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1. Introduction

As part of the Dynaiversity project, the aim of this document is to highlight how networks are built, developed as well as to identify their needs in order to secure their development and sustainability.

The various practices of breeding, multiplication, seed circulation and governance of the projects are discussed. These practices are specific to the individual situations, their actors, their size and the territories in which these projects operate.

The objective of our research has been to identify good practices as sources of inspiration and not as "ready-to-use recipes". These practices, based on our findings from 21 case studies that have been conducted in the context of Dynaiversity, are summarised in this deliverable (D 2.3). The analytical challenge was to provide a transversal analysis of the case studies which have been found to be different in history, objectives, governance and working mechanisms.

The lessons learned have been used to develop final recommendations which are presented at the end of the document.

In order to set-up the scene and understand the scope of each identified good practices, we present, first, the various obstacles and challenges for the creation and development of new networks (Part 1). Then under Part 2, we look at the individual identified good practices from the perspective of building "bridges" between and across project for an optimal cross-fertilisation across projects and initiatives. Eventually, based on the analysis of these good practices we elaborate seven pre-recommendations (Part 3). These pre-recommendations are used to feed the work of the other work packages of the project.

2. Obstacles in building and developing new networks

With regard to the 21 case studies, we highlight main obstacles in the creation and development of new networks aiming at valorising genetic resources:

- Barriers created by the European legal framework;
- Limited of financial resources;
- Lack of a single language; and
- Lack of links between the different stages of the supply chain (linking the plate to the seeds).

Each of these obstacles has consequences on the construction and governance of any network of cultivated biodiversity, whatever the scale of this network is.

2.1 European legal framework more than a legal restriction

The Distinction Uniformity Stability (DUS) standard is the European standard to identify a new variety. This standard has been developed and defended/supported by Bustarret (1944). The frame of reference is used when seeds need to be registered in the Official Catalogue of Varieties.

The use of this standard requires that all varieties are DUS varieties to the exception of amateur varieties. This exception concerns four linked items: seeds, breeding practices, ways of generating knowledge and people's identities. The stability's obligation and variety's uniformity deny the co-evolutionary relationship between seeds and practitioners. It is not only non-DUS seeds which are ignored, it's also the potential to build other possibilities. This paradigm transforms seeds into an invariable stabilised object.

The obligation to register varieties into the Catalogue reduces genetic diversity (Goffaux et al. 2011). This criticism has been partially recognised by authorities as, now, the Catalogue has two derogation categories: "varieties without inherent values" and "conservation varieties".

On the other hand, the technical device (e.g. authorised per bag and/or the link between the region of origin and production and marketing) closes this opening.

« For example, an independent advisor for organic farming in Finland, interested in heritage cereals, discussed the limitations in seed packaging sizes allowed to cell cereals of conservation varieties. He encouraged participants to think and exchange about how one could argue for this limit to be high enough to enable farmers to sow at least one or two hectares when they want to grow a conservation variety. » (Case study 1: Nordic Heritage Cereal Conference).

As a result, people-offering seeds outside this normalisation are generally excluded. At best, they are tolerated, but never recognised. From then on, it is a way of framing the subject and knowledge production. This obstacle didn't stop some individuals and groups from taking the risk of trying other possible solutions.

As highlighted in Case Study 20 on the American Seed Savers Exchange Association:

« This restriction, which is felt by most seed initiatives and much of the public opinion as an injustice, pushes seed initiatives and artisanal organic seed companies to market and create awareness for this injustice. Seeds are thus framed socio-politically, as well as phenotypically».

2.2 Limited financial resources

Many initiatives encountered are mainly funded for projects. Funding can be public and/or private. The project-based approach determines priorities of initiatives for a period of two to three years maximum. Therefore, the long-term sustainability of the project is at risk due to lack of resources when the initial funding is over.

Some people are spending a lot of time justifying project funding and looking for new projects to sustain the association they have created, as well as their job. From then on, time and money as a constraint goes hand in hand, so the project-based funding is open only for a limited time and only very rarely creates a window of opportunity for structural changes.

