



DIVERSIFOOD

Embedding crop diversity and networking for local high-quality food systems

Grant agreement n°: 633571

H2020 - Research and Innovation Action

D 5.1

Case studies of the marketing of products from newly bred lines and underutilized crops

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Due date: 31 August 2018

Actual submission date: 30 September 2018

Project start date: March 1st, 2015 **Duration:** 48 months

Workpackage concerned: 5

Concerned workpackage leader: Bernadette Oehen

Lead Beneficiary: ORC

Dissemination level:

- PU:** Public (must be available on the website)
- CO:** Confidential, only for members of the consortium (including the Commission Services)
- CI:** Classified, as referred to in Commission Decision 2001/844/EC

Comments:

The main authors changed the title, naming this report “Case studies of the marketing of products from newly bred lines and underutilized crops” rather than “Guidelines...” as stated in the DoA.

The reason for this change is that we are intending to complement this report in the following way:

- a) Recommendations for policy makers (D5.4) will be elaborated together with recommendation from the other tasks of WP5.
- b) The Guidelines for Practitioners will be presented as technical booklet as part of WP6, Task 6.1, this has been discussed and agreed with the task leader.

Abstract

The overall aim of Task 5.1 of the Diversifood project is to produce recommendations and guidelines for the marketing and valorisation strategies of biodiverse food products, including products from underutilized crops and based on newly-bred lines from participatory plant breeding. The work presented here identifies success and critical factors of existing initiatives, analysing the whole process of value-adding and communication from the genetic resource to the food product.

A common case study approach was used by national teams in eight countries, involving around 180 interviews with various actors of each initiative, including producers and a diversity of other supply chain actors and consumers. Results of the comparative analysis are presented into two separate sections, respectively focussing on eight case studies selling products from underutilized vegetables and grains, and on three cases of marketing of products from newly-bred lines from participatory plant breeding. The final chapter presents some common conclusions and recommendations. These are further elaborated in the recommendations for policy makers (D5.4) and a technical booklet (Task 6.1).

This study confirms that the systemic approach used here is able to contribute to the development of initiatives for the valorisation of biodiverse food products and supporting agrobiodiversity. This needs to consider both the internal coherence of the initiatives and external support, as well as all the different stages of the valorisation process.

All initiatives have the common aim to preserve the biodiversity of local and/or heritage crops, but differ in how they originated and developed. Some initiatives established from the interest of producers, and some from businesses recognising a demand for more diverse products by consumers. In many cases researchers and civil society organisations were strongly involved and key for the initiative development.

Common challenges relate to the need to overcome some technical problems in the farming and processing stage and improve some aspects of management. Lack of seeds and/or lack of good quality seed, low yields and low margins for producers have in several cases proven to be limiting factors that need to be carefully considered when developing business plans and seeking suitable forms of support. The legal framework of seed laws in general restricts the distribution of particular genetic materials, but some derogations are in place. Initiatives that originate mainly from the aim of protecting agrobiodiversity are often trying to identify and develop demand after they have started developing production.

A crucial factor to implement a valorisation strategy is the development of a common understanding of the distinguishing quality of the genetic resources and products among the actors. Special attention needs to be paid to the internal coherence of values and knowledge of the actors directly involved. Together with a good understanding of consumers' attitudes this is important developing effective communication of the values embedded in biodiverse crops and products and help consumers to understand them. Consumers' consensus towards biodiverse products, based on awareness and willingness to change consumption habits, is considered here as a crucial factor for the sustainability of biodiverse production systems. Indeed, many examples illustrate that the consumers as citizens are active participants of the initiative.

The cases studied refer to the nutritional value of biodiverse products, but also to the environmental, and social benefits from supporting the related production systems. Some also refer to cultural capital, local identity and networks and to heritage.

There is also a need for suitable tools for marketing and for more nuanced niche marketing strategies, targeting not only local but also national outlets and markets. Niche marketing strategies are built on long-term relationships, a special product quality and consumers' favourable orientation. Many initiatives rely on local markets and short chains, some finding innovative ways for example by

developing 'food communities'. Others have established cooperation with supermarkets, taking advantage of market trends (e.g. local products, superfoods and health food markets) and growing the market beyond the immediate local area. This challenges the common assumption that the most limiting factor for the development of biodiverse supply chains is likely to be a lack of consumer demand.

A focus on interaction with other networks and pathways illustrates the importance of relationships with similar initiatives elsewhere. All case studies have benefited from the support of researchers (e.g. in access to genetic resources, knowledge and funds) and of civil society organisations in terms of contacts and facilitation. Research support can prove to be important in relation to all stages of the supply chain, such as breeding and selection, crop cultivation, product quality, and market valorisation including providing evidence for product attribute claims. Other actors can also play a key role, in particular civil society organisations who act as facilitators in networking and knowledge building. Increasingly the thinking seems to progress beyond searching for old germplasm more towards adapted cultivars.

An appropriate business development strategy, based on a systemic approach considering all the different stages of the process and the various dimensions involved, provides the basis for supporting the long-term sustainability of the initiatives regarding the capacity to have a positive role in agrobiodiversity enhancement in the present and in the future. The study confirms the need for such a systemic approach, to allow initiatives for the valorisation of biodiverse food products to reach their full potential and through that support agrobiodiversity. This is important both for ensuring the internal coherence of the initiatives and for shaping and targeting external support. The cases also illustrate the importance of continued funding for research, incentivising a multi-actor and trans-disciplinary approach to reflecting the various dimensions and specificities of the initiatives.

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List of abbreviations

APHA	Animal and Plant Health Authority, UK
AT	Austria
BIO Austria	Austrian Organic Farmers Association
BOKU	University of Applied Life Sciences, Vienna
BPGV	National plant germplasm bank, Portugal
CCP	Cross Composite Population
CH	Switzerland
CIMMYT	International Maize and Wheat Improvement Centre
CREA	Council for Research and Experimentation in Agriculture, Italy
CTPB	Coordinamento Toscano dei Produttori Biologici' [The Tuscany Network of Organic Farmers]
DIVERSIFOOD	Embedding crop diversity and networking for local high-quality food systems
ES	Spain
FIBL	Research Institute for Organic Agriculture, Switzerland
GAS	Gruppi di Acquisto Solidale [Solidarity Purchase Groups]
HU	Hungary
INRA	Institut National de la Recherche Agronomique
IT	Italy
LLD	Lets Liberate Diversity
MOVA	Montespertoli Old Wheat Association
MV	Martonvasar, Hungarian breeder
OMIARD	Organic Marketing Initiatives and Rural Development
ÖMKi	Research Institute for Organic Agriculture, Hungary
ORC	Organic Research Centre
PPB	Participatory Plant Breeding
PSR	ProSpecieRara
PT	Portugal
RAS	Red Andaluza de Semillas
REWE	Austrian Retail Chain
RSP	Réseau Semences Paysannes
RSR	Rete Semi Rurali
UK	United Kingdom of Great Britain and Northern Ireland

1 Introduction

The overall aim of Task 5.1 of the Diversifood project is to produce recommendations and guidelines for the marketing and valorisation strategies of biodiverse food products, including products based on newly bred lines from participatory plant breeding. This is founded in the belief that embedding biodiversity at local level not only requires facing the agronomic challenges involved, but it is also linked to the appreciation of the products on the market involving the other phases of the supply chain and connections established with consumers.

The work presented here aims to identify critical factors of successful / unsuccessful valorisation strategies and to analyse in detail the whole process of identification-creation of value(s) of biodiverse plant genetic resources, their embeddedness in the production processes, communication and valorisation through the market, from the breeder to the consumer or from seeds to the final product.

The work used a broad approach to study 'marketing' that is conceived not only as an activity of product promotion, but a strategy that involves the whole supply chain around the creation and appreciation of value. Hamm (1991) quotes various authors in describing marketing as a 'market-oriented, entrepreneurial style of thinking in which customer satisfaction is seen as the key to reaching the company goals'. Food marketing approaches apply traditional marketing theory to agricultural and rural businesses, such as the marketing mix of the 4 Ps (Product-Price-Place-Promotion, theorized by McCarthy during the 1960s and diffused by Kotler during the 1990s) or the revised theory of 4 Cs (Consumer-Costs-Convenience-Communication, introduced by Lauterborn, 1990; or interpreted as Clarity-Credibility-Consistency-Competitiveness by Jobber and Fahy, 2009). An evolution to this approach adding the importance of the social dimension was developed by Schmid (2004) from studies about Organic Marketing Initiatives: *"Such collaborative marketing gets people working together to solve a market problem. The trust generated by successful collective activity builds confidence and gets people involved in wider networks"*. Further evolution in marketing goes in the direction to build up a close relationship with consumers and in general society.

The comprehensive approach underpinning the valorisation of biodiverse products are explicitly included in the food marketing approach used in this study. The definition and implementation of these strategies consider the complex nature of the value of biodiversity from plant to plate, which encompasses a multiplicity of components including many ethical and cultural values (i.e. social values). Some of these values, although not all fully translatable into monetary values, are proving to be important in differentiating such products from conventional ones.

The case studies presented include various attempts to develop a marketable product. They are at different stages, from just starting to well – successfully established supply chains. Cases also vary in scale and size and in supply chain structure and length, i.e. from local or regional markets and niche marketing to reach national or even international markets.

The authors want to encourage dialogue between the cases in a structured way, as well as learning lessons and providing recommendations for other initiatives that want to develop biodiverse products in future. The study is about people involved in seed conservation and breeding. This is a topic discussed at governments, universities and international companies but not with farmers or consumers. All the actors involved in the initiatives presented here see the need to change this system and give farmers and consumers back the control over the seeds. In more theoretical terms, they see a need for a transition of the seed system. According to the transition theories (Geels, 2004; Smith et al., 2005), at the basis of these processes is a reconfiguration of the technical-technological, organisational, social, cultural, economic and institutional components that influence practices in the diverse stages of the production-consumption process. Social learning activities that are linked to experimenting with new practices underpin this reconfiguration.

1.1 Aims

The common objective of the case study work is the identification of factors of successful marketing strategies for diverse local food and newly bred lines coming from participatory breeding.

The specific aim of the case studies in subtask 5.1.1 were identified in the framework (Rossi et al., 2016a) as to identify successful and failed marketing and valorisation strategies but also organisational, socio-economic, institutional and political factors in support or hindering the further development of the case investigated. The specific research questions are:

- How do the successful projects deal with bottlenecks and barriers?
- How do they communicate?
- Who benefits from adding the value valorisation of local diverse products and products from participatory breeding communicated (producers, retailers, consumers)?
- How can policy/networks and the legal and institutional framework support diverse product development and valorisation strategies?

The specific aim of the case studies in subtask 5.1.2 as set out in the framework (Rossi et al., 2016a) is to explore in depth the processes underlying the development of strategies of enhancement and market valorisation of products derived from the diversified genetic resources. In particular, it aims to identify which social learning processes and related practices can best contribute to the creation and recognition of social (ethical and cultural) values and their translation in economic values. The market valorisation of the biodiverse products allows the maintenance of the production systems and of the diverse genetic resources they manage. Specific research questions are:

- What are the main learning processes taking place in the different stages of valorisation strategies?
- How are the various actors involved in them?
- How do these learning processes give rise to new practices, so influencing the development and results of the different stages of valorisation strategies?
- How do the practices in turn contribute to new learning?

1.2 Outline of the report

Chapter 2 introduces the common approach of all the case studies that was set out in the guidelines developed. Chapter 3 presents results of the eight case studies of selling producers from underutilized vegetables and grains (sub-task 5.1.1), followed by Chapter 4 presenting the results from three cases of marketing of products based on newly bred lines coming from participatory plant breeding (sub-task 5.1.2). These chapters contain any specific aspects of the approach of each subtask, present the initiatives and the results of the comparative analysis. The final Chapter 5 presents some common conclusions and recommendations across all cases that were studied.

2 Methodological approach of the case studies

The main method used is that of comparative case studies. Case studies are investigations of a contemporary phenomenon in its real-world context (Yin, 2014). Case studies can also be more explorative, based on a framework or a theory (Ridder 2017).

The case study method has been widely used for the study of alternative food networks and initiatives concerning agriculture and agri-food system including in many European funded Projects¹ (for example Midmore et al., 2004; Schmid et al, 2004; Roep and Wiskerke, 2006, Galli and Brunori, 2013, Oehen et al, 2014). The task members' experience in several of these projects has been helpful to develop the approach for case studies in DIVERSIFOOD, based on a common framework (see Chapter 2.2.).

2.1 The case studies

The eleven case studies are different initiatives involved in the marketing or valorisation of biodiverse products at different stages of development, put forward by partners of the DIVERSIFOOD project (Table 1). All case studies followed a common framework and workplan with some differences in emphasis between the two sub-tasks that are explained in the following Section.

Four case studies covered biodiverse vegetable products (subtask 5.1.1.), five covered products from alternative cereals (subtasks 5.1.1) and three case studies focussed on bread-making using wheat varieties, landraces and populations obtained through participatory breeding (subtask 5.1.2).

Table 1: The eleven case studies of DIVERSIFOOD

Products from underutilized crops		Bread making from wheat varieties, landraces and populations from PPB (sub-task 5.1.2)
Vegetables (sub-task 5.1.1)	Alternative cereals (sub-task 5.1.1)	
Heirloom tomatoes, Austria	Heritage cereals, Spain	Bread making from a national PPB wheat programme, France
Landrace tomatoes, Hungary	Broa bread, Portugal	Seed marketing and bread making for CCP wheat, UK
Heritage vegetables, Switzerland	Emmer and Einkorn products, Hungary*	Bread making from old wheat varieties and landraces, Italy (three initiatives)
Purple carrots, Spain	Alternative cereals, Italy	

* Partly also reported in Healthy minor cereals (Oehen et al, 2014)

¹OMIARD—Organic Marketing initiatives and Rural Development (FP5 - [QLK5-CT-2000-01124](#)); SUS-CHAIN—Marketing Sustainable Agriculture: An analysis of the potential role of new food supply chains in sustainable rural development ([FP5 -QLK5-CT-2002-01349](#)); IN-SIGHT—Strengthening Innovation Processes for Growth and Development ([FP6- 44510](#)); SOLINSA—Agricultural Knowledge Systems in Transition: Towards a more effective and efficient Support of Learning and Innovation Networks for Sustainable Agriculture ([FP7-KBBE-266306](#)); FOODLINKS—Using knowledge networks to promote sustainable food ([FP7- KBBE- 265287](#)). Healthy Minor Cereals—Integrated approach towards small grain cereal production and diversification in Europe ([FP7, 613609](#) and <http://www.healthyminorcereals.eu/>)

2.2 The framework

A guiding framework for the case studies was developed building on work carried out as part of a regional project funded by Tuscany Region² (Bazzanti and Lazzarotto, 2006). This described five steps that occur when develop a valorisation or marketing strategy for biodiverse products (Figure 1).



Figure 1: Framework for valorisation strategy

The five critical stages of the developments are:

1. The mobilisation of genetic resources, which includes all the actions put in place to know, select, reproduce and improve the varieties that are relevant for maintaining agrobiodiversity;
2. The definition of specific quality, where the attributes of the genetic material and of the derived products are identified and codified;
3. The marketing and communication strategy, which refers to the choices/strategies/tools to manage the products on the market and to convey the values of products and production systems;
4. The interaction with other networks and projects, when initiatives for the valorisation of diverse food products interconnect with other pathways/projects/strategies;

² Typical products, perceptions of quality along the supply chain and potential for market development

5. The effectiveness and sustainability of the initiatives regarding the capacity to have a positive role in agrobiodiversity enhancement in the present and in the future.

