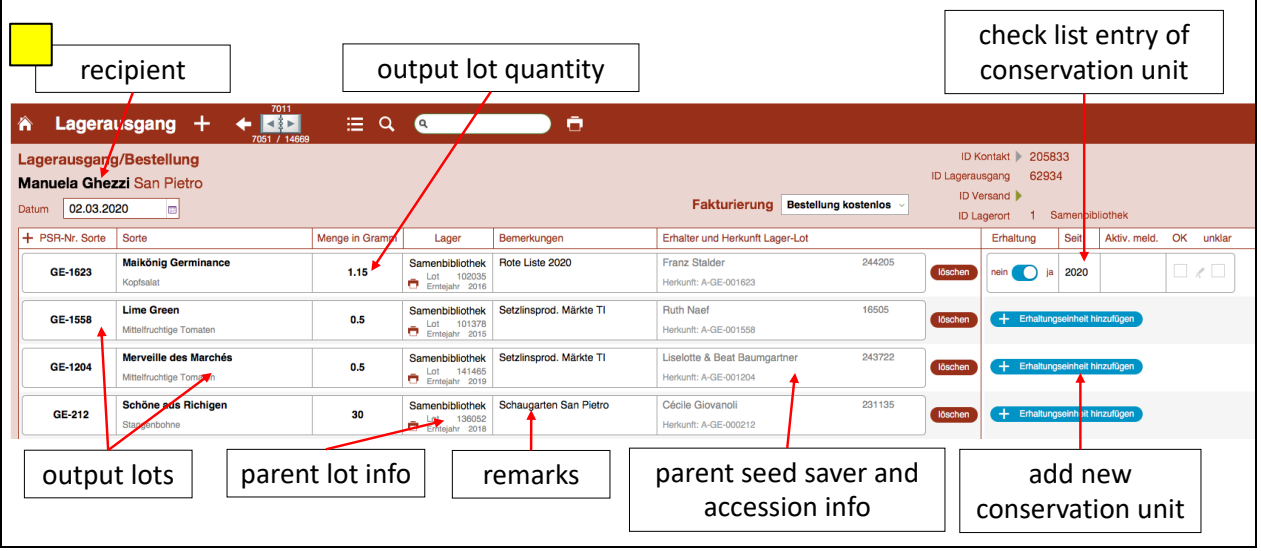


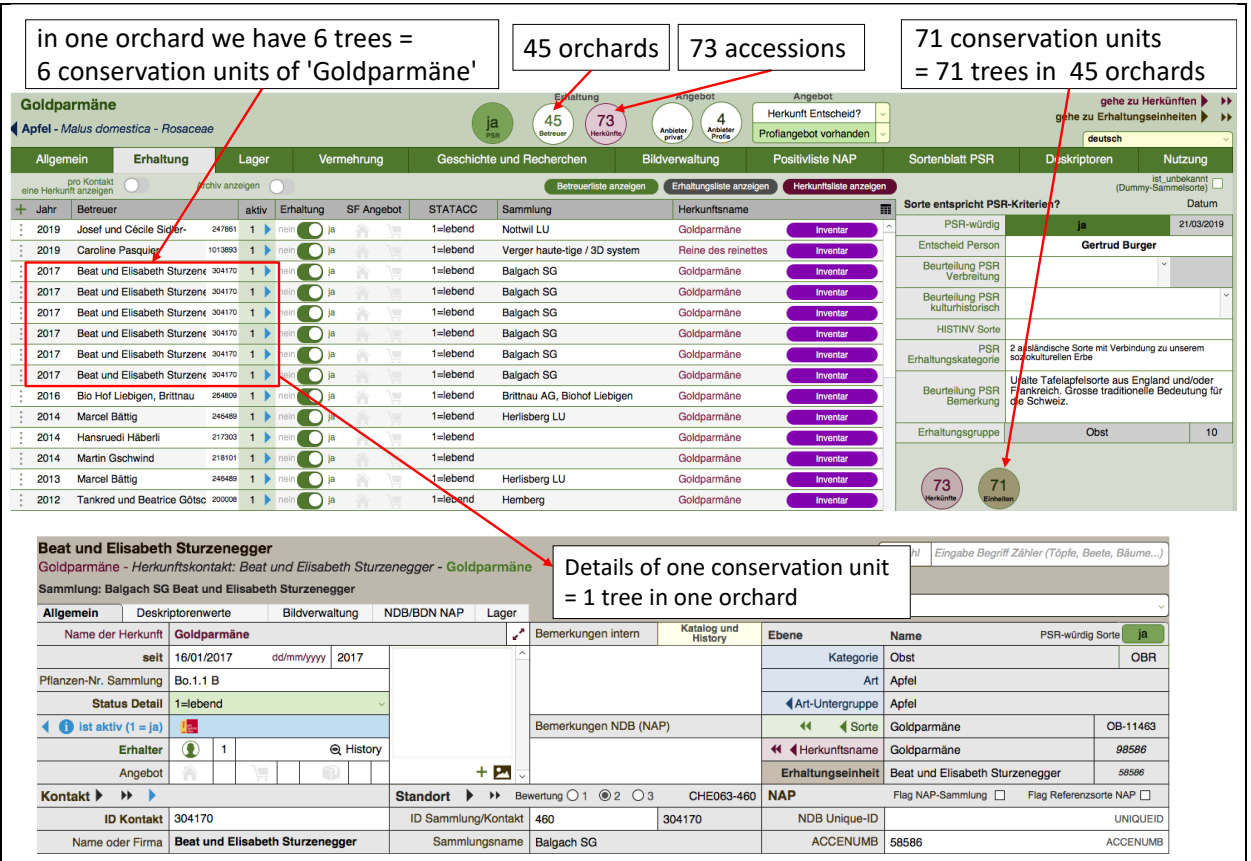


Output Seed lot becomes conservation unit when sent to new seed saver	**Output of seed material into network**	