This situation has many effects, for example, Pétanielle association (Case Study 14) had to return on a 100% voluntary basis in terms of operation. Both employees and board of directors considered the time cost and administrative energy needed to meet the obligations

of project financing were too high. Other initiatives, such as the Kokopelli association (Case Study 2) has developed its own source of income through the sale of seeds. Kultursaat (Case Study 9) has developed a new way to fund selection and creation of biodynamic varieties by the beneficiaries. Most of other initiatives are still looking for public and private funding to maintain their activities.

2.3 A single language for transnational networking

Regional networks (Petanielle, Kaol Kozh, Circulos de Sementes, etc.) and/or national networks from unilingual countries (Kokopelli, Seed Savers Exchange, Organic Seed Alliance, the development of Crop Wild Relatives Genetic Reserve) carry out their work in a common national language. Only one national network (Maghá - Case Study 5) uses English as common language. Their documents are coming from their international links. But « A specific group is working on translating English materials to Hungarian in order to make interesting and useful articles comprehensible for non-English speakers. The website uses a map containing seed exchanges all around the country. This is to inform everyone about the details and, also, to connect the different local hubs».

The language issue occurs for supra-national networks (ECLLD, Growing Seed Savers Initiative, SAVE, and during international meetings). For example, within the Nordic Heritage Cereal Conference (Case Study 1), their works with Finns lead them to use English.

« Language is usually a mix of Swedish, which is spoken and understood by most Nordic participants except for some Finns, and English. Websites and invitations of previous conferences were in Nordic languages, but for the 2018 edition; website and invitations were in English. The reason of this can be since the conference was held in Finland». (Case Study 1: Nordic Heritage Cereal Conference)

Similarly, international collaborations lead to the use of English as a common language. Language also carries a way of looking at the world. Each initiative qualifies the seeds with they interact with by a specific word: ancient, heirloom, open-pollinated, peasant, forgotten, free, etc. We make the hypothesis that, except for native speakers or people with a very good knowledge of the language, exchanges lose their richness at the risk of crushing identities. Another consequence is the exclusion of farmers from meetings without translation. This issue has been raised by the SAVE Foundation (Case Study 13).

« Two obstacles seem impacting their participation: their availability and the use of English. The annual meeting is a mix of workshops, visits and recreational moments. In order to stimulate mutual knowledge, the coordination has recently developed a pitch talk moment. »

2.4 Lack of links between the different stages of the supply chain (linking the plate to the seeds).

Beyond our 21 case studies, we note that short supply chain initiatives include rarely variety selection issues in their analyses of the food system. The two case studies specific to Community Supported Agriculture (Asociatia pentru Sustinerea Agriculturii Taranesti - ASAT Case Study 12 and CSA Brotes Compartidos Segovia Case Study 11) highlight the difficulty to involve consumers in cultivation and production of non-DUS varieties.

The difficulty to link seeds to the plate makes it more difficult to show the issues of cultivated biodiversity to the consumers. Therefore, some initiatives are looking for new ways to make the events and distinctive signs accessible. Thus, by using the passage through the marketed products (breads, vegetables, etc.) the vegetable is/can be used to explain the link between the selection of non-DUS varieties and taste. This is the case for the "Culinary Breeding Network" initiative or "Seed2Kitchen" developed in Case Study 20 Organic Seed Alliance.

2.5 Summary

These barriers lead to consequences which are summarized in the table below. Subsequently, this visualisation allows us to understand how "good practices" act as a brake on the networking developments of initiatives in favour of cultivated biodiversity.

Obstacles	Consequences
1. European legal framework	C1: Exclusion of non-DUS varieties - from practices (mass selection) - from the identity of practitioners C2: no (too few) testing
2. Limited financial resources	C3: Projects stops when funding is over
3. Language	C4: No access to farmers
4. Linking the plate to the seeds	C1 C5/ Failure to take into account seed issues in a systemic approach

3. Best practices

3.1 Reminder of the notion of "bridge"

The aim of the research is to identify the various socio-technical mechanisms that initiatives develop to overcome/circumvent the main obstacles which have been described above. To use our analytical framework (cfr. D 2.1), it is a question of showing how bridges can be used to overcome these obstacles. As a reminder: "bridges" (Granovetter, 2000) enable communication, coordination and cooperation at the different layers of a network. By this, we mean any human or non-human element which allows initiatives to link up and form a higher-level network.