All the steps are influenced by organisational, institutional/juridical, economic, cultural, social and technical aspects. The way these aspects interact with another one and in the different steps might influence the results of the valorisation strategy. This conceptual framework was implemented in both subtasks but with different emphasis.

2.3 The work plan and interviews carried out

All case studies also followed a common workplan with four stages, and common guidelines (Rossi et al., 2016) were provided to the national teams, with some different emphasis between the two subtasks.



Figure 2: Stages of the case study work

2.3.1 Stage 1 - Organisation of data collection

The preparation of the collected data involved the identification of the sources of data for the background analysis and planning of the data collection, including information about data protection and consent.

For the background analysis the partners were encouraged to consult grey and published literature that might be relevant to the case and publicity material including leaflets, internet sources (i.e. websites, blogs, social media).

A list of key stakeholders was developed from which potential interview partners were identified. The main aim in selecting interview participants was to understand the range of perspectives and views that have shaped the initiative.

2.3.2 Stage 2 – Data collection and first analysis

The main tool for data collection was semi-structured interviews with stakeholders of the initiative. This approach was chosen because it provides structure and, in turn, comparable data, whilst allowing for some flexibility to explore additional aspects that emerge during the interviews but that had not been foreseen initially.

Before beginning with any data collection, the researchers obtained a signed declaration of consent from each participant and followed national data protection procedures. A template consent form was provided including information for participants about the purpose of the study, willingness to participate and permission for the information provided and pictures and videos to be used.

A common interview guide was provided for each of the two subtasks (see Appendix 6 of the Case study guidelines). The interview guide included; questions related to personal background and motives for getting involved, interactions and relationships with other actors, perception of the initiative and change over the time, obstacles experienced and how they were overcome and unexpected things both positive and negative. The interview guide for the case studies on bread wheat from wheat varieties, landraces and populations from PPB (subtask 5.1.2) also included a list of 27 statements

about semantic relations that the interviewer should utilise to codify the results of the interviews (see Section 4.1 for more details).

In total 181 interviews were carried out for all case studies (see Figure 3). The number of face-to-face semi-structured interviews per case study varied between 3 and 19, covering the various stakeholders. In each case, the teams aimed to include about five producers (although this was not possible in all cases) and in total 62 interviews (about one third of the total) with farmers or growers. Interviews have also been conducted with other supply chain actors (such as processors, traders, retailers, millers, from restaurants) and other relevant persons for the initiative (such as directors, president, product manager, funders, extensionists, facilitators).

The approach to engage with consumers varied, four case studies carried out focus groups with consumers (in three cases combined with product testing) and in five cases, short interviews with consumers were used. In total the views of about 70 consumers were obtained, either through focus groups or interviews.

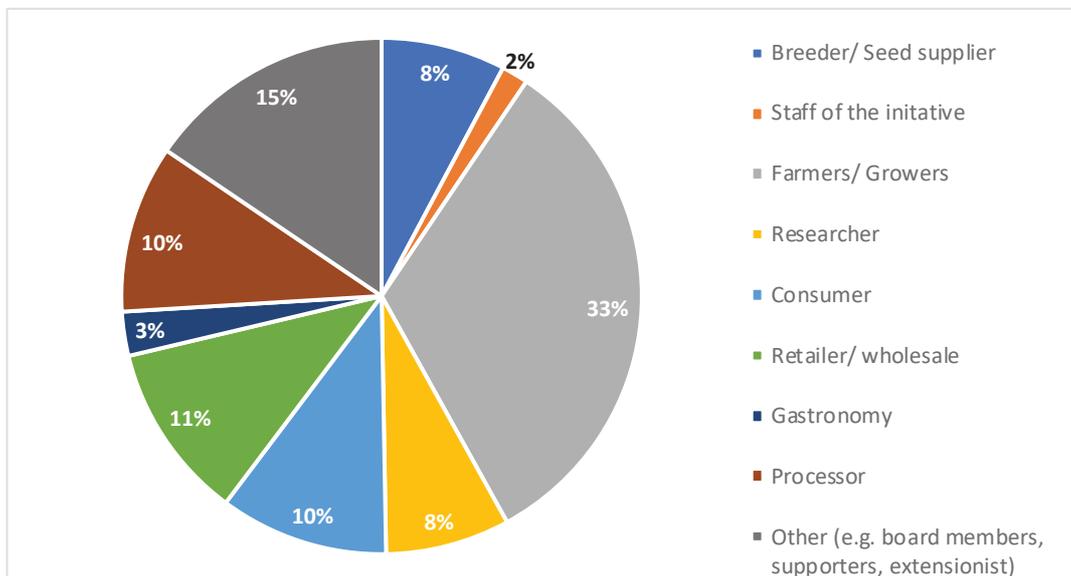


Figure 3: Distribution of stakeholder interviews in the DIVERSIFOOD case studies (N=181)

The national teams kept a log sheet of data collection and storage which is an important document to set out the evidence behind the case study report and their conclusions (Yin, 2014). In the case of subtask 1.5.1, the national teams carried out a first analysis of the data from each case study, leading to draft national reports that was shared with the task leader (ORC). In the case of subtask 1.5.2, the national teams carried out a domain analysis of the findings of the interviews, which was then analysed by the task leader (UNIP); the national teams also provided the other parts (initiative description, background analysis); this process led to the draft national reports that were shared with the national teams.

2.3.3 Stage 3 – Feedback and validation of the findings

A first analysis of the data led to draft national reports that were shared between the national teams and the task leaders.

In the case of sub-task 5.1.1 the task leader (ORC) provided feedback on the report and asked for some clarifications. The national teams were given the possibility to comment at the tentative comparative analysis at the 3rd Annual Project Meeting in Vienna in 2018.

The case studies in task 5.1.2 also carried out validation workshops, where the outcomes of the analysis were shared with in total 25 participants (ranging from four to nine per workshop). People invited were those that had been interviewed as part of the case study and, in one case other actors (belonging to the same categories of the interviewers) informed of the issue. This gave participants the possibility to validate the intermediate results of the analysis, leading to a final version of the national report.

2.3.4 Stage 4 - National reporting and comparative analysis

All the final national reports were then used for the comparative analysis in the two subtasks presented in this report.

The national reports followed a common template that covered:

- Background information on the initiative (including history of development, aims and actors involved)
- Short description of the approach
- Results
 - Perception and mobilisation of genetic resource,
 - Definition of the specific quality attributes,
 - Marketing and communication of the product quality
 - Enhancement of the network and interaction with other strategies
 - Effectiveness and consideration of the sustainability of the initiative and the need for public support
- First conclusions

This common template for all case studies ensured a common framework for reporting on the cases, identification of gaps in reporting, and ease of analysis across key themes. Each case study report was then reviewed and edited, after which the ORC communicated with individual case studies to clarify details and validate the reviewed report. This was followed by the task leaders for each sub-task carried out a comparative analysis across the cases in their sub-task (5.1.1. and 5.1.2), with particular focus on the specific research question of each subtask which is presented in the Chapters 3 and 4 of this report.

The case studies represent examples of local food, old and new varieties, and newly bred lines from participatory breeding. The following chapters describe the aims, network of actors, breeding/variety selection involved, final products and market channels and level of development of the products from these case studies. A rich picture of each case study, visualising the stakeholders involved and links along the value chain is presented in the Appendix.

3 Marketing of underutilized crops from vegetable and grains

Anna Sellars and Susanne Padel (ORC) with contributions from case study partners

“When you cultivate a traditional variety wishing to commercialize it... you have to see the demand in the market”. Arrate Corres, organic pasta producer, Malaga, Spain.

3.1 Specific approach for case studies on underutilized crops

The case studies followed the general approach set out in Section in 2. For these specific case studies, the national teams were encouraged to develop a list of stakeholders and potential interview partners, aiming for the following distribution, which was achieved in most cases (see Table 2).

- Five interviews with farmers, covering a diversity of producers involved.
- Five interviews with actors along the supply chain (processors, traders, retailers, mills, restaurants).
- Five interviews with other relevant persons for the initiative (consumers’ directors, president, product manager, funders, scientists).

Table 2: Data collection for the case studies of underutilized crops in Task 5.1.1

	Vegetables				Cereals			
	AT	CH	HU	ES	HU	IT	PT	ES
	Heirloom Tomato	Heritage Vegetables	Heritage Tomato	Purple carrot	Einkorn & Emmer	Alternative cereal	Broa bread	Wheat
No of interviews								
Breeder/ Seed supplier		1		2	2			
Staff of the initiative						3		
Farmers/ Growers	5	6	5	5	14	2	4	5
Researcher	3		3	3	2			3
Consumer	6							
Retailer/ wholesale	1	4	1	2				
Gastronomy	1	2	1	1				
Processor			1		1	2	3	5
Other	1			4	5	2	7	3
Total	17	13	11	17	24	9	14	16
Focus groups			2	1			2	
Consumers			24	5			14	

All eight case studies of the marketing of underutilized crops (Chapter 3) were analysed comparatively, starting with common shared values and considering the five themes of perception and mobilisation of genetic resource, specific quality attributes of the product, marketing and communication of the product, enhancement of the networking and integration with other projects and the effectiveness and consideration of the sustainability of the initiative and the need for public support. Key findings, examples and questions were drawn out to be included in comparative report presented here. First results of this analysis were presented at the Diversifood Annual Meeting in Vienna, Austria in 2018,

providing an opportunity for all case study partners to discuss and validate the findings and discuss the recommendations.

3.2 Description of the cases

3.2.1 Heirloom tomatoes (Bauernparadeiser), Austria

The “Bauernparadeiser” (farmers’ tomatoes) working group was established in 2010. The initiative came from gardeners who grow heirloom tomatoes (mostly for direct marketing) and found their own needs neglected by the formal seed systems. Therefore, Arche Noah decided to build an open network for interested people to participate in. The network aims to support the use of open pollinated varieties and decentralised on-farm breeding to create seed sovereignty and good product quality, through collaborative learning, where each member of the working group contributes individual skills and experiences.

This network involves organic tomato farmers, the organic farmers’ association BIO AUSTRIA, a horticultural school and research stations, the University of Applied Life Sciences Vienna (BOKU) and the seed savers’ organisation Arche Noah.

In the first years the initiative focused on collecting agronomic characteristics of commonly used heirloom varieties. In the past few years specific work on important pathogens in organic cultivation systems has become more and more important. Participating farmers conserve and improve individual varieties, through on-farm selection, and have meetings to discuss cultivation practices and seed quality (such varieties screenings, genetic resistance to pathogens, etc).

The tomatoes are sold unprocessed and, in most cases, directly by farmers at local markets. One farmer sells to the biggest food retailer in Austria, REWE Österreich. Most actors of the working group are happy with their direct sales approach and not interested in an enlargement of their production to supply retailers, as well as reluctant to stimulate external competition.

3.2.2 Landrace tomatoes, Hungary

The on-farm network of landrace tomato producers aims to assess, compare, and evaluate Hungarian tomato landraces, develop organic production recommendations, and explore marketing opportunities for the varieties, as raw or processed products. The network in Hungary involves around 40 farmers, and researchers at ÖMKi and the Corvinus University of Budapest Experimental and Research Farm. It covers four regions of Hungary and 15 landrace varieties.

ÖMKi propagates seeds which are mainly bought from Austria or Germany, as there are no organic seed producers in Hungary. Farmers for the most part depend on this propagated material, although some of them save seed.

The tomato landraces are valued by farmers due to their genetic diversity and adaptability, but many do not meet the requirements of industrialized production and therefore have largely disappeared from cultivation. However, other favourable characteristics such as disease resistance, rich taste, higher nutritional value may mean that some local varieties may perform well under organic cultivation in Hungary and meet demand from a higher-value market.

Consumers and producers are showing increased interest in local tomato varieties, in particular due to their special taste, shapes and colours. Currently the value chains are short, and producers are small-scale farmers; the initiative is at an early stage of development, with no capacities to process to supply to mainstream retailers.

3.2.3 Heritage vegetables, Switzerland

The initiative is led by Pro Specie Rara (PSR), a Swiss non-profit organisation, and aims to support and promote the conserving, breeding and cropping of old, traditional varieties. It consists of a network of volunteers involved in knowledge sharing, seed propagation and conservation as well as producers involved in breeding and trading new lines with interesting characteristics from old varieties and marketing the vegetables under the PSR label.

The initiative works along the value chain, from seed to the sale of products as well as project acquisition; this involves breeders, the Federal Office for Agriculture which assists in the preservation of species, farmers, Coop, the main large-scale retailer of the PSR-products. Other actors working in the sale of non-food products such as propagators selling seedlings at markets, and community groups selling grow-your-own starter kits and growing courses.

Pro Specie Rara employs 20 staff who, with help from volunteers, donations and project money from the Federal Office for Agriculture, work to collect and preserve old varieties, totalling more than 32 species and 1600 varieties to date. The aim is to preserve old varieties for cultural and genetic diversity, to enable in-site conservation of these through farming and gardening and provide free access to these varieties for any interested actors.

There is a high level of interest from consumers in heritage Swiss varieties of vegetables. The logo of PSR is also used on the product. The label is widely understood and valued and third party certified.

3.2.4 Purple carrots, Spain

The case study aims to analyse the productive context and the marketing of two types of purple carrot, local to the La Janda and Cuevas Bajas areas of Andalusia. The case study focuses on two actor networks in these areas, who aim to collaborate to recover and commercialise production, heritage and genetics of these varieties of purple carrot. These networks include local farmers, Red Andaluza de Semillas, local municipalities such as Cuevas Bajas, cooperatives such as El Encinar, La Ortiga and La Verde, researchers at Malaga University, Plamtaromed (a local seed variety microenterprise), and Slow Food Sevilla.

The varieties have been preserved by local farmers and gardeners for generations, who shared seed among them. A seed enterprise now trades the seed, although sharing of seed is still common. In Andalusia, as well as in other Spanish regions, you can still find different varieties of purple carrots, which differ in size, colour intensity, internal colour, and culinary uses.

Some processed novelty products such as beer, gin, vinegar, carrot jam, pate, juices/soups and dried snacks and being popularised in nearby cities, or the carrots can be used to make special local dishes and tapas, have a potential use for food colouring, and the seeds are sold to small producers and amateur growers.

The farmers valorise these products mainly through short distribution channels of organic production, often through local markets and festivals, where they are recognized and valued by consumers for their organoleptic and nutritional characteristics. Market develop differs among actors, as there is no one consolidated marketing channel; some producers are in the early stages of market development and are less interested in upscaling, whereas others seek to develop processing and distribution capacities.

3.2.5 Heritage cereals, Spain

Red Andaluza de Semillas (RAS) have been working on projects with farmers and researchers to develop value chains for local varieties of wheat used in artisanal bread, pasta and other cereal products. The projects involve working with farmer groups growing wheat and other cereals (e.g. rye

and spelt), organic and artisanal bakeries, wheat and pasta processors, and the National Centre of Plant Genetic Resources.