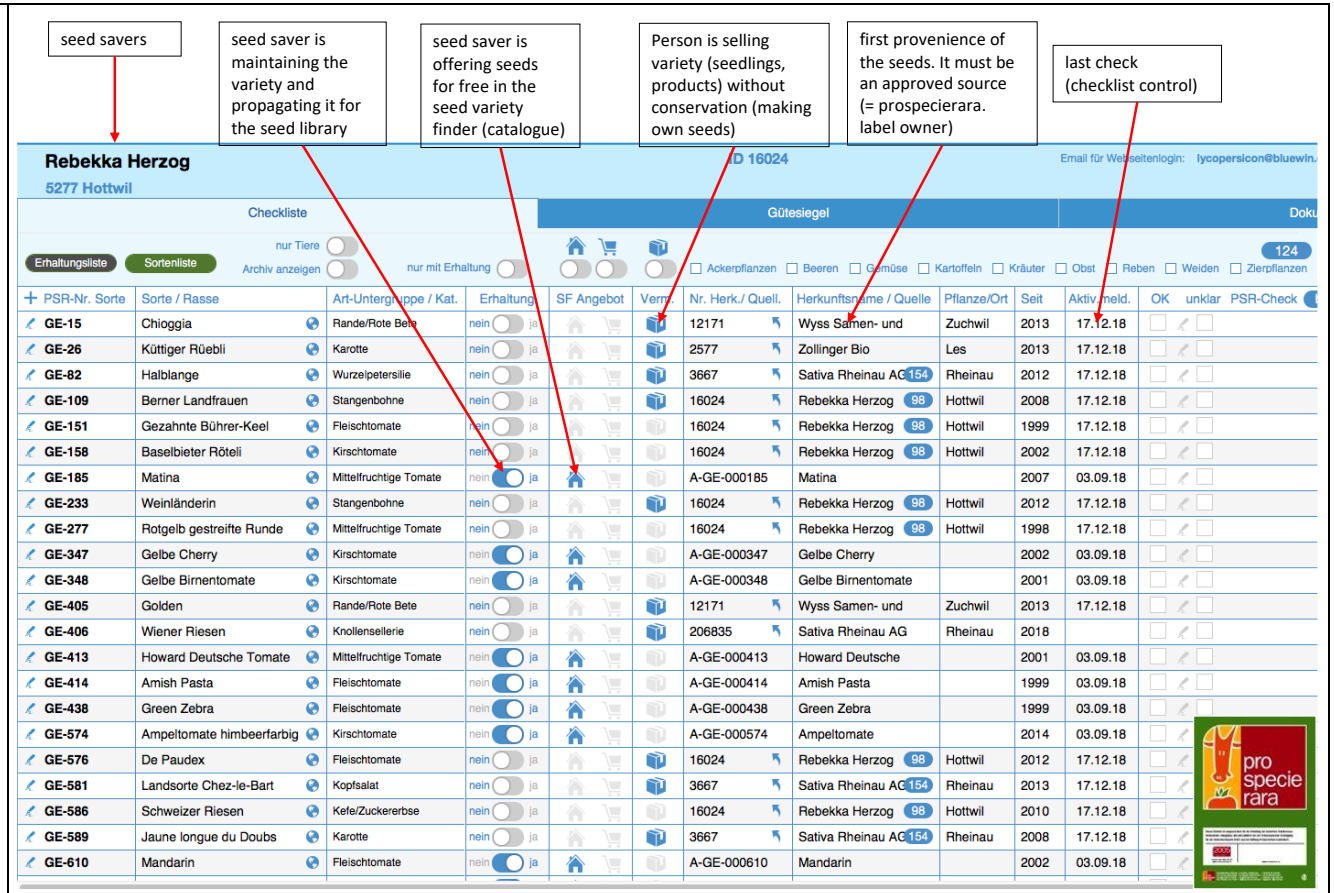


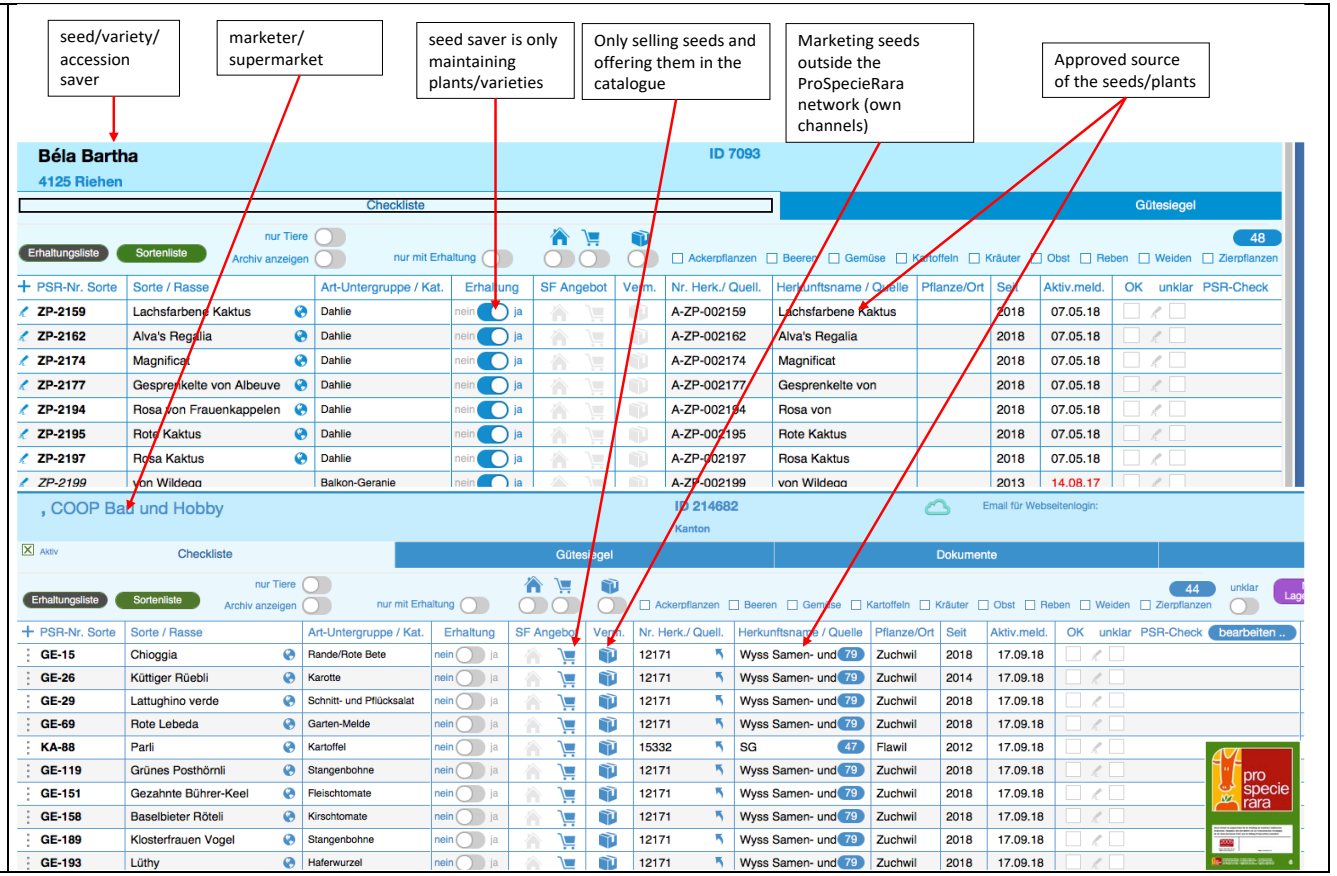
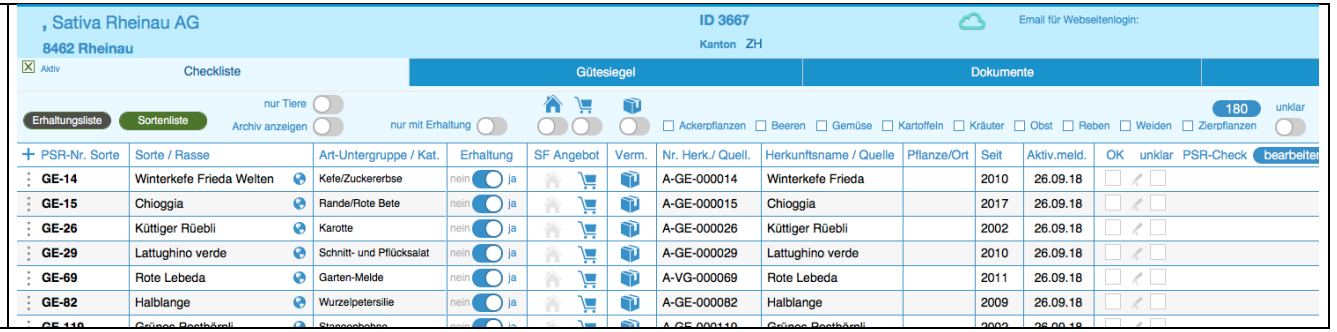




Conservation Unit	How many units of one accession are present on a specific site or at a specific address. E.g. how many trees of one accession and of one variety are present in one orchard at that specific locality.	

7.4 Monitoring use of plant genetic resources (incl checklist)

Monitoring System	Here we show an active seed saver. In this case she is a farmer with her own little nursery for seedling and seed production. She is selling seedlings, plants and products at different local markets. For some varieties she is propagating her own seeds and offering them to the ProSpecieRara community seed bank network by publishing her offer in the web based ProSpecieRara seed catalogue. Because she is selling seeds and conserving as well, she has the right to use the ProSpecieRara label.	

Monitoring System	Here we show two different kinds of stakeholders in the diversity management system. Béla Bartha is only maintaining the variety. He is neither offering seeds nor selling seeds or products. Coop is only marketing seeds or products without maintaining the varieties. Coop owns the ProSpecieRara label and has to prove the source of the seeds they are selling.	
	Example for an organic seed and breeding company. Left: List of varieties they are propagating and selling. Right: List of the ProSpecieRara-source of the varieties they are propagating or using for breeding work.	