3.2 Socio-technical measures

Regarding the 21 case studies, we propose four categories of good practices:

- Quality and signs of distinction;
- Events;
- Varieties and history; and
- Structural supports.

3.2.1 Quality and signs of distinction

Several case studies are working to promote the value of products derived from cultivated biodiversity. To achieve this, they build a network. In an impersonal market (Karpik 1989), the product with a distinct qualification sign allows the network to be extended to the person who consumes the product. The network is the result of assemblies, of bridges between the different people and objects that allow the product to be qualified from seed to plate. We point out three methods of valuation, the development of a common living object; the valuation of taste; the construction of a label, which are described below.

3.2.1.1 A common living object

To begin, we go back to Case Study 1 of the Nordic Heritage Cereal Conference. At the conference, practitioners identified sourdough as the living object that brings together farmers, bakers and scientists. In addition, home baking with sourdough, especially of rye, remains an important activity for many people in the Nordic countries, so sourdough is something a larger public, beyond bakers, can relate with. It is important to note that handcraft sourdough baking is a way to make bread from organic heritage grains, which seldom have the properties for industrial baking purposes. As a participant puts it "Cereals stand between the soil and sourdough", wondering why (microbial) diversity is increasingly valued in "our soils, in our sourdough and in our guts", but that few people feel concerned about diversity in cereal fields and in the economic structures producing and distributing food. Thus, sourdough and its microbial characteristics can be promoted in bread to promote cereal biodiversity.

3.2.1.2 The taste

Secondly, alongside the search for a common living object such as sourdough in the Nordic countries, the question of taste is central to the valuation of products derived from biodiversity. In Germany, Kultursaat (Case Study 9) developed the concept of "Gemüse mit Charakter" (Vegetables That Have Character) for promotion. The development of this concept required the mobilisation of stores specialised in the distribution of organic and biodynamic products.

Facing the challenge of raising awareness on this complex and technical topic without drowning utterly un-informed target groups in information, an analysis of the knowledge situation and an expert survey were conducted between 2002 and 2004. They resulted in the idea of sensitising consumers to bio-dynamic breeding through the experience of taste. After a planning phase, the concept of variety marketing – already common in produce like wine, apples or potatoes, but never applied to other vegetables – was launched in pilot shops. Rather than just selling carrots, distributors differentiated among three different Kultursaat varieties – intensively aromatic 'Rodelika', nutty-mild 'Robila' and juicy-fresh 'Milan'¹. The pilot-phase was considered a success by all involved partners² and granted attention with the prize for "Recommendation of the year" at the 2005 edition of the German organic trade faire "BioFach". The concept was thus extended to four varieties in 2006 (pepper, lettuce, spinach and cabbage), four more in 2007 (pumpkin, iceberg lettuce, red beat and carrot) and finally one parsnip variety in 2010. Specific labels for vegetable crates, information sheets for shop owners and employees and information leaflets for customers are among the communication material which has been developed. A more in-depth booklet on bio-dynamic breeding is available for people wanting to go into further technical detail. Organic grocery stores have seized the marketing initiative as a means to put forward their specialisation in the domain of vegetables and specific training sessions for shop staff have been organised, as well.

The Culinary Breeding Network (CBN) included in Case Study 21 Organic Seed Alliance is another experiment concerning the place of taste as an argument to interest consumers in cultivated biodiversity. The CBN, coordinated by Lane Selman a Professor of Practice at

¹ https://www.kultursaat.org/fileadmin/user_upload/pdf/vk-hilfen.pdf

² https://www.lebendigeerde.de/fileadmin/alte_hefte/Ausgaben/hintergrund_2004-04.html