Farmers in the region are increasingly interested in growing common/bread wheat and durum wheat landraces. In most of the cases they have begun by bulking up such varieties through seed donated by the National Centre of Plant Genetic Resources or other farmers. Only in certain cases where the availability of seed was higher, has it been possible for these farmers to cultivate a bigger area.

In the recent years there has also been a growing interest in local, artisanal varieties of cereals and their products by consumers, and numerous initiatives involving baking bread with sourdough have appeared in Andalusia. The potential for development of this production and commercial activity is huge, although currently the value chain is relatively new, and both processing and sales are mainly done at the local level through local small-scale millers, bakers and farmers markets. To carry on with this development it is necessary to connect the different actors and start up appropriate valorisation strategies.

3.2.6 Broa bread, Portugal

The programme aims to, in the long term, improve yield and maintain quality of maize landraces for maize bread under participatory plant breeding and in-situ conservation of landraces in sustainable agriculture conditions, as well as develop capacities for maize breeding. In the shorter-term it aims to register varieties or develop ways allow farmers to obtain quality seed for maize bread quality, identify and develop routes to market in local supply chains for maize bread, and better understand consumers' preferences toward traditional maize varieties and local food.

The Broa bread network in Portugal consists of farmers, breeders, researchers, and local millers, bakers and shops who sell maize bread that has been traditional to the area for generations. The Polytechnic of Coimbra is involved in quantitative genetics, socio-economics and participatory plant breeding with farmers and the scientific community, providing a multidisciplinary and transdisciplinary approach.

In the 1960s Portuguese maize breeders, conscious of the threat to the unique national maize germplasm caused by diffusion of hybrids, started a regional collection of maize germplasm. More than 3000 accessions were collected and stored at the national plant germplasm bank, BPGV, and in the 1980s the scientific community began to see the need for in-situ/on-farm conservation, initiating participatory plant breeding (PPB) programs funded by CIMMYT. The varieties that were bred from these programmes focussed on breeder and farmer needs, and due to the choice of local adapted germplasm, diversity and quality were considered as the priority traits.

The final product is a regionally specific type of maize bread, distinct from much of the maize bread in the domestic market; it is reported to be of higher quality and taste, and requires traditional recipes and methods of baking, so it is considered of high cultural capital in the region. Despite this the market is relatively undeveloped, being maintained through loyal customers in niche local bakeries and markets.

3.2.7 Einkorn and emmer, Hungary

The project aims to promote the production and marketing of einkorn and emmer, with the aim of diversifying from the main crop dinkel. The value chain involves a small group of stakeholders including less than 10 organic producers, the Agricultural Institute, Centre for Agricultural Research at Martonvasar (as the breeder), Naturgold Ltd. (the owner of available einkorn and emmer varieties, as well as seed and grain trader and processor), Körös-Maros Biofarm Kft. (a producer and processor), and approximately 3 to 4 organic bakeries.

In Hungary only two einkorn varieties and one emmer variety are listed in the National Variety Catalogue: Martonvasar (MV) Alkor, MV Menket and MV Hegyes, which were bred by a state

organization, the Agricultural Institute, Centre for Agricultural Research. The trading company Naturgold purchased the rights of the two available einkorn and one available emmer varieties and are the only commercial supplier of seed. Producers can only purchase seed if they also sign a contract to sell any produced grain to Naturgold. Other varieties of seed are currently not available in Hungary, or there is very limited availability e.g. of land races.

The einkorn has two main uses: some varieties were bred as part of the 'Alkobeer' project to make einkorn beer; einkorn flour is used to make bread, beer, pasta, flakes, cookies, crackers, as niche high-end nutritional product (low carb and gluten, high nutrient and high protein). The emmer grown is used for bread and pastries as niche high-end nutritional products (marketed as high protein and fibre).

For the most part, products from both einkorn and emmer occupy niche health-food markets which are still in development on a national and international scale; the marketing is led by Naturgold, who already has established value chains for other cereal and health food products. However, the project to sell einkorn beer has an annual budget of approximately 2 million Euros and sells around 100,000 33cl litre bottles. The potential of niche cereal markets in Hungary was also studied as part of the Healthy Minor Cereals project (Oehen et al, 2014).

3.2.8 Alternative cereals, Italy

The companies Shebar® and Prometeo have been working, which selecting and breeding both heritage and new varieties of alternative cereals, aiming to support the diversification of cereals through new markets.

Prometeo is working with a network of farmers producing the seeds and another network of farmers cultivating the crops. They process the grain, make the pasta, organise the sales and marketing and information campaign about these old crops. They work with public research institutions and technicians to support their activities. The Shebar project works with the regional tourism board Pianura Bresciana who finance and support the initiative; the local food consortium; the agricultural cooperative L'Antica Terra, who cultivates the einkorn; the local pasta factory Tradizioni Padane who introduced a production line in 2007 dedicated exclusively to the einkorn Shebar®; and local millers and bakers and a beer factory.

Prometeo chose to create its own varieties of cereals by selecting varieties registered in the National List of Varieties to breed from. These varieties are multiplied and certified by Prometeo and the certified seed is used by farmers who are part of the Prometeo's chain of production. Other research and breeding programmes on are ongoing, including einkorn, spelt, durum wheat and barley.

Shebar® originated from a research project by CREA (Council for Research and Experimentation in Agriculture) and the University of Milan aiming to study the agronomic, technological and nutritional potential of five varieties of einkorn. The chosen variety of einkorn was then registered with the trademark Shebar® and launched on the market as the oldest cereal that is still cultivated in a small area of the plain of Brescia province.

The projects use durum wheat, emmer, einkorn, spelt and barley for pasta, bread, biscuits, flour and beer; the products are marketed as having high nutrition and health benefits (such as being prebiotic and with a low glycaemic index), and in some cases there is an emphasis in the marketing on the local heritage of the cereals, where relevant. These are sold through local bakeries, specialist health food channels, and to hotels and restaurants, and Shebar® is looking into expanding into specialist international markets.

3.3 Comparative analysis

3.3.1 Mobilization of local genetic resources and motivations

All case studies have the common aim to preserve biodiversity of local and/or heritage crops, by definition of their involvement in the DIVERSIFOOD project.

The first distinguishing factor can be identified from the development history. Most cases were driven by a strong commitment and longstanding belief in biodiversity conservation and seed sovereignty, at either from producers or consumers. These include the case of purple carrots (Spain), broa bread (Portugal), heritage cereals (Spain), landrace tomatoes (Hungary), PSR labelled products (Switzerland) and heirloom tomatoes (Austria). For most stakeholders involved in these cases, economic returns were considered as by-products of the necessity of collaborating with retailers, or a fortunate bonus in market success, but not the primary motive for involvement. For example, the gardeners who established *Bauernparadeiser* (farmer's tomatoes) in Austria grow heirloom tomatoes mostly for direct marketing and found their needs neglected. Therefore, they decided to build an open network for interested people. Most of these that that originated from seed that had been saved by local farmers and shared among the local farming community are entirely dependent on their own capacities to continue the preservation of genetic diversity and constrained by their inability to trade in often unregistered seeds.

On the other hand, the interest in heritage and local genetic resources also arose from recognising a perceived demand or seeing a niche in the market (e.g. for nutritious or quality products), or from a wish to diversify the range of products sold and enter new markets. This is noticeable as a driver in the case of alternative cereals in Italy and einkorn and emmer in Hungary. Emmer and einkorn in Hungary are being produced as an alternative to the saturated organic dinkel market, although they are non-native species with very few varieties in the country, sometimes reliant on imported seed. This highlights the opportunities provided by crop diversification in establishing new markets, regardless of local heritage. The only seed available is through the grain trader Naturgold and farmers buying seed are contractually obliged to sell the harvested crop back to the trader, limiting their autonomy in establishing independent sales channels of their own. Meeting a perceived demand was also important for adapting heritage vegetables to the current production system in Switzerland.

A second distinguishing feature is whether or not the genetic resource is a heritage or old variety or has been adapted. The Hungarian cases are working with registered varieties of Emmer and Einkorn. And several initiatives also changed their emphasis over time, started with heritage lines but also genetic resources that are better adapted to their conditions. This is case with growers of Heirloom tomatoes in Austria, where many actors felt that the breeding needed would be best done by or in cooperation with professionals, although they acknowledged that on-farm breeding facilitated the preservation of characteristics and varieties that are individual to local contexts and are perhaps incompatible with the needs of professional breeders. The need for in situ conservation of maize varieties for bread making in Portugal was recognised by the scientific community in the 80s that initiated participatory plant breeding (PPB) programs with external funding. The varieties that were bred from these programmes focussed on breeder and farmer needs, and due to the choice of local adapted germplasm, diversity and quality were considered as the priority traits. The alternative cereal initiatives in Italy also initiated from breeders' aim to improve heritage lines in situ with local farmers.

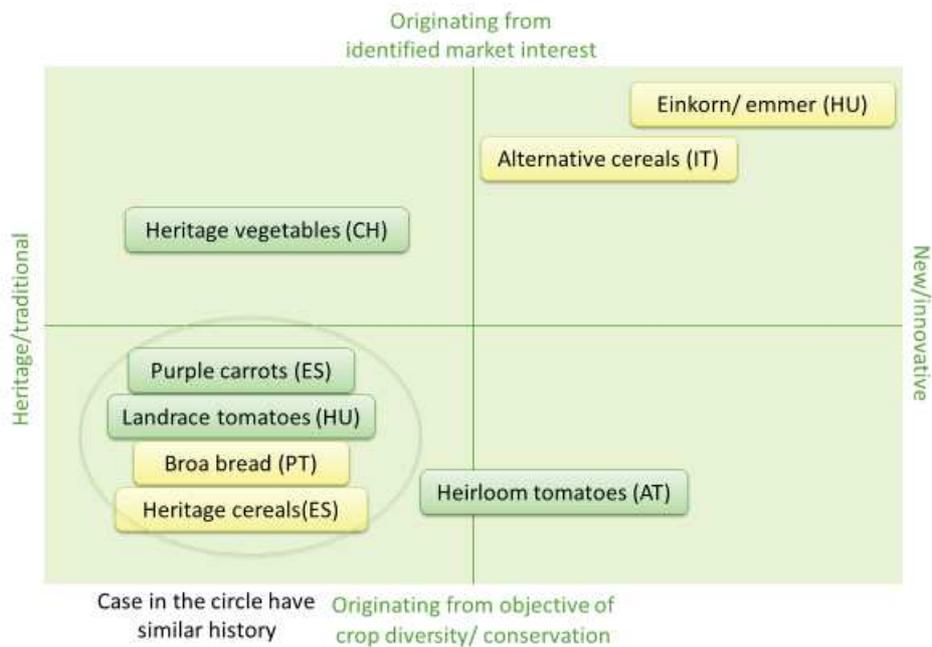


Figure 4: Characterisation of the case study initiatives according to main aims and motivations.
Source: Own data.

3.3.2 Definition of the specific quality attributes

3.3.2.1 Agronomic practice

The adaptation of agronomic practice is a common reality of working with heritage, alternative and local crops, whether this requires an adaptation of machinery, spacing and rotation of crops, application of different/additional, or acquisition of knowledge specific to varieties that are new to farmers (this is particularly relevant to cases like Emmer and Einkorn in Hungary where there is little or no experience of farmers growing the crop). It is important for the technical and advisory services to be made available and the cost of these to be included in the price of the product if initiatives wish to maximise the efficiency, productivity and sustainability of production

3.3.2.2 Quality attributes and marketing

The emphasis on quality is a main selling point embedded along the value chains of the cases studied, including quality-oriented methods of production, as well as quality of produce and derived products. For heritage produce such as tomatoes and purple carrots as well as bread from alternative cereals, smaller-scale, hands-on and traditional methods of production are closely linked to the perception of care taken and artisanal skills involved in ensuring products' quality. In the Spanish bread case study, consumers prefer the artisan bread because they feel that modern bread does not have the same quality, and they associate ideas of 'utopia' and 'eco-friendliness' to their involvement in localised food systems and supporting the preservation of traditional mills. For a restaurateur too, the quality of the product is important, such as the appearance, aroma, taste, as well as sometimes the story and locality also. Local and traditional restaurants can offer a good initial market for niche products, especially with products that are lower in cost on their order list, such as bread, or seasonal vegetables, as the

difference in cost may be small relative to returns from advertising with labels such as 'local', 'seasonal', 'artisan' and 'traditional'.

3.3.2.3 Health and nutrition markets

The increasing consumer awareness and interest in nutritious and health food products is noticeably providing opportunities in targeting specific consumer groups and highlighting particular qualitative attributes of the products. Across the cases studied, various terms were chosen for use in the communication and marketing of the product, including: 'super-grains', 'low glycaemic index', 'prebiotic', 'high nutrient', 'gluten free', 'low gluten', 'high in antioxidants'. Low gluten and gluten free heritage/alternative cereals in particular show possibilities to enter new markets, in addition to, or instead of, a focus on local and traditional sales areas. This could be in the marketing of traditional maize broa in Portugal through niche health-oriented sales channels, or in the capture of value in premium products aimed at specialist markets, such as emmer-, einkorn- and durum wheat-derived products in Italy and Hungary.

It is important to mention here, however, the controversies around the authenticity and ability to quantify specific health and nutrition benefits from such products. Whereas logos and labels such as organic require rigorous measures and certification to support marketing claims, many of the labels listed above are used at the discretion of the manufacturers, and, in the case of gluten-free cereals, have been known to be based on dubious scientific evidence. Collaboration with research stakeholders, such as the partnership with the purple carrot initiative and the University of Cordoba in Spain, can prove beneficial both in the validating claims made in the marketing of the product, and in feeding research into quantifying nutritional differences relative to conventional products.

3.3.3 Marketing and communication

3.3.3.1 Supply chain management and logistics

Beyond the farm, the degree of management of the supply chain correlated strongly with the level of market establishment, although a direct causal relationship between these factors is problematic to identify. For example, less developed markets such as heritage tomatoes in Hungary and purple carrots in Spain indicated that the lack of organisation of the network restricted their ability to upscale, and that they wished for a cooperative to be established to help with producer support and market development. With many producers in these initiatives operating on a small-scale, coordination of the collection of produce would be beneficial, but that involves complexity and requires an actor to take responsibility, which is challenging in a fragmented network. This fragmentation of existing networks seems to result in a lack of negotiating power further down the supply chain and the marketability of the crop, perpetuating income insecurity for the farmer. Farmers are more willing to try new varieties if they are guaranteed of productivity and a fair price, emphasising the need for collaboration and assurance along supply chains of underutilised crop varieties.

The case of emmer production in Hungary is a good example of how engagement of a larger actor coordinating much of the supply chain can support crop diversification at a farm level. By identifying a market potential, the seed and grain trader was able to ask farmers to diversify their crops and provide a guaranteed market to incentivise them to do so. However, the success depends on one actor who is knowledgeable and influential enough in the market, as well as willing to take on the responsibility of coordinating much of the supply chain, which are conditions that smaller and non-commercial enterprises may find much more challenging. The farmers are contractually obliged to sell to this outlet.