Checklist

für Menschen und Institutionen, die ProSpecieRara-Sorten und -Rassen erhalten, anbauen resp. halten, verarbeiten und/ oder vermarkten

Es freut uns, dass Sie mithelfen, die gefährdete Vielfalt der Sorten und Rassen zu bewahren und zu fördern!
Mit dieser Checkliste bestätigen Sie uns als Sortenerhalter*in, Anbauer*in, Tierzüchter*in, Restaurantbetreiber*in oder Handelsbetrieb, für welche Sorten und Rassen Sie sich engagieren und damit Teil des ProSpecieRara-Netzwerks sind.

Indem Sie uns helfen, Ihre Liste aktuell zu halten, ermöglichen Sie es uns, die Übersicht über alle Erhaltungs- und Förderaktivitäten zu behalten. Danke vielmals, dass Sie sich Zeit nehmen dafür.

Bitte kontrollieren Sie die Einträge, die wir bei Ihnen erfasst haben.

Sorten/Rassen, mit denen Sie nicht mehr arbeiten, bitte ganze Zeile durchstreichen.

Ja/nein Felder bitte so korrigieren: ja ☒ nein ☒

Einträge, die weder Erhaltung, Sortenfinder-Angebot noch Vermarktung haben, werden archiviert.

Ist Ihre Liste unvollständig? Dann melden Sie uns bitte die fehlenden Einträge.

Gemüse

		durch PSR ausgefüllt[1]	Pflanze Nr.[2]	Erhaltung[3]	Sortenfinder-Angebot[4]	Vermarktung und ggf. Bezugsquelle[5]
Rande/Rote Bete GE-1061	**Ägyptische Plattrunde schwarz**	Ägyptische Plattrunde schwarz		ja ☐ nein ☒	für Gönner ☐ kommerziell ☐	ja ☒ PSR 3667 **Sativa Rheinau AG**
Paprika GE-2299	**Aji Golden**	Aji Golden		ja ☐ nein ☒	für Gönner ☐ kommerziell ☐	ja ☐
Fleischtomate GE-414	**Amish Pasta**	Amish Pasta		ja ☒ nein ☐	für Gönner ☒ kommerziell ☐	ja ☒
Kirschtomate GE-574	**Ampeltomate himbeerfarbig**	Ampeltomate himbeerfarbig		ja ☒ nein ☐	für Gönner ☒ kommerziell ☐	ja ☒
Fleischtomate GE-1459	**Ananas**	Ananas		ja ☒ nein ☐	für Gönner ☐ kommerziell ☐	ja ☒
Kopfsalat GE-1211	**Attraktion**	Attraktion		ja ☐ nein ☒	für Gönner ☐ kommerziell ☐	ja ☒ PSR 3667 **Sativa Rheinau AG**
Kirschtomate GE-158	**Baselbieter Röteli**	Baselbieter Röteli		ja ☐ nein ☒	für Gönner ☐ kommerziell ☐	ja ☒ PSR 16024 **Rebekka Herzog**
Stangenbohne GE-109	**Berner Landfrauen**	Berner Landfrauen		ja ☐ nein ☒	für Gönner ☐ kommerziell ☐	ja ☒ PSR 16024 **Rebekka Herzog**
Fleischtomate GE-1230	**Berner Rose**	Berner Rose		ja ☒ nein ☐	für Gönner ☒ kommerziell ☐	ja ☒
Kirschtomate GE-1531	**Black Cherry**	Black Cherry		ja ☒ nein ☐	für Gönner ☒ kommerziell ☐	ja ☒
Fleischtomate GE-782	**Black Prince**	Black Prince		ja ☒ nein ☐	für Gönner ☒ kommerziell ☐	ja ☒
Kohlrabi GE-1981	**Blaro**	Blaro		ja ☐ nein ☒	für Gönner ☐ kommerziell ☐	ja ☒ PSR 3667 **Sativa Rheinau AG**

nie) Bio oder Demeter: ja ☐ nein ☐

☐ Ich habe **keine kommerzielle Vermarktung** mit dem ProSpecieRara-Gütesiegel betrieben.
-> direkt weiter zu Punkt 3 (Die grösstenteils kostenlose Abgabe von Saat-/Pflanzgut durch unsere Sortenerhalter*innen via Sortenfinder an Gönner*innen gilt nicht als kommerzielle Vermarktung.)