Oregon State University. After having experienced that common breeding programs pay little or no attention to taste, and that organic on-farm breeding was able to produce very tasty vegetable varieties, she decided to focus on taste in variety evaluation and breeding, in the final objective of making tasty vegetables and grains available to motivate people to eat more fresh foods instead of processed food. To do so, she mobilized a group of chefs which she previously knew to profit from their tasting skills for a pepper evaluation in 2010. As soon as the following year, chefs were involved in taste-testing breeding lines. In this way, the connection between breeders and chefs was made. Based on the networking of chefs and breeders, the coordinator decided to go a step further and include independent seed companies and consumers in the network. The first "Variety Showcase" event was held in 2014. 14 tables hosting different crop varieties and breeding projects were presented to participants, who had the opportunity to see and taste crop diversity. Since then, 4 "Variety Showcases" have been held in total, 2 in Portland, 1 in New York City and 1 in Hawaii. Approximately 100 participants had attended the first event, with a free entrance. The most recent one, in 2017, welcomed around 540 participants, who contributed a 50\$ entrance fee. In order to favor a broad diversity of participants, farmers, minorities and people representing social movements are usually given discounts. A similar network engaged in variety evaluation and breeding for taste has established in the Midwest, coordinated by a research from University of Wisconsin-Madison (UW Madison), called the Seed2Kitchen. This collaborative network also aims at connecting chefs with organic breeding projects to improve taste in crop varieties.

3.2.1.3 Label

Finally, we identify three experiences of label valuations: Save Foundation (Case Study 13); Resia Valley Garlic Producers Community (Case Study 18); Kaol Kozh (Case Study 7).

For SAVE, product development makes it possible, on the one hand, to contribute to the maintenance of the necessary biodiversity and, on the other hand, to meet the socio-economic challenges of the regions where this biodiversity exists. Therefore, for the organization, a quality label offers the possibility of «contributing to the solution of these problems by creating an income for rural areas. This income is of especial benefit to young people and to women». SAVE has named its label «Heritaste®»: a contraction of the terms "Heritage" and "Taste".

The second example is that of a Natural Park. Very often protected areas ease and manage the processes of maintaining and/or re-discovering local products, cultivars and traditional knowledge about cultivation and transformation of products. Parks are generally in favor of traditional agriculture because it implies a higher level of biodiversity and the presence of low impacts cultivated fields can allow the permanence or establishment of more diverse and resilient ecosystems and communities. Other institutions, e.g. local municipalities or consortia of mountains municipalities, promote and often finance projects and activities aimed to maintain local agricultural traditions; usually young people (preferably women, usually being disadvantaged in finding a job) are invited to participate and involved in medium term initiatives. Moreover, Protected areas often promote local products labelling thus improving the opportunities, also in term of revenues, for local farmers. Depending on the composition of their teams, Natural Parks can work on an entire sector (from seed to plate / from field to restaurant). It requires to involve the actors of the sector on the territory (farmers, chefs) and to develop the necessary tools to promote a product derived from cultivated biodiversity.

For example, the Prealpi Giulie Nature Park covers a large part of the Resia Valley. The parc is located on the western edge of a high mountain range of the Eastern Alps. To develop and enhance the Garlic of Resia sector, in this park, Parc brought together farmers, the 6 municipalities of the territory and the University of Udine.

“Established in 2008 the Association of Resia Garlic “Rosajanski Strok”, affiliated to Slow Food, which today has over 30 producers for a production of about 35 quintals of fresh

product, numbers that tend to increase every year, increasing a virtuous microeconomics of the territory.” The University of Udine study the quality of the seeds and plants. The process is guaranteed by a control system in which the Association controls the producers, the Local Municipality is in charge for labelling the products.

The third example concerns the valuation of vegetables derived from non-DHS seeds by the French supermarket Carrefour.