This coordination is more crucial for the successful marketing of diversified crops where adaptability along the supply chain is necessary, involving a greater level of communication and negotiation than

in more conventional supply chains. These adaptations are generally either adaptations to technique or equipment, or adaptations requiring the separation of products from more conventional products. For vegetables the main challenges noted by the cases studied were in maintaining the quality of the produce in transportation between the farm and the consumer; tomatoes are susceptible to damage in transportation which limits the geographical scope of marketing, and carrots dried out when washed. This has led some supply chains to work with processors and wholesalers who are more willing to take secondary-grade or all sizes of product, processing these through pasteurisation, drying or canning; this can valorise what might otherwise be waste, and potentially open up markets in a wider geographical area. Alternatively, geographical limitations arising from perishable nature of heirloom tomatoes in Austria, are seen as an advantage. This creates more potential for farmers to sell more directly and locally, and reduces the risk of developing external competition. Therefore, the members of the group are not interested in developing longer supply chains.

Cereals in particular offer a greater number of challenges for supply chain adaptation, as the cereal has to be processed more before the end product than the horticulture products studies. For example, harder or softer grains require different milling techniques and separation in the mill, as well as skills and experimentation required in baking with the flour (including differences between grains, flour blends, batches and baking methods), restricting these cereals to work with small-scale and artisanal operations in the majority of cases. In Hungary, where the seed and grain trader Naturgold aims to create a commercialised international market for einkorn, they acknowledge that it will take time to build greater and steadier supply to encourage larger bakeries to take on the flour, but for now they are limited to using specialist bakeries or selling to households or gastro-bloggers.

3.3.3.2 External communication of initiative/product

"If you want to product a different product it should be sold as something different as well."
(Spanish baker)

Among the seven case studies a variety of communication strategies were used to market the product to consumers, ranging from word of mouth in the local community, to campaigns on social media, or creating product websites. The Broa initiative in Portugal and heirloom tomatoes in Austria are two of the least publicised, relying mainly on local, long-standing customers who are familiar with the products, their heritage and story, and know where to buy the products. Portuguese actors reported that it is difficult for non-regular customers, such as tourists, to buy the bread, as sales channels (usually through local shops, bakeries, markets and farmers selling door-to-door) are poorly advertised, the product is not available through supermarkets, and there is a lack of clarity for those not familiar with the product on distinguishing from more mainstream types of maize bread which are quite different. While the current network may aim to support local production rather than commercialise and is closely tied to the values and story of broa bread, it will not necessarily support business sustainability in the long term, without considering how to better reach out in communications to new consumer groups.

Other similarly local-level initiatives on the other hand have begun to explore ways of reaching beyond their existing consumer base. Tomato growers in Hungary sell some produce through social media (e.g. Facebook), and have proposed the creation of a website to communicate the farm and research learnings, with descriptions of the different varieties, photos, dish recommendation and recommended growing conditions. In contrast, some purple carrot producers in Spain viewed the use of social media in promotions with scepticism and were worried that it might create unsustainable or unreliable demand that doesn't fit with carrot seasonality or quantities availability.

Websites have proven a powerful tool in reaching and expanding markets and in communicating the products' diversification story and the quality attributes. PSR have an online species database called 'variety finder' for engaging the public in learning about Swiss heritage varieties, and the external

communication of the initiative is seen as one of its greatest strengths. Webshops selling products from cereals in the Hungarian and Italian case studies have allowed them to reach a geographically wider consumer base, increasingly international, as well as target the communication and marketing of the nutritional quality and health information of the products e.g. low gluten content. Furthermore, the Alkobeer project in Hungary managed to attract a generous marketing budget and has had success in producing a short documentary about the beer, television and radio features, and a Facebook campaign, which will help support the valorisation of other products from diversified crops.

Despite evidence of success in leveraging product sales through media, cases working with shorter value chains expressed that it is easier to convey the qualities and local heritage of the product by communicating face-to-face, and that there was value in consumers being able to meet and talk directly to people involved in the production of the food. The Spanish bread case study in particular notes the challenges of communicating the different types and flavours of bread from alternative and heritage cereals, and the processes involved in milling and baking. As one seller said, “most people need to explain it to them there, through word of mouth not leaflets”, but that “the people in sales have to be motivated to explain”, which not all are. They did however recognise the value in having traditional style paper bags with stamps, and the opportunity of having blackboards in bakeries with a ‘menu’ of breads, describing each’s characteristics and how it is made, similar to styles of advertising craft beer or whisky.

Communicating this story and the values of the product, whether in person or through a website, is key for selling under-utilised crops as a differentiated product from the mainstream, and creating an understanding to consumers about the value-added of such products. One producer stated that in such food networks where “the cultural anchor [of the crop] plays an important role in the preservation”, if one is able to communicate that in a way to inspire a customer once, they will want to discover it themselves, which can serve to sustain diversification projects into the future. Furthermore, capturing the lifestyle and interests of target consumer groups within the communication narrative and marketing channels can enable ‘traditional’ and ‘heritage’ products to appeal to people who would normally be unaware or uninterested, as the Swizz initiative have managed to do in engaging an increasingly young and urban population for PSR products.

3.3.3.3 Interactive events

Tastings, fairs and exhibitions are common across most case studies, and reported as very effective in educating and raising awareness among potential new customers, and communicating the quality and taste of the products. Tastings are often done at organic outlets or at local markets, to attract customers who are already more engaged in local and quality foods. Fairs also allow initiatives to emphasise the regional and cultural identity of products, such as the Festival of the Purple Carrot, run by the local council for 12 years in Portugal, and showcasing the characteristics and uses of the purple carrot both to local and to tourists. Similarly, ‘best broa’ competitions are held for the best maize bread at an equivalent festival for a local Farmers’ Cooperative Association in Portugal. Various projects also have success in partnering with visitor attractions like castles, museums and community gardens, to exhibit varieties and run open days, workshops, educational talks and markets. The annual Fair of Genuce in Spain, showcasing crops (including cereals) to 2500 farmers, targets farmers specifically as potential growers of heritage cereals. In 2012 an urban tomato project was launched in Switzerland to encourage people to grow their own vegetables on balconies and other small available spaces, raise awareness and interest in PSR’s quality products and the brand. This catalysed interest for the grow-your-own starter kits that are now being sold, including seeds for salads, tomatoes and poppies, with a photo competition to encourage people to get involved.

3.3.3.4 Consumers' willingness to pay

The ability to effectively communicate the quality, story and added value of a product is closely linked to consumers' willingness to pay. Where some projects struggled with this, they experienced a lot of public confusion or ignorance around the product and the price being asked. Farmers' market sellers reported to be more successful in selling as they were able to explain face-to-face the quality and value of the product and address a lack of understanding by consumers which might make them unwilling to pay any more for a product that they aren't familiar with. Additionally, it is also likely the case that the regularity of local markets and the type of consumers that these attract also self-selected people who are more aware of and prepared to spend more of quality and local products.

By contrast, in Spain, where bread from heritage grains is sold for between 50% and 70% more than regular bread to compensate for the greater costs in production and processing of the flour, most customers are reported to be unwilling to pay so much. By contrast, in Hungary consumers were reported to be willing to pay between 20% and 70% more for the product, although perception of how much this depends on those reporting it. The project leader was much more ambitious in their estimations than the retailers, but the overall argument was that customers were enthusiastic about the quality of the products, so price was not a limiting factor; indeed, demand was reported to be the factor most limiting to the market. Similarly, while Austrian consumers reported to be willing to pay 20-40% more for heirloom tomatoes, whereas they were sold for 40-60% more than organic tomatoes, you might expect that demand would fall short of supply but like in Hungary the limiting factors was from supply suggesting that market buyers are not always very price-sensitive. Despite the higher price of bread from alternative cereals, many consumers in Portugal (and some in Spain) felt that as the bread keeps better and has a better flavour and texture compared to regular bread, so they are happy to pay more for it. The price for the broa bread from traditional varieties in Portugal is around 15% higher than other bread, but this premium may not be fully sufficient to compensate producers for the lower yield in production that may be less than half of that of commercial varieties.

It is important to recognise quality factors as informing consumer choice as it in turn informs how a product might be publicised (e.g. through tastings not just descriptions); without enough consumers understanding and valuing the quality attributes of the product and being willing to pay more for it, the leader of the bread initiative in Spain argued that there would be little point in its existence.

Some Spanish bread sellers try to keep a uniform price across their breads to manage price expectations, despite that some flours much more expensive than others. This way they are able to compensate costs of more expensive bread production with those costing less and reduces the need to justify the factors influencing costs in detail to consumers and overwhelm with information. The diversity of cereals and breads in this case is definitely a benefit, and points to the fact that diversity at 'point of sale', as well as in the field, is therefore helpful for enabling crop and value chain diversification.

3.3.3.5 Labelling and certification

One commonly suggested strategy to communicate the story and provenance of the products among the case studies is through labelling, whether that is the writing and aesthetics of packaging, distinguishing the brand or product through a chosen name or logo, or through certification logos. Where labelling had been used, stakeholders found it valuable in increasing the visibility of the product in a simple and accessible way. Consumers in Switzerland felt that the well-established PSR label 'has high credibility and a positive image among the public'. However, in order for this to have value there needs to be awareness, understanding and trust of consumer; it is difficult to determine whether the recognition by Swiss consumers is directly attributable to the label itself, or indirectly to the strength of its developed network for distribution, marketing and communication of their products.

For this to work there needs to be clarity in exactly what aspect of the product is wanted to be communicated, and what the intended market will identify with, as there cannot be one size fits all recommendations for the labelling of underutilised crops or their derived products. Some initiatives felt that a denomination of origin would be the best way to distinguish the product from others, by emphasising the locality and provenance in the labelling; this was particularly noted by the Spanish purple carrot case study, where they wished to differentiate the local carrot from other varieties of purple carrot around the world. In other cases, such as the more national and international markets for Italian and Hungarian cereals, having organic, halal or kosher certification and labelling was a greater, and more universal, strength in marketing.

For some projects it was felt important to instead use a label that recognises and communicates the role of breeders and growers, emphasising the network and their aims (e.g. seed sovereignty) in the labelling, rather than a specific crop per se. This shows another way of tying provenance into the labelling, except that rather than linking a product to a particular geographical area, it attempts to link consumers to the producers in 'personalising' the producer network in the communication of the product. This strategy is linked to the feeling from several cases that a fundamental aspect of labelling is a need to tackle consumer doubts about the authenticity of the product, whether this is done through a network recognition label, variety recognition level, or certificate of origin.

3.3.4 Collaboration and networking

3.3.4.1 Collaboration with other projects and initiatives

Most case studies collaborate with other projects and stakeholder networks, such as researchers from Universities, National Centres for plant genetic resources, facilitators from NGOs and seed conservation organisations and projects and municipalities or regional authorities. These links with other farmers, technicians and research are seen as a crucial benefit for initiatives, although in practice sometimes ad-hoc and fragmented in implementation.

3.3.4.2 Internal coordination and its impact on the marketing of the products

Most case studies identified the need for coordination of the initiative, whether a farmer network, or a broader network extending to processors, retailers and researchers, as an important part of creating cohesion of values and direction for business development. Regular communication and consistency of actors were included in this, as to build relationships of trust, particularly for initiatives who have not naturally 'self-organised'. Physical proximity helps, although this was not always possible.

Centralisation of coordination roles by an actor, such as in Italy, Austria and Switzerland, is often viewed as beneficial to have a coordinator that takes charge, although it does not necessarily guarantee that in that case there will be two-way communication, or that it will develop as much 'ownership' of a project as a more decentralised model of organisation, particularly where local identity in an integral aspect of the crop. However, communication with the main office is considered important and very positive from all stakeholders in the PSR network in Switzerland, who identify that the passion and enthusiasm of the staff makes a difference in working with them; the central office gives the network a structure and gives actors the feeling that they have control over the initiative.

In terms of inter-actor events, most case studies coordinate farmer workshops and forums (online and in-person) where they share experiences among each other e.g. about sowing, harvesting, optimum varieties, maximising yield, seed sharing, although many of these have little or no interaction with others further down the value chain. In some cases, however, farmers are included into networks involving chefs, bakers, retailers and processors, to do tastings and trials, discussions on best uses of the products, and best varieties for actors further down the value chain. In Portugal, Hungary and Austria farmers work also with researchers on gastronomic trails, nutritional evaluations, and genetic

heritage of crops, as well as discussing experiences with varieties and determining optimum growing practices.

These benefits are not necessarily automatically realised though, even with efforts to coordinate interactions between stakeholders. In Spain the Association of the Producers and Traders of the Purple Carrot of Cuevas Bajas had at one point 40 members who would meet to discuss how to increase the production and commercialisation of the product. Like in the broa bread network, differing views of how to realise this over time has caused fragmentation of the network, which has limited the coherence and potential of the marketing of these products.

In Hungary, there has been little interaction among farmers, because of a lack of trust historically which was attributed to post-soviet culture. Now, on the other hand, some farmers would be interested in creating a cooperative to share experiences and equipment for production and processing then sell to local bakeries was suggested by a farmer, forming a network themselves independent of the seed and grain trader, Naturgold. However, currently they are obliged to sell back to Naturgold who supplies their seeds, and some said that they found it easiest to sell to someone who have the expertise and budget to do the marketing for them even if it means sacrificing some price and autonomy.

3.3.4.3 Collaborations in marketing

Some more developed case studies have found opportunities in reaching markets through collaborations with other stakeholders, often those further down the value chain, who have skills and resources well-suited to be able to facilitate sales of underutilised crops and their derived products. Of these the collaboration between PSR and the Cooperative in Switzerland is the most interesting, in that the 'pioneering' collaboration is between a non-profit, volunteer-based farmer network, and one of the country's leading food retailers (accounting for about 32% of the grocery market). The collaboration is viewed as both good and bad by stakeholders, and seen as a 'balancing act' of expectations and priorities; it provides a profitable route to a large market, employment, and the opportunity to publicise the work of PSR widely in its work on preserving heritage Swiss vegetables. Similarly, the network growing alternative cereal in Italy is linked to the Slow Food Network and BioLive, which gives them further visibility and sales channels, even if they do not adopt the logos. However, some stakeholders are cautious about the possibility that it dilutes the value of the products through difficulties in telling the stories of products effectively, and opening up risk of popularising alternative hybrid products that look like old varieties.

Collaboration with restaurants and cooking schools have enabled purple carrot producers in Portugal to introduce the variety to people in a dining-out setting where they are likely be more open-minded about trying new foods, and offer a way to show various uses of the carrot in tapas and innovative dishes. On the contrary, other case studies found that working with catering was challenging, as they required regularity of size, quantity and seasonality more than selling through markets, which some crops were unable to provide easily, and were more sensitive to prices than individual customers.

The work of the seed and grain trader Naturgold with einkorn and emmer producers in Hungary, has undoubtedly led to successful valorisation of diversified crops, largely as the need for diversification in the market was identified prior to prompting diversification on farm. The advantages are that Naturgold is able to monitor international markets, and control growth in the production area to match gradually developing demand and thus prevent a saturation of the market and collapse in einkorn or emmer prices. And farmers' are able to use the existing sales lines through Naturgold and do not need to establish new marketing outlets and the company aims to 'tag on' marketing to that of existing dinkel lines, an attempt to convert, rather than find, customers. However, the company is the sole distributor of the variety and this is only available to farmers that buy seed and sell product to the company and not to any farmer who may want to grow these crops.