☐ Ich habe mit dem ProSpecieRara-Gütesiegel folgende Umsätze realisiert:

Umsatz in Direktvermarktung an Endkunden: CHF .....
(An ProSpecieRara-Märkten gemachte Umsätze sind nicht anzugeben)

Umsatz über Verkauf an Läden/Händler/Verarbeiter: CHF .....

2. Abzüge (nur anzugeben, falls Vermarktung erfolgte)

An ProSpecieRara-Rassevereine bezahlte Mitgliederbeiträge können von den Gütesiegelgebühren abgezogen werden:

Im Jahr 2019 bezahlte Rasseverein-Mitgliederbeiträge: CHF .....

Auf ProSpecieRara-Produkten bezahlte Alkoholsteuern werden vom Umsatz abgezogen:

Im Jahr 2019 für ProSpecieRara-Produkte bezahlte Alkohlsteuern: CHF .....

3. Jahresvignetten

Ich wünsche für das Jahr 2020 für meine Gütesiegeltafel(n) ..... Stk. Jahresvignette(n)*.

4. Unterschrift

Ich will auch 2020 Teil des ProSpecieRara-Netzwerks sein. Ich bestätige die Korrektheit der obigen Angaben und akzeptiere die ProSpecieRara-Gütesiegelrichtlinien. (einsehbar unter www.prospecierara.ch/guetesiegelrichtlinien).

.....
Ort, Datum und Unterschrift

Herzlichen Dank für die Retournierung Ihrer Liste per Post (ProSpecieRara, Unter Brüglingen 6, 4052 Basel) oder per Email (info@prospecierara.ch).

Erläuterungen

Alle gemachten Angaben werden vertraulich behandelt. Sortenerhalter*innen und professionelle Anbieter, die im ProSpecieRara-Sortenfinder Saat-/Pflanzgut anbieten, werden auf der ProSpecieRara-Webseite aufgeführt.

Legende

1 Hier wird bei den Pflanzen die genetische **«Herkunft»** (Akzession) aufgeführt, mit der ProSpecieRara die Übersicht behält, welche Genetik (Linie) innerhalb einer Sorte in Erhaltung wo vorhanden ist. (Bei Tieren leer).

2 Pflanzen-Nr. = Ihre individuelle Nummern, die Sie in Ihrer Anlage Ihren Pflanzen vergeben (z.B. Baumnummer). Kann fakultativ angegeben werden.

3 **«Erhaltung» = ja**, wenn man für die entsprechende Sorte Sortenerhalter*in (= Sortenbetreuer*in) ist oder die Tierrasse als Mitglied eines ProSpecieRara-Rasseverein züchtet.
Wenn Anbau, Aufzucht, Handel, Verarbeitung ohne Sortenerhaltung/Tierzucht erfolgt, dann bitte **«Erhaltung» = nein** wählen.

4 **Private Sortenerhalter*innen** kreuzen **«für Gönner»** an, wenn sie Saat-/Pflanzgut grösstenteils kostenlos an ProSpecieRara Gönner abgeben. **Professionelle Betriebe** wählen **«kommerziell»**, wenn sie Saat-/Pflanzgut für jedermann käuflich anbieten.

5 Bitte «Ja» ankreuzen, wenn Vermarktung von Saat- und Pflanzgut, Früchten, Fleisch, verarbeitete Produkte, etc. erfolgt (z.B. Gärtnereien, Läden, Restaurants, Produzenten, Aufzüchter, Verarbeiter, Vermarkter...).
Nur wenn für die Zeile keine Erhaltung erfolgt: Bezugsquelle mit Name und Ort angeben.

* Die ProSpecieRara-Auszeichnung (Gütesiegeltafel), wird jährlich als PDF kostenlos abgegeben. Es gibt sie auch käuflich als wetterfeste Tafel. Dafür gibt es Vignetten.

= **keine ProSpecieRara-Sorte**, darf nicht als solche vermarktet werden

= **ProSpecieRara-Sorte in Abklärung**, darf nicht als solche vermarktet werden

= kein zulässiger Lieferant (hat hier kein Gütesiegel)