To offer an outlet for production and promote the "farmer seeds" approach, the Réseau Semences Paysannes (RSP) has turned to the distribution network specialising in organic Biocoop products. The RSP is a national network of French organizations involved and/or practicing cultivated biodiversity. It was created in 2003. Biocoop is an organic store chain. In May 2016, after two years of discussions, RSP and Biocoop signed a "framework agreement" base on a dual financing mechanism. A fixed annual fee for the use of the mention "Farmers' Seeds in Network", and a variable fee for the selection/multiplication work (Farmers' Seeds Network 2016) were a part of this agreement. RSP and Biocoop also decided to test new varieties for a period of two years (December 2016-December 2018), with the promotion of vegetables under the brand "Semences Paysannes en Réseau". Thus, the valuation of seed issues depends on the vegetable. To test the certification of vegetables promoted in Biocoop, the RSP chose the association of seed and vegetable producers Kaol Kozh (located in Brittany). However, while Kaol Kozh was preparing the labelling of the first products, in March and April of 2017, the communication company Publicis contacted several members of the RSP (including members of Kaol Kozh) in order to carry out a communication campaign for the Carrefour supermarkets. The RSP denounced a campaign by Carrefour as greenwashing, while Kaol Kozh believed that it was better to be part of the Carrefour initiative rather than leave the retailer alone to run its initiative without their input. Thus, Kaol Kozh decided to "accompany" Carrefour in its approach entitled "Forbidden Market". Kaol Kozh is developing a certification system adapted to both Biocoop and Carrefour. Depending on the distribution network, the label on the product varies. For Biocoop, the label reads "vegetables from farmer seeds", while Carrefour's label states the product as from "farmer seeds". In exchange for this expertise, according to our sources, through Carrefour's foundation, supports the breeding activities with an annual funding of 186,000 euros for a period of five years. For its part, Biocoop is providing 40,000 euros to support research concerning varieties from 'farmer seeds' (« semences paysannes » in French).

The Carrefour supermarket is launching a national campaign to promote vegetables grown from farmer seeds. They call the campaign and its products "The Forbidden Market". The retailer registered the 'farmer seeds' as a brand, set up differentiated shelving for it within its store, and organized a petition to demonstrate interest in the products among consumers. Furthermore, each vegetable is associated with a dedicated farmer within this line of products. These efforts were boosted by an associated powerful media campaign that produced nearly fifty national and regional articles and television interventions. In its marketing campaign, Carrefour is trying to position itself as a defender of biodiversity. Their petition for biodiversity has received 83,654 signatures and though it could be seen as a recovery, it nevertheless contributes to the demand for justice towards the circulation of biodiversity and those who practice it.

This situation raises questions among the various stakeholders in cultivated biodiversity about collaboration with supermarkets. This question refers to the way networks are developed. Should there be a general increase by collaborating with actors who have the capacity to reach as many people as possible OR another development by multiplying initiatives on smaller scales?

3.2.2 Events

Within different case studies, the meetings between members at events seem to be essential. The events allow the creation of a common culture based on exchanges, the co-construction of knowledge:

«The "Let's Cultivate Diversity" practical meetings aim to share and co-construct practical and theoretical knowledge on varieties. Beyond knowledge, they help to create links between people involved in cultivated biodiversity. During these meetings, practitioners (farmers and gardeners) and researchers explain how they co-construct knowledge from scientific and "lay" knowledge.» (European Coordination Let's Liberate Diversity – Case Study 3)

Events bring together and connect people from the same region, like the Let's Liberate Diversity meeting held in Belgium in 2017.

The regional organizers at a specific time of the meeting bring together the different people who want to act on a cross-border level (Belgium, Luxembourg, northern France, Germany and the Netherlands). This makes it possible to strengthen the network of the Meuse-Rhine-Mosel territory “ (Case Study 3 - ECLLD)

Other events such as the festival "Les tambours de Gaïa" organized by Kokopelli (Case Study 2) seeks to broaden the question of seeds including the management of life and the relationship that humans have with it.

3.2.3 Varieties and history

Thanks to the different practices observed, a third type of learning emerges and has to do with the place of human history in the conservation and transmission of varieties. The Seed Savers Exchange association (SSE - Case Study 20) is fully in line with an approach that links varieties and human history.