Therefore, like the management of wins and losses among various types of bread from heritage cereals in Spain, the marketing, sales and logistics costs are covered from profits from other more mainstream product lines. The advantages of being part of a larger business or teaming up with a strong network is that it can facilitate subsidising of otherwise commercially not viable products.

3.3.4.1 Valorising beyond the crop – by-products, processing and services

Several of the initiatives studied described ways in which actors are moving beyond their initial value chains, oriented around largely vegetables, bread and pastas, to more innovative products and services to expand their market opportunities. The success and public interest in the einkorn beer value chain in Hungary has capitalised on the novelty of both new end products and einkorn as an alternative cereal. As a result, it is able to support the up-scaling of cultivation and conservation of alternative varieties, as well as facilitate new end products, such as alcohol-free beer, and beer from other niche cereals.

Similarly, the purple carrot initiative in Spain is looking to develop sales outside of the region and through larger supermarkets and retailers, particularly through more novelty and processed food and drink. This shows that there is potential to have two complimentary markets from one product – one based on the traditional raw product with an emphasis on heritage, and one based on market demands for new and innovative convenience products and health foods – and that this diversity of products offers opportunity to diversify sales channels/income sources and therefore the stability of the initiative.

In Switzerland however, the national recognition of the brand has enabled it to diversify even beyond food products, capitalising the interests of consumers in the connection to the producers, heritage and locality of the vegetable range. PSR now markets grow-your-own starter kits as another spin off product, including salads, tomatoes and poppies, with a photo competition to encourage people to engage with the broader network. Furthermore, it offers balcony gardening for consumers in towns and cities, and they sell PSR varieties through well-known and population Swiss seedling markets and commercial gardens.

The processing and practice of consumption of the product has also shown to become a ‘product’ in itself. In many cases nostalgia is an important driver of demand and sales, such as for Broa bread; people associate it with memories of family, home, grandparents, and social events, as well as rituals of serving it traditionally with other foods like sardines, ham and chorizo. The increasing market interest in artisanal and, in particular, sourdough bread can mean that consumers identify more easily with bread that is advertised as ‘sourdough’, as opposed to marketing of the origins, characteristics and story of the flour itself. This suggests that there are opportunities to think far beyond the raw product in developing routes to market for a diversified crop, such as valuing and marketing the practices, processes or dishes around a product.

3.3.5 Effectiveness and sustainability of the strategy and the need for public support

3.3.5.1 Interest in and funding support for initiatives

Interest from local government and policymakers in projects preserving heritage and local varieties were largely understood as being either neutral or positive. In more favourable cases municipal governments have created strategies and development plans, to promote local food initiatives through public events, and to investigate the opportunities for the scaling up of projects and the sourcing of technical or financial support. Whereas those working in the food networks tend to report positively on the impact of fairs and events in raising awareness and encouraging sales of produce and products, the evidence as to whether the regional development strategies themselves have a positive effect on support for such projects is less clear. The Portuguese cases receive funding for farmer involvement

from the council, government and provincial government, and the Hungarian authorities used to provide a subsidy for rare and special variety conservation.

Beyond a regional or national level of funding, few projects have been successful in accessing funds from further afield. CIMMYT was involved in sourcing maize varieties and providing funding for the initiative in Spain, which has also previously received funding from the Canadian government. However, the bureaucracy of funding and regulation is largely considered difficult for small-scale farmers to navigate without teaming up with organisations or companies who already have experience in this area; the einkorn growers in Hungary can potentially access EU funds through their seed and grain trader, Naturgold. The company was involved in a large research and development project with their einkorn product Alkobeer. This indicates that private-sector investors also may have a role to play for initiatives aiming to scale up and out with their products. Success with selling one product from diverse crops can facilitate the development of other products derived from different crops in similar supply chains.

Several actors argued that authorities working rural development programmes and funding provision need to be sensitive to projects covering the whole food chain, which is not currently the case. This is particularly pertinent to longer value chains, such as those for cereals, where more stakeholders are involved in the production and processing of the crop from farm to fork. For example, grants have been available in the past for the preservation and development of small-scale, traditional mills in the past, to support valorisation of the cereal; however, there are little or no grants available for bakers, undermining efforts to establish a whole supply chain to develop production of a minor cereal crop.

For many of the initiatives it was recognised that without the long-term commitment and investment of time and voluntary work from various actors the projects would no longer exist, as external funding was either rare, unstable, unavailable or insufficient. Therefore, a combination of several factors is critical in ensuring sustainability, namely: internal coherence; an ability to attract external funding; an ability to capture and distribute the value of products from sales back to farmers; and an ability to use the commitment to the crop/values of the group and to mobilise in-kind contributions of actors.

3.3.5.2 Policies effecting the initiatives' viability

Further to the apparent need for more financial support, actors drew attention to the need for policy support in maintaining the farming profession into future generations. In Spain and Portugal in particular, mainly older farmers are working on the conservation and small-scale agriculture projects, while the younger population often moves to urban areas for better employment opportunities. This should not just be important to promote policies to encourage young people to work in the agriculture sector, but to inform broader policies for rural development; as a researcher from the National Centre of Plant Genetic Resources in Spain argued, *"there has to be attractive policies so that people choose to stay in a town where maybe you do not have the convenience[s] you find in a city"*.

3.3.5.3 Impact of policy and regulations

The impact of EU regulations is mostly apparent in initiatives aiming to preserve heritage or amateur varieties that are not registered. Where varieties are not registered, the genetic resource can only be preserved through free exchange among farmers of saved seed. Seed cannot be bought or sold in large quantities, and saving is dependent on the available skills.

Many actors in the case studies believe that seed certification is not adapted for landraces and heterogenous germplasm (populations), as they do not meet DUS specifications. Some actors advocate for state-run breeding systems to work on preserving native varieties, rather than depending on seed companies, or for more flexibility in regulations on certifying seed, such as creating a category between a landrace and a variety. This result in limited availability of certified seed. Organic initiatives are also

obliged to use organic seed, and registration and certification as organic is sometimes seen as an obstacle to maintaining biodiversity.

Further down the value chain regulations for processors and retailers are often the same as for industrial production, although there are less resources to meet these requirements, and this can have a negative impact on actors' ability to adapt processes or capture the true value of the products. For example, in most contexts mill regulations are standard regardless of the type, size or age of the mill, and these can be strict and prohibitive for small, traditional, local mills, particularly with regards to mill restoration; this was notably the case in Spain and Portugal. Actors called for more awareness and flexibility in these regulations, and an attention to nationally- or regionally- specific policies.

3.4 Conclusion

Based on the comparison of the different cases, we identified several issues relevant for the further development of seed conservation networks and the marketing of products from biodiverse crops.

The root drivers of a product diversification initiatives can have implications for the ability to match demand and supply. Several initiatives are facing limitations to grow their production base that is of long-term concern to them. Production is largely carried out by farmers or growers, who are committed to preserving the variety at a small scale rather than expanding production. This was observed in initiatives with both a large consumer demand for the product and in more localised and less well-established ones. Whilst this ensures the continuation of in situ-conservation, growing the biodiverse crops is not attractive for other farmers seeking a profitable business. This can limit the volume of supply and restricts the scope of the initiative to grow and invest in infrastructure and technology and skills. Some cases also experienced difficulties in meeting demand due to lower yields, limited access to seeds, unsteady supply and higher wastage in the value chain of these non-conventional crops.

On the other hand, the top-down introduction of alternative varieties of emmer and einkorn in Hungary showed the smaller-scale of farms to be a potential advantage to market-led diversification, arguing that *"small scale farmers could take advantage of their flexibility and supply niche markets with alternative grains, as for larger producers it takes more effort and investment to change their production structure"*.

The issue of how to effectively capture the complex value of the product in pricing is also important. Not all quality attributes are easily attractive to consumers' and can be turned into a monetary value. For example, a different and perhaps less attractive colour, or the benefits for a farmer's soil health when included in his rotation are more difficult to explain. For example, in the case of the purple carrots in Spain, the fact that the carrots are larger, sometimes hairier and have a different taste when cooked reduces the willingness to pay more of some consumers. Some producers, therefore, sell them for the same price as orange carrots, arguing no one would buy them otherwise. Other producers aim to charge a premium, arguing that people are willing to pay for the novelty and that they need to charge more because they are more expensive and riskier to produce. This emphasises the importance of coherence in awareness of the quality attributes across networks to avoid competition and confusion. Variation in price expectations between farmers in a relatively small market can be detrimental to the project, as some farmers undercut others and in doing so devalue the product in the eyes of the consumer, creating confusion and scepticism. Coherent communication is key if consumers are expected to pay a premium for the product. In the case of tomato growers in Austria who sell directly and determine their own prices, this was not deemed to be an issue, but this network of growers has no intention to develop collective product identity for marketing.

Also, in the Swiss case study of heritage vegetables, it was highlighted, that products should offer more benefits to consumers than just being a heritage variety to ensure a sustainable market demand,

particularly when collaborating with mainstream retailers. That is not to say that the preservation of crop heritage is not important to consumers, but products should aim to offer more 'new and innovative' characteristics to be successful in finding and defining their 'niche' and engaging with consumers' interests.

Several case studies described feeling in danger of compromising the product integrity and values of the initiative in order to facilitate product sales. For example, although expanding the cultivation area for heritage crops was possible in several cases and might enable access to a greater market or the ability to produce on larger scales, it poses the challenge of whether this would dilute the local identity of the product and the perception of authenticity by consumers and producers in the networks.

Often the non-standard and heterogeneous characteristics of alternative/heritage varieties demand adaptation to the processing, storage and distribution of the product to ensure quality is optimised. These can be challenging and problematic (for example the drying-out of fresh pasta during transport as observed in Spain), although visible differences in the product can offer an opportunity to more easily differentiate the product from consumers' regular expectations. Retailers in Switzerland argued that to overcome some scepticism over the price and quality claims of the heritage vegetables, they must look different or better than a regular one, otherwise people will be doubtful of the difference; tomato sellers in Austria also identified the diversity in size, shape and colour to be a key selling point. Alternative cereal producers often sell to smaller-scale mills who are better able to separate milling batches, and adjust techniques to suit the specific grain and better conserve its quality (e.g. reducing the speed and heat of milling so as not to damage grains, or milling grains with harder/softer husks). In baking, sourdough techniques are also regularly used with alternative cereals to ensure the best possible results, and often requires regular experimentation (with each batch of flour), involving time, money and experience, from bakers to produce a quality loaf. These non-standard characteristics offer opportunities to recognise skills and add value to the products, providing this can be effectively communicated to the consumer and they are willing to pay a premium. However, willingness to pay may not be sufficient to fully compensate for all additional costs during production and processing.

Value capture is an issue for many farmers, particularly those in cereal value chains where specialist skills are required at each stage of the value chain to process the grains, and the prices of end products must be kept competitive enough to maintain demand. The farmer can charge more for the grain in most cases for the cereal, but a combination of often lower yields and higher costs for milling (particularly in larger-scale mills that are further away) implies that the farmers can get little more than usual. As a result, some of the cases studied expressed an interest in creating local processing capacity to capture value more locally, as well as to reinforce the commitment to cultural integrity of those crops with local heritage.

Humphrey and Schmitz (2002) suggest four main ways to upgrade in value chains and examples for most of them can be identified from the cases studied:

- Product upgrading – produce higher-value products (e.g. Spanish cereal farmers making biscuits for local markets, snacks made from Spanish purple carrots, emphasis on nutrition or organic labels in Swiss vegetables and Italian cereals)
- Process upgrading – more efficient transformation of inputs in production such as through mechanisation of process (mechanisation was not recorded explicitly by any case studies as production of underutilised crops is often labour intensive and difficult to mechanise and machinery not suited to smaller scale production. However, Swiss vegetable retailers add value through additional packaging)
- Functional upgrading – adding new processes to production process to increase skill involved in product and increase value (e.g. traditional milling and sourdough baking, as in Spain and Portugal)

- Inter-sectoral upgrading –moving into new value chains/production networks to capture greater value (e.g. Grow-your-own starter kits and growing courses in Switzerland)

The challenge for applying these in value chains for diversified crops is that often this requires investment, resources and time which those working in such initiatives don't have. Emmer and einkorn farmers in Hungary, for example, say that they prefer to sell to the seed and grain trader Naturgold, as the local market is undeveloped and unpredictable, while Naturgold guarantees them sales, as well as the fact that it has better capacities and resources to be able to monitor and manage processing and marketing to retailers. This indicates caution in being prescriptive for capturing value of alternative crops at a local level, particularly where there is less of a local heritage of the crop, and that the farmers' needs might be better met through getting a fairer price through lower-risk sales into a non-localised and more commercialised value chain.

The mismatch of ideals, priorities, funding and human resources is a concern of the stakeholders, who emphasise the difficulties of performing a 'balancing act'; the lack of funding and resources at farm level also raises the question of whether enough value is being captured along the supply chain to ensure the sustainability of the initiative, suggesting that initiatives must look carefully at how to incorporate costs such as the requirement for professional seeds into the sales value of products and ensure that this reaches the farm-level.

Interestingly, the network of tomato growers in Austria noted that interest has shifted over the years of the project from an interest in 'old' towards 'modern' varieties, suggesting that both growers and consumers are more interested in what makes the product different and diverse than its genetic heritage.

Across the projects other quality issues were reported: some experience that working with heritage and local varieties involves compromises in the stability of the yield (emmer in Hungary and tomatoes in Austria), and susceptibility to environmental stress and disease (tomatoes in Hungary), whereas others experience the opposite and credit this as an advantage of using varieties and techniques adapted to local conditions (in the case of cereals in Portugal, carrots in Spain, and tomatoes in Austria). This indicated that there should be caution in claiming yield benefits in recommending locally adapted varieties without research evidence.

Seed availability is a key concern for many of the cases studied, and for several it is reported to be a limiting factor in the ability to supply increasing market demand. Where varieties have been collected by government initiatives, universities or research institutes in gene banks, the projects stand a better chance of having a stock of seeds from which to grow and breed from.

Seed saving also raises issues of the quality and authenticity of seeds. This is particularly apparent in the case of Switzerland where voluntary seed production is providing germplasm for produce supplied to a mainstream retailer, creating unreliability in the consistency of both the produce and of supply.

4 Marketing of products based on newly bred lines coming from participatory plant breeding

Adanella Rossi and Simona D'Amico (UNIFI) with contributions from case study partners

4.1 Specific approach for the case studies

The case studies carried out under sub-task 5.1.2 followed the common framework (see Chapter 2). Semi-structured interviews with various actors were conducted as part of the data collection (see Table 3). The specific questions covered each step of the valorisation strategies and paid attention to all relevant aspects.

Per each section of the interview – which corresponds to a step of the valorisation strategy - the same questions for the different categories of interviewee are foreseen. However, some adjustments were required given the different roles of the different interviewees. They were minor adjustments that did not compromise the possibility to compare results. The type of actors interviewed include those that are relevant for the functioning of valorisation strategies, namely: farmers, breeders, bakers, retailers, clients, consumers, scientists, facilitators, extensionists. The initial indication was to interview more than one actor per type (for a maximum of 5 per case) and to cover all the type of actors per each case. However, this indication had to be adapted to actual organisation of the studied initiatives. In some initiatives, other roles than those initially indicated emerged as relevant or more than one role was covered by the same person. Table 3 summarises the interviewed people in each case study.