Among the SSE staff, one seed historian researches and collects historical information about the varieties in the collection, and two staff members evaluate the varieties as regards agronomical and taste properties. These activities create new knowledge about the varieties. While the information on agronomical traits and taste enables people to know what to expect from a variety, the history passes on the heritage which have made it come into existence. As a whole, the information provided with the seed gives a sense of relationship with the environment and of broader food sovereignty. Stories are also an important means to pass on SSE's own heritage and values. Stories are also an important means to pass on SSE's own heritage and values. Most staff members we have met have at some point referred to the initiators of SSE and their initial idea and motivation. One staff member explains with fascination that the initial idea and commitment of the Whealy couple sparked something that lives on today in SSE. The heritage and values of the initiative are passed on through stories and in the every day practice based on open sharing and the care for OP and heirloom varieties and their stewards. Although these practices are intrinsically political – they are geared towards agrobiodiversity and an open and general access to that diversity – the political perspective of the activity remains implicit and is not something the people involved in SSE are used to talk about. In the same manner, values are communicated through everyday practices, as something that is passed on without necessarily putting them into words. Most staff members we have met have at some point referred to the initiators of SSE and their initial idea and motivation. One staff member explains with fascination that the initial idea and commitment of the Whealy couple sparked something that lives on today in SSE. The heritage and values of the initiative are passed on through stories and in the every day practice based on open sharing and the care for open pollination (OP) and heirloom varieties and their stewards. Although these practices are intrinsically political – they are geared towards agrobiodiversity and an open and general access to that diversity – the political perspective of the activity remains implicit and is not something the people involved in SSE are used to talk about. In the same manner, values are communicated through

everyday practices, as something that is passed on without necessarily putting them into words.

3.2.4 Structural supports

The achievement of socio-technical distinguishing devices (common living object; valuation of taste; label), events and the construction of relationships between varieties and humans requires a structure. We highlight two important elements in the structuring of networks regarding the 21 case studies: the role of a coordinator and the development of communication tools.

3.2.4.1 Role and place of a coordinator

Out of 21 cases, 14 have a coordinator which is an employee. The others have a voluntary coordination. Having an employee coordinator is essential according to SAVE (Case Study 13). Since its inception, staff has been hired to facilitate information sharing, exchanges and collaboration. Project office and staff also ensures that SAVE remains focused on the projects they have. The coordination seeks to involve SAVE members so that they spend time sharing their experiences and do not go off in all directions. In other situations, it is difficult to pay a coordinator. The Estonian initiative involved in the Growing Seed Savers Initiative (Case Study 6) indicates that the leaders so far feel they are not doing enough for member empowerment, because it is a voluntary organization, and a lot of work is on the chairperson's shoulders. Now that more people are interested in plant diversity, they hope that more of the work could be distributed.

As regards the ECLLD network, the network decided that this person should work within a national network, while remaining several months within other members. This system has a triple objective:

- 1) Avoid isolating the coordinator;
- 2) Give the coordinator the opportunity to immerse himself in the diversity of the members; and
- 3) Avoid that the coordinator adopts the vision of the member who hosts him/her.

The coordinator of various projects comes from Natural Parks or the research area (Cross-border Fruit Network; Crop Wild Relatives). In other cases, scientists support networks (Nordic Heritage Cereal Conference; Kaol Kozh; Poma Culta; Organic Seed Alliance). For example, since the 1970s, in Belgium, the Centre de Recherche en Agronomie (CRA) has been working on fruit trees. Initially, the CRA develops knowledge on the resistance capacity of apple varieties from "old" varieties. It means that they have not been selected for industrial production with chemical inputs. Mr. Lateur's objective is to provide fruit varieties that do not require inputs and offer taste and cultivation quality.

This knowledge comes from scientific practice: observation, characterization and evaluation of genetic resources. Conservation through use helps to strengthen the production of knowledge. After a long period of rigorous and methodical analysis, knowledge becomes scientific knowledge that can be used by the network's stakeholders. However, it is important to specify that the CRA-W is the scientific reference of the network and thus the key actor, embodied by M. Lateur, who allowed its structuring. Thanks to his expertise and public service status, the network has been able to expand by encouraging stakeholders in the sector to take up the challenges surrounding orchards of old varieties. Much of the knowledge held at CRA-W, produced by Mr. Lateur and his collaborators, is disseminated in the form of technical sheets for field actors. These are a key tool for transmitting knowledge and enabling field actors to connect to the network. Today, thanks to his position and notoriety, Mr. Lateur is the bridgehead of the network. Mr. Lateur's research status also allows the knowledge developed at CRA-W and in-situ to extend beyond the network's borders. However, as a research institute, some projects do not fall within their remit and do not fall within the missions of a research centre. Thus, Mr. Lateur had to form alliances with

key actors in the sector in order to develop the network on other activities and at different scales.

In the case of the Crop Wild Relative study, we also find a researcher at the starting and management of the network.

Knowledge about the importance of CWR and about the sake of their conservation is created by academic actors: researchers from the University of Birmingham and mostly by Nigel Maxted. This English conversationism has been working with his team for several years on CWR to increase their visibility. The research that is carried out, as well as its results, are communicated in numerous scientific articles that serve as a knowledge base for the network's knowledge and know-how. These scientific articles also allow knowledge to be recognized and discussed beyond the network, notably in scientific arenas. They also have the potential to raise awareness among new actors about the utility of CWR.

What is more; within the network, researchers from the University of Birmingham worked in collaboration with Natural England actors to identify the territory's "hotspots". A first study (2007) was carried out solely by researchers from the University of Birmingham. In 2016, Natural England wanted to carry the geographical analyses of these "hotspots" once more, to take part in the process and to confirm the results previously issued by the University's researchers. Thus, most of the knowledge that builds and animates the network comes from scientific skills and knowledge. This knowledge is built upstream the network construction but is applied when the genetic reserve is established. The academic actors have passed on their knowledge and know-how to the field actors so they can be mobilized and put it into practice. Nigel Maxted made a presentation, followed by a discussion with stakeholders on the Lizard Peninsula, to share with them the challenges and interests of CWR conservation. He also made recommendations to Natural England on land management and conservation to ensure the preservation of CWR habitats.

These two cases differ on how field actors are involved. In the context of fruit growers, the CRA wants to disappear as the driving force behind the network and focus on its scientific support. Thus, they created an association called Diversifruit and a certification system called Certifruit, while N. Maxted seems to be seeking to promote a conservation approach around the notion of Crop Wild Relative.

In addition to the involvement of research, we find several situations where Natural Parks play an important role in the coordination of a network (Parco Nazionale della Majella - Case Study 17; Resia Valley Garlic Case - Study 18; Parj's Custodian Farmers Network – Case Study 19), such as the case of Parj's Custodian Farmers Network.

The National Park has been the key player of the process and thanks to the staff professionalism and skills many activities were planned, and many projects were financed. After more than 15 years of continuous work and with the enthusiasm showed by local farmers that. The Park has succeeded in attracting and coordinating different actors (universities, farmers, restaurateurs, distributors) with specific skills to select, produce and promote local products from cultivated biodiversity.

3.2.4.2 Place and role of scientists

Since scientists are involved in different cases, we believe it is important to reconsider their roles. As mentioned above, this role may be to coordinate but it could also be to support knowledge production. For example, in the United States, public breeders located in universities propose and participate to research programs (participatory or not) to propose open-pollinated varieties that do not require inputs (see case study n° 20 and 21: Seed Savers Exchange and Organic Seed Alliance). In Europe, a minority of researchers offers participatory research. The hatching of the Kaol Kozh association (case study n°7) is reflecting that.

From 2001 to 2003, the Susicinio testing station tested more than 300 cabbage varieties (Conseil and Chable 2009), including 120 autumn cauliflowers, 100 winter cauliflowers and 80 pointed cabbages. Observation and testing plots have been carried out at farmer level in order to identify their adaptive potential at local level. These plots also aimed to seek to "combine the homogeneity of the product and/or agricultural criteria with the heterogeneity of the genetic background (Conseil et Chable 2008).

In order to build knowledge and access to "genetic resources", some initiatives collaborate with seed banks. The relationship to gene banks is different in each case studies. Some are avoiding them, others are collaborating.

3.2.4.3 Communication tools

The various initiatives develop communication tools between members. It ranges from the use of social media to the publication of books. For example, *Sușinerea pentru Asociația Agriculturii - ASAT* (Case Study 12) uses Facebook and a mailing list to communicate management points to members. These tools are managed and facilitated by one person.