Table 3: Interviewed actors

Initiatives / Type and number of actors	Marketing experiment & bread supply chain	Bread from French PPB	Floriddia organic farm	Montespertoli bread	Virgo bread	Total
Breeder - scientist	3	2	1	1	2	9
Extensionist				1		1
Farmer	2		1	2	1	6
Farmer - bread maker - retailer			1	1	1	3
Miller		1	1	1		3
Farmers - miller - bread maker - retailer		2			1	3
Bread maker - retailer	4	1	2	1	2	10
Retailer	4			2		6
Clients				1		1
Consumer		4	3	3	3	13
Facilitator		1		1		2
Regulatory authority	1					1
Breeder and farmer	1					1
Seed merchant	1					1

Table 4: List of semantic relations

SEMANTIC RELATIONS
1. A is a benefit of old wheat varieties (classify into ecologic, economic and social-cultural)
2. B is a characteristic of old wheat varieties
3. C stimulates the raising of knowledge on the characteristics of old varieties of wheat
4. D hinders the valorisation of the old varieties of wheat (recognition, maintenance, diffusion, farming, processing and food practices)
5. E favours the valorisation of the old varieties of wheat (recognition, maintenance, diffusion, farming, processing and food practices)
6. F is involved in the valorisation of old varieties of wheat (recognition, maintenance, diffusion, farming, processing and food practices)
7. A is a characteristic (symbolic or physical) of bread
8. B contributes to the production, utilisation and consumption processes in the bread chain
9. C contributes to the development of shared knowledge, understanding and attitudes around quality in the bread chain
10. D is an instrument to meet agreed quality requirements in the bread chain
11. A is an attribute of the marketing & communication strategy in the bread chain
12. B is a type of user or consumer (actually or potentially) targeted by the marketing & communication strategy in the bread chain
13. C is an element the process of market channels identification for intermediate and final products (grain, flour, bread) of the bread chain
14. D is part of the process of prices definition in the bread chain
15. E is an attribute of the price of products (intermediate and final) in the bread chain
16. F contributes to the definition and functioning of the marketing & communication strategy in the bread chain
17. G is an untapped opportunity for of the marketing & communication strategy in the bread chain
18. H is an instrument to market the intermediate and final products (grain, flour, bread) of the bread chain
19. I is a (monetary or non-monetary) resource necessary for the actualisation of the marketing & communication strategy in the bread chain
20. A is involved in the network (bread chain and beyond) developed around the promotion of bread from old wheat varieties
21. B contributes to the (miss)functioning of the network (bread chain and beyond) developed around the promotion of bread from old wheat varieties
22. C is an attribute of the network (bread chain and beyond) developed around the promotion of bread from old wheat varieties
23. D is a way to further develop the network (bread chain and beyond) for the promotion of bread from old wheat varieties
24. E is an opportunity that may derive from the further development the network (bread chain and beyond) for the promotion of bread from old wheat varieties
25. F is a challenge for the further development the network (bread chain and beyond) for the promotion of bread from old wheat varieties
26. A is the impact of the of the initiative to promote bread from old varieties of wheat
27. B is a possible feature of the initiative to promote bread from old varieties of wheat in the future
Other semantic relationships (to be indicated by the interviewer if something emerges during the interview)

The interviews have been recorded and the recording are available. A coding frame has been defined for the analysis of the recording according to the domain analysis method. 27 semantic relations have been defined to capture the view of the different interviewees with respect to aspects that are crucial to understand the functioning of the valorisation strategy (Table 4). Notes and quotes have been

reported per each semantic relation and per each interviewee. Based on this, the analysis has been conducted focussing on the following points per each step of the valorisation: functioning, achievements, shortcomings.

The second stage of the methodology consisted of a validation workshop in each case study after the analysis of the results of the interviews. These workshops aimed at verifying the correctness of the analysis but also at providing insights for recommendations on how to set up and implement initiatives for the valorisation of diverse food products that address both practitioners and policy makers. They were structured to discuss the findings from the interviews, especially the shortcomings to the valorisation and possible solutions.

The facilitated workshop discussions focussed on the different steps of the valorisation process, on achievements and challenges with respect to the organisational, institutional/judicial, economic, cultural, social and technical aspects. All stakeholders interviewed were invited to join the discussions and to provide their opinion about the findings related to the achievements of the initiatives and their way to move forward with respect to the challenges. However, some of the invited stakeholders could not attend. In the case of France, the focus group was held in only one local organisation participating to the national PPB programme, while the interviews had involved more local organisations and people belonging to the same programme and working in different parts of France. Table 5 reports on the actors who actually attended the validation workshops.

Table 5: Actors taking part in the validation workshops

	UK	France	Italy			
Initiatives / Type and number of stakeholders	<i>Marketing experiment & bread supply chain</i>	<i>Bread from French PPB</i>	<i>Floriddia organic farm</i>	<i>Montespertoli bread</i>	<i>Virgo bread</i>	Total
<i>Breeder - scientist</i>	2		1	1		4
<i>Extensionist</i>						
<i>Farmer</i>		1	1	1		3
<i>Farmer - bread maker - retailer</i>		2	1			3
<i>Miller</i>		1		1		2
<i>Farmers - miller - bread maker - retailer</i>			1			1
<i>Bread maker - retailer</i>			1	1	1	3
<i>Retailer</i>	2		2			4
<i>Clients</i>				1		1
<i>Consumer</i>			2			2
<i>Facilitator</i>		1		1		2

The results of the workshops were analysed for each stage of the valorisation strategy, focussing in particular on refining the interpretation on the functioning and shortcomings emerging from the interviews and identifying shared solutions. The approach with common headings supported the comparison of data across cases. However, the same basis of questions for all cases placed some restrictions on picking up specific issues of individual cases and the use of English as the reporting language was limiting for some participants. The participatory approach, according to which the partners have had the possibility to validate the intermediate and final results of the analysis,

contributed to overcome the described limitation. The partners integrated the analysis with data that had been possibly overlooked or misinterpreted by UNIPI, when developing the analysis.

4.2 Description of the cases investigated

4.2.1 Bread wheat from PPB: France

The case study performed in task 5.1.2. is related to a Participatory Plant Breeding (PPB) programme on cereals (einkorn, rivet wheat, bread wheat) in a network of farmers gathered into local farmers' associations belonging to Réseau Semences Paysannes (RSP). This network is working with Institut National de la Recherche Agronomique (INRA) since 2005 on bread wheat and started to formalise a programme on einkorn and rivet wheat since 2015, in the continuity of the bread wheat programme (Dawson et al, 2011; Rivière et al, 2013b; Rivière, 2014). Within this programme, a set of methods and tools have been co-constructed between the research team (researchers, technicians, students), facilitators of farmers' organisations and farmers. Within farmers' organisations there is most of the time a facilitator making the link between farmers and research and managing the logistic and coordination of the programme at the local scale. There is a high farmer and farming system diversity within each farmer organisation: farmers, farmer-millers, farmer-miller-bakers, with animals or not, in mountain, lowland, etc. The groups are spread through all of France and there is one in Belgium.

The aims of the programme are to develop new cereal population-varieties adapted to organic agriculture free of intellectual property that lead to healthy flour and bread and enhance the autonomy of farmers' organisation in breeding and management of cultivated biodiversity by creating methods, tools and training sessions. The assumption is that it is possible to create a collective organisation, with people from different fields (research and farmers' organisations), to manage cultivated biodiversity and breed new varieties. The main hypothesis of this project is that a great diversity (genetic as well as human) is the basis of success: this diversity can cope with all situations and needs.

This programme started in 2005 with one farmer-miller-baker and one researcher of population and quantitative genetics. From this collaboration started a PPB programme with crosses between several landraces, old and modern varieties that led to 90 new populations (Rivière et al, 2013a). These new populations were spread to 20 farms all over France. Each farmer started to select from these new broad diverse populations. Farmers can choose all varieties they want, for example mixture.

In order to conduct selection within the group, methods and tools are under development and coming from the co-construction of actors (Bonneuil et al, 2006), experimental design in the network of farms regarding statistical analysis, new statistics methods and tools (Rivière et al, 2015 ; Rivière, 2017), management of data by developing a data base (De Oliveira et al, 2015; Rivière et al, 2016), sheet to follow the crops cycle, training sessions, general logistic of this kind of project, organisation of the group with the setting of internal rules.

In concrete terms, the following phases are repeated every year and are nationally coordinated by RSP in relation with INRA. Local coordination is done by the facilitators of farmers' organisations.

1. meeting in September for all the participants of the group to have an overview of the past year in the field and in the lab (research results) and agree on the next steps
2. send by post the results regarding experiment on the farm and on the network of farms to all farmers following statistical analysis. Each farmer does its own selection based on the results from the network, the farms day, its own expertise from its observation in the field
3. coordinate exchange of seeds between farmers' organisation
4. sowing according to experimental design on farm
5. measures the behaviour of the population for each season. Everything is uploaded in a data base
6. meeting in February to update internal rules and discuss some research results

7. several meeting on farms at the regional level and a big meeting at the national level
8. each farm sent spikes samples to INRA
9. INRA measures the spikes and upload the results in a data base
10. INRA and RSP do the analysis and prepare the September meeting.

Analyses regarding agronomic, organoleptic, nutritional and molecular data are performed within the project. Agronomic data are taken by the farmers themselves and the research team every year on all farms participating in the programme. Organoleptic analysis are done every year on subset of populations grown in some regions. Nutritional and molecular analysis are done every five years in average on subset of populations agreed by all actors of the group (Thomas et al, 2012).

In 2017, the group became bigger: 15 farmers' organisations and 120 farmers in total for PPB in cereals growing in total more than 1000 populations in breeding process. To answer this switch in size, there was a need to spend more time on rules to govern our group. These rules, set at a national level in a network of farmers' organisations in relation with research team, are the first steps to manage the new variety coming from the PPB programme. Themes treated are: decision-making, arrival of new actors, access to new population derived from the PPB programme, data management, publication of results, juridical framework, leaving or exclusion of actor of the group.

There are no marketing strategy agreed among all actors of the group. Each farmer has his own strategy. Most of the farmers involved in the PPB programme sale on local market without any intermediary. In some rare cases, farmers sale their grain to local miller or to the "local" cooperative. Farmers-millers sale their flour to local bakers or on local market (with other products from the farm). Farmers-millers-bakers sale the bread to the market. Moreover, most of them sale their products to local food grocery.

Within RSP, a work started to create a brand called "Peasant seeds in network". The specification needs of the brand are under construction for legumes. It should start soon for cereals. The first population derived from PPB in production in the field are just coming and it needs time to settle a collective strategy.

The programme is funded by public research projects (regional, national, European level) or private foundations. A rich picture of the initiative can be found in the Appendix.

4.2.2 Seed marking and bread making with cross composite wheat populations: United Kingdom

The ORC Wakelyns wheat population is the result of an evolutionary breeding programme, a cross composite population (CCP) which first started 15 years ago to produce a hugely diverse population of wheat that is suited to organic and low-input farming systems. The population is the result of over 190 crosses - between 20 different parent varieties of wheat – and then mixing the resulting seed. This has produced an incredibly diverse and dynamic population of wheat, which can evolve and adapt to suit different environments.

The idea behind the population is that this diversity allows for more efficient use of soil nutrients and water and lowers plant disease and pest levels; this provides greater yield stability. The population is not designed to give as high yields as possible, instead the aim is to provide greater resilience and more consistent yields, rather than peaks and troughs. The parent varieties are a mixture of new and older varieties – rather than a 'heritage' wheat population – which have a mixture of good grain yield and quality attributes.

The initial crossing of the varieties was done by the John Innes Centre in Norwich and then taken on by Martin Wolfe at Wakelyns Agroforestry as well as other farmers across the UK. Currently Martin Wolfe is the only farmer growing the population on a non-seed basis and one other farmer grew the population for the 2015/16 harvest to produce seed stocks. Martin Wolfe has been instrumental in

continuing to develop the population over the last 15 years and sells the wheat as flour to various local shops and retailers.

The initiative focuses heavily on Wakelyns Agroforestry in Suffolk in the east of England - as this was where a large proportion of the breeding work was done – and the population has been grown there continually for over 10 years. Other farmers who have grown the population are located around the UK.

Due to the issues with seed regulations – which would normally prohibit the sale of seed like this – there has been considerable involvement from the UK Animal and Plant Health Authority (APHA) who have facilitated a temporary relaxation of the seed regulations for experimental purposes. The initiative has also benefited from the involvement of a seed merchant with similar aims, who has helped to find farmers willing to grow the population seed.

Compared to other more established initiatives to market diverse crops, the number of actors involved is relatively small and the supply chain is very short, generally with no more than two intermediary actors between the farmer and the end consumer – a grain trader and miller/baker. As the initiative is at an early stage, the market channels are relatively undeveloped. Currently the flour is used by a small number of small businesses in the east of England to bake bread or is sold in bags. Likewise, a small online retailer also stocks the flour in their ‘Guest producer’ range. Other than this, the market channels are limited.

Further, along the supply chain, there are several bakers who have been given samples of the flour to bake with. However, much of this was several years ago and there are few people who bake regularly with the flour on a commercial basis. Martin Wolfe from Wakelyns is in the process of negotiating a relationship with an artisan bakery in Nottingham, which should provide an outlet for his product. Likewise, he is also organising nutritional testing to ascertain the suitability of the population wheat for animal feed too. A rich picture of the initiative can be found in the Appendix.

4.2.3 Bread-making from old wheat varieties, landraces and populations, Italy

4.2.3.1 Floriddia Organic Farm

Floriddia is a family farm located in Tuscany (Italy) that focusses on the production of cereals and legumes and follows organic farming principles since 1987. The two crucial objectives of Floriddia’s farm are: to close the food chain – from crops to final products – with the farm acting as guarantee; to introduce products on the market that are organic, nutritious and healthy (with special regard to food intolerances).

The farm is part of the ‘Coordinamento Toscano dei Produttori Biologici’ (CTPB - The Tuscany Network of Organic Farmers). Through this organisation, it came into contact with the University of Florence which proposed to it to farm and reproduce landraces and old varieties of wheat. Floriddia accepted to introduce few of those varieties, interested in the fact that they were more adapt to organic farming than the modern varieties farmed until then.

Some years of experiences with farming old varieties and landraces confirmed their suitability to organic farming method and connected Floriddia with RSR, that was working on the rediscovery and reproduction of old wheat varieties and landraces. Through RSR, Floriddia’s farm also started interacting with other civil society and farmers’ organisations - in Italy and in Europe – which were committed to the same cause of rediscovering, reproducing and farming old wheat and landraces. All these actors and networks became more and more involved in joint efforts around cereal agrobiodiversity and in the implementation of participatory breeding activities and research projects funded by European, national and regional institutions.

Since 2009, the farm uses only landraces and old varieties of wheat, cereals and legumes. The farm has internalised the processing of pasta and bread and, partially, the selling. Nowadays, Floriddia's farm extends over about 300 ha, and grows bread and durum wheat, einkorn, chickpeas, chickling, oats, barley, millet. The farm produces and processes on average per year: 70 tons of grains (including 40 tons of bread wheat and 30 tons of durum wheat). It is connected to 8 other farmers involved in a formal agreement ('Contratto di Rete'). They farm 280 ha and produce on average per year 500 tons of grain. Of these, 350 tons that is sold to Floriddia's farm for the processing at a price of 500 € and 700 € per ton, for bread wheat and durum wheat, respectively.