To establish the link with its 12,000 members, *Kokopelli* (Case Study 2) publishes annually a book on seed production, a verified description and several post-production texts. *Kokopelli* manages to bring together heterogeneous groups composed of three networks: gardeners; activists and people linked to *Gaia*. Thus, people a priori not very or not concerned, can appropriate the different dimensions by discovering the projects of the association as well as the stakes carried by the "liberation of seeds and humus". The people involved, in part or in whole, in the mission that *Dominique Guillet* (founder) has given himself, spread seeds to all winds in the service of Mother Earth.

3.3 Good practices with regard to the consequences of obstacles

Based on the identification of the barriers for networking and their consequences (see Section 2.5), the networks seek to open up spaces for socio-technical experimentation for the breeding, multiplication, circulation and valorisation of products derived from non-DUS seeds. It involves the search for a common living object, a taste, a label. This good practice, different from one initiative to another, is seeking to open the limits of the European legislative framework. The demonstration of feasibility aims to obtain recognition of their practices (mass selection), their non-DUS seeds and their identities. The affirmation of an existence other than DUS is achieved through taste, the construction of chains bearing a sign of differentiated quality, and then to link the base and the short circuits to the challenges of building diversity in the fields. However, the good practices presented do not overcome the language barrier to include practitioners (farmers, gardeners) in international networks. Finally, in terms of structural funding, initiatives are usually regretting the lack of resources for structurally necessary functions (coordinator, communication). The initiatives underline that project management, in short periods of time, does not allow the development of a force for change. The potential exists but does not really have the means to deploy.

4. Pre-recommendations

This part is used to feed D 2.4 "Preliminary report on challenges and bottlenecks" and the Task 2.3 "Challenges and bottlenecks" lead by RSR as mentioned in the project description as follows: "Having drawn upon work and outcomes about terms and concepts (Task 1.1), context (Task 1.2), actors and stakeholders (Task 1.3 and 2.2), and having identified expectations, opportunities and limits (Task 2.1; Task 2.2), *Dynaversity* aims to elaborate a preliminary report on challenges and bottlenecks towards new partnerships between the

conservation, farming, gardening and breeding communities. This report will be discussed and validated thanks to the contribution of the SKEP and during the Let's Liberate Diversity (LLD) meeting in 2019».

Our preliminary recommendations read as follows:

1. Encourage multiplication rather than scaling up

This first recommendation focuses on how to approach the development of biodiversity networks. The case studies highlight the importance of territorial anchoring. The scale of the territory makes it possible to mobilise and create contact between the different actors. Thus, we recommend supporting both anchored networks and structures that facilitate the exchange of "good practices" between these territories. On the other hand, this general increase cannot overwhelm specificities. The challenge is how to create a common world without standards overwhelming specificities. The focus is then to redraw the global food system in order to make it more local and articulated by community-based economies.

2. Fostering experimentation spaces through trial and error

Develop a space next to the regular catalogues for other seed existences. To allow socio-varietal innovations to develop, it is necessary to have a protected space until they mature. Thus, as well as "incubators" for companies, we suggest raising funds for the development of participatory experimental spaces between researchers and farmers and seed companies (seed craftsmen) to develop varieties with evolving adaptive capacities.

3 Support the structural (time to build a common culture)

It seems essential for initiatives to obtain time security at the level of their structure. Project financing does not allow them to deploy their transformation proposal over time. Therefore, we recommend the development of a dedicated funding for network coordination.

4. Strengthen and develop action research on nutritional aspects

Taste has emerged as a way to distinguish products from non-DUS varieties. In addition to this organoleptic distinction, it is essential to study the nutritional contribution of these varieties. To our knowledge, this dimension has not been studied very much so far. One of the main obstacles is the price of nutritional testing. We will propose to create and finance a European programme to evaluate the nutritional intake of products from vegetables, cereals, legumes and fruits of non-DUS varieties.

5. Develop a space for reflecting (and experimentation) on the use of new technologies to develop and share knowledge on seeds (genetic resources)

Currently, new technologies are developing in small-scale agriculture. We propose to draw inspiration from various North American initiatives (SeedLinked; research programme involving chefs) to develop computer tools (application) for data collection, distribution of information on collaborative form at European level on non-DUS varieties adapted to the needs of its users (farmers, amateur gardeners).

5. References

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