Floriddia's milling plant has a capacity of 2.5 tons/day. The oven can produce 0.3 tons/day. Through the wheat collected, the farm produces about 26 tons/year of bread and 400 tons of flour. This product is all sold at a price of 1.60 €/kg for flour and 3.50 €/kg for bread. Bread is sold in the farm shop and, once a week, through the on-line shop. Moreover, there are 12 more selling points including GAS (Gruppi di Acquisto Solidale - Solidarity Purchase Groups) and specialised shops in the provinces of Firenze and Pisa. Health related benefits connected with old wheats contributed to create and expand the market for bread. All production phases are certified organic. The farm is also certified by an Italian certification body for soil protection. Moreover, the farm organises farm visits every second Sunday of the month.

Funds from Rural Development Plan have been essential for the development of Floriddia's farm project. They have contributed to the set-up of the processing plant and of the whole chain. Moreover, and complemented with other European funds, they have been instrumental to conduct participatory breeding and other field experiments aimed at the rediscovery and reproduction of old wheat varieties and landraces. The interaction with RSR, University of Florence, CTPB and other civil society organisations and research centres has contributed to facilitate the access to this funding. These organisations and research institutes have also contributed to the development of the project through their experience, expertise and network in the field. A rich picture of the initiative can be found in the Appendix.

4.2.3.2 Montespertoli Bread

The "Montespertoli Old Wheat Association" (MOWA) is running a supply chain that uses old wheat varieties and for the development and commercialisation of the related final products. All producers and processors must be associated to the Association and follow a code of practice that the Association has defined. By following it, they obtain the right to use the label "Old Wheats of Montespertoli". Retailers of the final products do not need to be associated as well as the consumers of these products. The consumers of intermediate products, such as flour, are associated to the Association.

MOWA was founded in 2010 and formally established in September 2014 as a non-profit association for social promotion, based in the town of Montespertoli, close to Florence, Italy. The initiative aims at creating a virtuous local supply chain, that involves and connects farmers, processors and consumers and that contributes to re-valorise a territory, protect human health and the environment for present and future generations. A miller and a bread maker that aimed at creating a local chain for bread had a key-role in the initiative development. The collaboration with the University of Florence introduced them to the old wheat varieties and broadened their initial motivation. The passion for the land, the commitment to sustainable agriculture and to restoring wheat agrobiodiversity become the guiding principles. The miller and the bread maker united some farmers around these principles and set up the Association.

Currently the Association includes as members 37 farmers, one bread maker, one miller, and some consumers. The land area cultivated with old wheat varieties amounts to 200 ha and is located around Montespertoli, in the province of Florence. On average, they produce 1.5 tons per ha, for a total of 300 tons of wheat per year. All farmers bring their harvest to one mill. Among the products with the label

“Old Wheats of Montespertoli”, 6000 kg of flour are produced on average each year and 200 kg of bread on average per day, seven days a week. There are 20 selling points for bread. They include bakeries, specialised shops, super markets of small-medium dimensions and a school canteen. The flour is sold exclusively at the mill. The price for flour is 1.40 € per kg, the price for bread varies from 3.40 to 4.50 €. All is defined starting from the price for grains that is 600 €/ton. Pasta is the other product carrying the label.

Farmers and processors use production techniques that respect the environment, human health and cultural heritage. These techniques are described in a code of practice that has been defined by the board of the Association in collaboration with the University of Florence. The code is mandatory for all the producers of the Association who want to use the label “Old Wheats of Montespertoli”. The respect of the requirements is checked through a Participatory Guarantee System³ where all members of the Association can be involved. The label is registered at the Chamber of Commerce as a collective label in use of MOWA.

By promoting the old wheat varieties, the Association has allowed farmers to restore some portions of abandoned land as well as to give back vitality to some traditional jobs that were disappearing. An agreement that guarantees fair and sustainable prices along the food chain has been crucial to that end. The grain is bought from farmers at a higher price than the price on the conventional market; the consumers buy the bread at a low price compared to the quality of the product.

The Association has benefited from the technical and knowledge support of the University of Florence. Moreover, the Municipality of Montespertoli contributed to give it visibility and to build up the network supporting it. The Municipality also raised awareness on the nutritional aspects of the old wheats. All the consumers associated, the retailers and clients, and the organisations expressing interest represent another relevant support. They contribute to the continuation of the project through the economic and, even more, motivational incentives that the promoters of the initiative get from seeing continuously growing attention to what they do. A rich picture of the initiative can be found in the Appendix.

4.2.3.3 Virgo Bread

Virgo is an Italian collective trademark for wheat-based products. Virgo is also a project and it gives a follow up to another project called Bio-Pane. Both projects focussed on establishing short food chains for bread - with high nutritional and health features – starting from old wheat varieties. Both projects have been involving the University of Bologna, farmers, bread makers and civil society organisations.

The objective of Virgo as a project and a collective trademark are: to rediscover old wheat varieties and study their features, organoleptic, nutritional, health and technological; to make the products resulting from the varieties available to citizens through a short food chain that benefits both the local economy and the environment while guaranteeing high quality products to consumers at a fair price; to guarantee the origin and quality of products, through compliance with a strict code of practice.

Everything started in the early 2000s. On one side, there was a group of organic farmers, guided by a family doctor and working on reproducing old wheats and deriving products from them. On the other side, there was a professor at the University of Bologna who was working, with other colleagues around Italy, on the nutritional, health and technical features of old wheats. Both of them were moved by the idea that farming and processing old wheats through a short chain could be an opportunity to safeguard consumers’ health, to ensure fair incomes to small farmers doing natural farming as well as promoting a territory with its environment and socio-cultural capital.

³ www.garanziapartecipata.it

The professor found the opportunity to set up a project of participatory plant breeding with local farmers, supported by Regional funds. He got in touch with some biodynamic farmers and with the above-mentioned group of organic farmers. Five, between organic and biodynamic, farmers decided to join in together with an organic bread maker. All of them and the University of Bologna set up an association using the structure of an already established association, inspired to Steiner's principles, called Arca Biodinamica. They presented the project Bio-Pane as equal partners, the farmers and bread maker playing the role of researchers.

The project was funded by Emilia Romagna Regional Government and lasted for two years (2009 – 2012). During the project, they did field experiments on five old wheat varieties that had been already tested in lab. They also did some baking experiments. This collaboration permitted to: understand more about the technical, nutritional and health features of the old wheat varieties; reproduce a sufficient quantity of seeds for both production and research purposes; start a short chain for flour and bread; define guidelines to regulate the process of association and production.

In 2013, a new project has been presented by the same consortium that presented and implemented Bio-Pane. It was funded by Regional Government funds and lasted until 2015. This second project gives a follow up to the previous project. It allowed to further study the features of the five varieties cultivated together - Virgo mix - as well as to explore the features of new varieties. Moreover, it expanded the area of action of the first project to places that had been hit by earthquake in 2012.

Nowadays the Virgo initiative involves ten farmers in three provinces in the Emilia Romagna Region. They farm the Virgo mix, following biodynamic principles, over 20 ha of land. All members of Virgo initiative have also agreed on a regulation that guides the production. The regulation has been set in collaboration between University and practitioners. It is inspired to biodynamic principles. The respect of the regulation is assessed by mean of external biodynamic or organic certification or through self-assessment inspired by participatory guarantee systems. The association Arca Biodinamica, who is the formal entity behind Virgo initiative, has registered a trademark that can be used, after the payment of a fee, by those who respect Virgo regulation. So far, no-one is using it.

The average size of the fields is 2 ha. All of the farmers do rotations and most of them farm other crops and run multifunctional farms, with agro-tourism and similar. They produce on average per year 56 tons of Virgo mix and produce and sell on average per year 42 tons of flour. The main selling point are on farm shops, on-line shops, GAS, farmers' markets, medium size shops specialised on organic, high quality products. Some farmers sell to bread makers or use some flour to produce bread. They produce 6000 kg of bread that is sold through the same channels they use for flour. However, there is just one bread maker that does this as main job and has been engaged in the project since the early stages. He produces and sell 10 kg of Virgo bread per day. He sells in his own bakery and in some specialised, middle size shops. A rich picture of the initiative can be found in the Appendix.

4.3 Comparative analysis of the valorisation strategies

This section presents the information collected about the functioning of the valorisation strategy implemented by each of the studied cases. They are presented per each step of the valorisation strategy, highlighting functioning, achievements, and shortcomings.

Each section provides a synthesis of what emerged from all cases. Case specific examples are provided when appropriate. This is followed by a section presenting the main insights from the validating workshops with respect to the shortcoming identified during the interviews. These shortcomings have been discussed during the workshops, validated and possible shared solutions emerged. They are reported per each step of the valorisation strategy.

4.3.1 Mobilisation of genetic resources

4.3.1.1 The functioning

The mobilisation of genetic resources is done in a participatory form in all cases. Collaboration between University and farmers is crucial and, in some cases, it is mediated by civil society organisations, and extensionists. This stage always includes reproduction of genetic material and, in some cases, selection and improvement too.

In the **French case**, a Participatory Plant Breeding (PPB) programme started with one farmer (who is also a miller and a baker) and one researcher of population and quantitative genetics in 2005. The PPB programme with crosses between several landraces, and old and modern varieties led to 90 new populations (Rivière et al, 2013a). These new populations were spread to 20 farms all over France. Each farmer started to select from these new broad diverse populations.

Nowadays there is a network of farmers gathered into local farmers' associations; each of them has a facilitator and belongs to the civil society organisation Réseau Semences Paysannes (RSP). This network is working with Institut National de la Recherche Agronomique (INRA) since 2005 on bread wheat and started to formalise a programme since 2015 on einkorn and rivet wheat in the continuity of the bread wheat programme (Dawson et al, 2011; Rivière et al, 2013b; Rivière, 2014).

Within this programme reproduction, selection and improvement are conducted. The RSP and the INRA coordinate a year-long process that is repeated over time. Farmers' organisations exchange seeds and sow according to experimental design defined by researchers and practitioners. Farmers monitor the experiment and collect data. They share their findings about the agronomic aspects in several periodic meetings within the organisation they belong to and via email and during one annual meeting with the national network. The INRA and RSP collect, organise and analyse all the data communicated by the farmers; moreover, they perform analyses on the organoleptic, nutritional and molecular aspects of the wheat. Organoleptic analyses are done every year on subset of populations grown in some regions. Nutritional and molecular analyses are done every five years in average on subset of populations agreed by all actors of the group (Thomas et al, 2012). All the results are discussed every year by researchers and practitioners and are the basis to set up new experiments for reproduction, selection and improvement. Farmers can exchange and use the genetic material following the indications of the programme.

A similar system is organised at **Floriddia's farm** in Italy. In the 1990s there was a collection of old wheats and the University of Florence, with a geneticist who was working on germplasm related issues, decided to experiment on farm cultivation of some of the varieties, since it was too expensive to maintain germplasm. The geneticist got in touch with the Tuscany Coordination of Organic Producers (CTPB) through Rete Semi Rurali (RSR) – a civil society organisation working on the valorisation of genetic resources. Floriddia's farm was part of the CTPB and accepted to farm some varieties. It was 2005 when Floriddia started farming Verna, Frassineto and Inallettabile varieties.

The geneticist, an agronomist providing extension services to organic and biodynamic farmers, and RSR were supporting Floriddia in its first attempt to farm traditional varieties. They were giving technical advice and they were creating a connection with other national and European initiatives that were working on similar projects. In 2008, Floriddia decided to just farm traditional varieties and had already set up an experimental field.

The experimental field was monitored by the University and RSR and has been involved in several European and national projects over the time. Besides the initial varieties, other varieties started to be experimented and some populations. The experimental field is still at Floriddia's farm and part of participatory selection and improvement projects are monitored by RSR. Floriddia collects data on agronomic aspects of the varieties and shares them with RSR. RSR analyses the information together

with other information provided by other farmers around Italy. The information is instrumental to research projects and the set-up of other experiments. Differently from the French case, they do not systematically work on organoleptic, nutritional and health aspects, but RSR occasionally organises events that involve tastings; about the other two aspects, Floriddia has established direct relationships of cooperation with researchers of Siena and Florence Universities.

With the support of RSR Floriddia has been able to interconnect with some local organic farmers and engage them in the reproduction of seeds and in the production of grains from the traditional varieties. Floriddia provided the first seed to the farmers. Then they set up a system according to which, at the moment of the harvest, the farmers bring all the harvested grains to Floriddia's mill. There the grains are cleaned and the best grains are selected for the new sowing. The farmers keep these grains for their sowing while the rest is sold to Floriddia for the production. The farmers do not do selection and improvements, they just reproduce the seeds for new production. When the seed is lacking to one or more farmers, exchanges are allowed. So, the farmers who lack the seeds might get them from Floriddia or other farmers involved in the project.

The same wheat selection as that used in the case of Floriddia is the starting point of the reproduction work done at **MOWA**. In the early 2000s, the same geneticist of Florence University provided Verna, Sieve and Andriolo seed to the miller and baker who were planning the start-up of the MOWA. They provided the seeds to some farmers and followed the sowing and farming under the guidance of the geneticist. Once they had enough harvest to start producing bread, they extended the farmers network and involved an agronomist, suggested by the geneticist, to guide the reproduction and selection.

For the reproduction, the MOWA uses a sowing plan. The agronomist defines it in collaboration with farmers every year. The agronomist visits the farms and discuss with the farmers: personal interests and plan, the condition of the soil and land availability, the location of the farm and vocation of the territory, the followed farming methods (i.e. at least organic, certified or not). Once the agronomist has an overview of the farms, consultations with University as well as with the miller and baker of the association might be started to consider their point of view and needs too.

The sowing plan should be ready by July, concurrently to the harvesting of the wheat. The plan says:

- which varieties, the share of grain that will be used for sowing purposes
- which farm will sow what, where, the hectares that will be sown and the purposes (i.e. pure varieties for reproduction purposes and variety mixes or populations for production)
- which farm will prepare its own seeds and the amount of seed, per variety, that should be prepared by the mill.

On-farm seed preparation should respect the following:

- purge in the field where the wheat is growing to eliminate possible contaminations
- selection of the best and healthy grains
- seed toss with products that are allowed in organic farming.

If a farm is not able to guarantee the above described procedures, the mill will take over. The farm will sell the whole grain to the mill for 0.60 € per kg. The mill will prepare the seed (purge, selection, toss) and sell the seed back to the farmers, according to the sowing plan, as grain for a price of 0.80 € per kg. When a new farmer joins the association, for the first time the seed will be bought from another producer or from the miller for 0.80 €/kg according to what set in the sowing plan.

In the extreme event that the seed cannot be reproduced within the association (e.g. for diseases affecting the wheat), it is possible to retrieve it from close by farms or mills as far as they respect the principles of organic farming and the seed derives from old and local wheat varieties with given nutritional features. The assembly of the MOWA will monitor the process and approve the use of the seed when appropriated.

The described system allows for selection and reproduction of seeds, but does not consider the improvement of the genetic material. This is done very randomly and upon the request of Florence University. Researchers at this University might ask for the availability of farmers to sow some seeds that they want to experiment with. They will set the experiment on the field and monitor it.

In the case of **Virgo** bread all the stages of reproduction, selection and improvement are performed: Reproduction is done by all farmers; selection and improvement are under the responsibility of just one farmer. The initiatives start from the same varieties as those used in the other Italian cases. A geneticist at the Bologna University got the seed from the geneticist at the Florence University and started networking with some organic and biodynamic farmers because they would guarantee the right farm conditions for the experiments.

The geneticist found the opportunity to set up projects of participatory plant breeding with local farmers, supported by Regional funds with field experiments with five old wheat varieties. They also did some baking experiments. This collaboration permitted to: understand more about the technical, nutritional and health features of the old wheat varieties and to select and improve them; reproduce a sufficient quantity of seeds for both production and research purposes.

Nowadays, the selection and improvement is carried out by the University in collaboration with one farmer, namely the biodynamic farmer who got in touch with the geneticist at the beginning of the project. His farm hosts now an experimental field observed, tested and selected for possible future use. This work continues thanks to the private investment of the farmer as well as with some public contribution that the University has been able to mobilise over the years through regional, national and European research projects.

The reproduction is done by each single farmer. Each farmer involved in the initiative reproduces the seeds that are needed for the following farming season in a mix developed through the above mentioned projects. At the harvest, the University of Bologna checks that the grains comply with the set standards. Then, each farmer selects the grains that will be used as seeds. They clean and treat them according to established procedures. Those farmers who do not have the machines and skills to attend these procedures can ask for the services of other farmers, within or beyond those involved in Virgo, as far as they follow the agreed procedures. Sometimes, farmers within the Virgo project organise days of collective seeds preparation in their farms and other farmers in the Virgo project can join and share skills and facilities. These days of collective work are mostly hosted by the biodynamic farmer who also lead the experiments.

Finally, this farmer together with two more farmers, keeps the varieties that are part of the farmed mixture as pure lines. When farmers are not able to produce their seeds, or want to start from the pure lines again, or want to join the project anew, they can ask these farmers – who are in charge with keeping the pure varieties – to provide them with the seeds. Seeds are exchanged as grains and at the first harvest the inputs source cannot be traced.

The **UK case** is at an earlier stage compared to what described for the French and Italian cases. However, its starting point shows some common traits with the other cases. The case is an evolutionary breeding programme that started 15 years ago, to produce a hugely diverse population of wheat that is suited to organic and low-input farming systems. The initial crossing of varieties was done by the John Innes Centre in Norwich and then taken on by Martin Wolfe at Wakelyns Agroforestry as well as other farmers across the UK. When the case study research was undertaken, Martin Wolfe was the main farmer growing the population on a non-seed basis and one other farmer grew the population for the 2015/16 harvest to produce seed stocks. Martin Wolfe at Wakelyns has been instrumental in continuing to develop the population over the last 15 years and sells the wheat as flour to various local shops and retailers. The initiative has also benefited from the involvement of a seed merchant with similar aims, who has helped to find farmers willing to grow the population seed.

4.3.1.2 The achievements

All cases have developed **varieties, variety mixes** or **populations** that are derived from old and new wheat varieties and that are suitable for bread production. In the French case, they started from 90 populations to reach more than 1000 populations in breeding process. In Italy, Floriddia has just registered a population of bread wheat; MOWA farms ten different varieties of bread wheat; in the Virgo project, there is a mix of five varieties already under production and 130 varieties are being tested and reproduced for possible inclusion in the commercial mixture. Moreover, as a result of the cooperation between Virgo network and a private seed company specialised in organic seeds, another bread wheat population has been registered and can be marketed. Finally, in the UK a population has resulted from over 190 crosses - between 20 different parent varieties of wheat, including new and older varieties characterised by good grain yield and quality attributes – and then mixing the resulting seed. This has produced an incredibly diverse and dynamic population of wheat, which can evolve and adapt to suit different environments, providing greater resilience and more constant yields.

Alongside the development of varieties, variety mixes, and populations, these initiatives have set-up and run **participatory programmes of reproduction, selection and improvement**. The French programme is the most advanced if considering the number and variety of people involved as well as the tools used. The French programme includes 15 farmers' organisations, 120 farmers in total, one research centre and one civil society national network organisation. A set of methods and tools have been co-constructed between research team (researchers, technicians, students) in order to conduct the programme. They include experimental design in the network of farms regarding statistical analysis, new statistics methods and tools (Rivière et al, 2015 ; Rivière, 2017), management of data by developing a data base (De Oliveira et al, 2015; Rivière et al, 2016), sheet to follow the crops cycle, training session, general logistic of this kind of project, organisation of the group with the setting of internal rules. Also in the Italian case, during the last ten years the activities of participatory experimentation and assessment have greatly developed, leading to significant process of empowerment of the actors directly involved in the production processes. The UK case is currently the least developed in terms of length and tools.

In all cases, we see the development of seeds reproduction, selection and improvement that are alternative to the mainstream ones. They are not ruled by seed companies, patents and markets. Rather they are participated on an equal basis by the farmers, researchers, organisations involved.

4.3.1.3 The shortcomings

Despite the achievements, there are some shortcomings hampering the systems for genetic material mobilisation set up by the different cases. These are all systems working thanks to derogations or vacuum in the European and national seed laws. The seed do not fulfil the criteria for registration, neither the people involved in the system are willing to register the seeds under the current conditions of patentability and private ownership. These informal systems, if on the one hand represent interesting experimentations of innovative organisational-institutional models, on the other still show some deficiencies in technical and organisational terms. One of these concerns the **availability of sufficient amount of seeds**. Most of the studied initiatives can produce and exchange the amount of seeds needed for their functioning, but this is a limited quantity and in some cases, it is fluctuating. Moreover, there are cases of diseases spreading because of seed not well prepared. This problem has sometimes emerged in those initiatives that source seed from outside group and have to rely on exchange of seed with farmers that are not involved in the initiatives (e.g. MOWA) and not so well aware of how to deal with the problem. In those cases, entire harvests might be lost and the possibility to reproduce the seeds too.

A better organisation of these informal systems and, within it, a proper technical running of these genetic materials might allow addressing these critical issues. Research might also contribute to finding

proper solutions to prevent or treat seed quality problems. However, **research on such genetic material is still scarce**. Not least because they are an outcome of niche initiatives, moreover not fully legally recognised. The researchers of the Italian case studies pointed out that funds and research interests remain concentrated in conventional varieties that can go through standard process of registration and marketing, whereas the skills and equipment they would need to implement their research are different compared to what available. They have to take into consideration more variables and have to be adapt to the structure of the experimental fields where they will be used.

The farmers are also faced with **difficulties when trying to get involved in the initiatives**. Farmers are sometimes discouraged from joining programmes of participatory selection, improvement and reproduction because of the uncertainty that still characterises the production and the marketing phases. Moreover, these programmes require a significant investment in both tools and knowledge acquisition, which are instrumental to implement activities but are not common among farmers. All this requires resources, such as time and funds, which are not always in the hands of farmers as well as represent a challenge for organisations engaged in promoting and supporting these initiatives.

4.3.1.4 Summary of the findings and feedback from the workshops

Table 6 summarises the key findings from the comparative analysis of the cases in relation to the mobilisation of the genetic resources. These findings and more details from each individual case were provided for the discussion to the stakeholder workshops that were held to validate the findings.

Table 6: Mobilisation of genetic resources: summary of the findings

	Functioning	Achievements	Shortcomings
Mobilisation of genetic resources	Participatory reproduction and, occasionally, selection and improvement	Old varieties rediscovered, new varieties selected	Reduced and unstable seeds availability
	Some key figures: researchers (especially geneticists), facilitators (especially from civil society organisations), some leader farmers and farmers' organisations, some extensionists	Development of methods and tools for participatory reproduction, selection, improvement	Lack of legal recognition, scarce interests from research, difficulties for farmers
	Beyond registration, patents and markets exchange and collective rules	Empowerment of farmers and creation of collaborative environments	Uncertainty related to the production and marketing phases

The main shortcoming of the mobilisation of genetic resources is that **the availability of seeds is limited and unstable**. This is the result of some other problems:

- The system is working thanks to derogations or vacuum in the European and national seed laws. All this results in informal systems that have to face many difficulties and that produce small amounts of seed.
- Research on such genetic material is still scarce as most of the funds are invested in conventional varieties that can go through standard process of registration and marketing.
- Farmers have to invest to get the right tools and knowledge to operate in participatory programmes of participatory selection, improvement and reproduction. The available incentives and forms of support are not always appropriate to foster their engagement despite farmers' interest.

During the discussions, some possible solutions have been proposed:

- **Cooperative learning** should be fostered to enhance the involvement of farmers and to by-pass the resources limitations for research. There is a need to simplify the message that is passed on

to the farmers. Identifying simpler terminology to describe the varieties might be a starting point. Moreover, it might help to better describe not just the population, but the process by which it has come about. Overcoming the separation between crop breeding and crop growing may facilitate this.

- **Stimulate further involvement of farmers**, collective dynamics around peasant seeds is an important factor since it enhances motivation. As well important is to avoid the heritage approach and, rather, consider this breeding work in its innovation potential, so to engage a broader variety of farmers.
- As far as the **legal recognition** is concerned, continue on the path traced by the current derogations (e.g. conservation varieties, registration of populations). This will open-up opportunities to formalise the system of genetic resources mobilisation for these varieties while avoiding risks associated with patenting. Once the system is formalised the traceability and the safety can be improved and, in turn, this will temper one of the causes behind the limited and unstable availability of resources.
- Continue to **improve and stabilise seed availability**: Seed reserves can be created as an insurance policy for cases where seed is infected with diseases, so that they can continue to use the population and treat the diseases adequately. Resources should be provided for seed testing and diseases treatment.

4.3.2 Defining the quality attributes

4.3.2.1 The functioning

In this section it is set out how the initiatives are defining the quality attributes and their meaning, whereas Section 3.4.2 covers tools and institutional aspects that are instrumental to manage quality in marketing. The definition of the quality concerns identification of the features of both genetic resources and derived products. In all the cases, the quality definition is the outcome of a **participatory process, based on the interaction among several actors, including researchers, facilitators and practitioners**. The researchers contribute with their scientific knowledge in the fields of agronomy, genetics, biology, food sciences, and the practitioners contribute with their empirical understanding of the same areas. The cooperation might start from a request by the researchers, who need to test some scientific assumption, or from an involvement of researchers in exploring empirical evidences, or from a project developed in a collaborative way. These processes of participatory research might be formalised into research projects funded through local, national, or European contributions. Otherwise, they can also be run informally on the basis of volunteer commitment of the different actors. In all cases, an informal collaboration at the local level is the starting point for more formalised processes that might also imply exchanges at the European level.

In France, everything started from the collaboration between one farmer-miller-baker and one researcher, leading to a formalised research programme of PPB involving various partners: a research centre (INRA), a civil society organisation (RSP), 15 farmers' organisations members of RSP for a total of 120 farmers. RSP bridges the researchers with the practitioners and facilitate the development of methods and tools for participatory research as well as the generation and circulation of knowledge on the agronomic, organoleptic and nutritional aspects of the varieties and derived products. The programme has been subsidised through France and European funds for research and has looked at the agronomic, organoleptic, nutritional features of the genetic resources and the derived products.

A similar process has been traced in Italy, where all cases started with the commitment of agronomists or facilitators and geneticist, who were able to mobilise local (from provincial and regional governments) funds to identify traditional varieties of wheat. Then they started getting in touch with local farmers and bakers willing to experiment with these varieties because it was too expensive to

organise the whole research in laboratory. To take part in these experiments (or as a consequence of the change of farming orientation), the farmers and bakers went through processes of re-organisation of their activities. In some cases (i.e. Floriddia and Virgo) the re-organisation implied some costs, for new machineries or farm/bakery restructuring or new services to be internalised or externalised. Here the involvement of farmers and bakers has been supported with public funds. In the case of Virgo bread, the farmers and bakers become partners in publically funded research projects. In the case of Floriddia, the support for investments come in the form of European funds for rural development. In one case, MOWA, which is also the case where the active involvement of practitioners in research is the lowest, the investments for re-organisation have been low and covered through the market of the derived products.

In the Italian cases, moreover, and similar to the France case, civil society organisations and local institutions play a crucial role in facilitating the interactions between researchers and practitioners. Researchers mapping traditional varieties entered in touch with farmers and bakers for experiments through meetings organised by the Coordination of Organic Producers in Tuscany, the Organisation of Biodynamic Producers in Emilia Romagna, some local institutions and RSR. This last has played a crucial role afterward too. It supported the farmers and bakers in getting into the process of participatory research; moreover, it has built up a national network of farmers and bakers interested in contributing to the development and spreading of knowledge on the quality features of the varieties and their products, so facilitating the interaction among practitioners and between these and researchers. RSR also contributed to the enlargement of the participatory research process to a national scale, first, and to a European scale later through EU funded research projects.

In the UK, the participatory research process for the development of knowledge about the quality of genetic resources and derived products first started in 2001. Research centres, such as the John Innes Centre in Norwich and the ORC, played a role in starting up experiments with varieties and in giving them a follow up, respectively. Farmers, such as Martin Wolfe at Wakelyns Agroforestry, took on the role of implementing the experiments while the research centres were processing data about the agronomic features of the varieties. National funds have been used to carry on the research as well as European one. The ORC was the intermediary between the UK research programme and other research programmes implemented in other European countries.

Beside the direct or mediated cooperation between practitioners and researchers, the interaction among the producers, in their different roles (farmers, millers, bakers), remains central. This is evident both in the French and Italian cases, where there is a considerable number of these actors involved, although the cooperation along the chain (that is between actors belonging to different stages) can be different. The exchanges of information and experience taking place within these interactions are crucial to processes of experiential learning. In the Italian cases, they contribute to the definition of informal agreements and protocols related to the production practices, which are important also for the marketing and communication activities.

4.3.2.2 The achievements

The described participatory processes of knowledge generation have led to a **comprehensive, shared understanding of the quality features of the genetic resources, of the final products and of the production processes surrounding them**. Shared knowledge is now available, in all cases, about the agronomic features of several varieties, variety mixes and populations. Among these features are: adaptability to no-inputs farming and to ecological conditions of a territory, attached with history, subject to technical issues and sensitivity to new-old diseases, low but stable productivity, difficulty to fit into European standards for genetic resources registration. Other knowledge is shared about the technological properties of the different genetic materials, concerning both their exigencies in terms of processing methods and the related qualitative characteristics of the final products. Finally, ethics,

mostly in terms of socio-economic and environmental fairness, characterise the processes around the production of the varieties and final products. Most cases have generated some knowledge on the organoleptic, healthy, nutritional-nutraceutical, ethical features of the varieties and of the final products.

Besides the knowledge generated, the cases have contributed to define **processes, methods, and tools – both formal and informal – to interconnect empirical and scientific knowledge**. They have also been able to make these processes recognisable for being funded with public money.

4.3.2.3 The shortcomings

Despite the achievements, there are still some factors hampering the process of quality definition in the studied initiative. First, there is still **need for knowledge**. Deficiencies of understanding concerns particularly the technical features at the processing stage. This is mentioned both in the early stage (e.g. UK) and in a more advanced stage with years of baking practices (e.g. Italy). The technical aspects at the agronomic level are more advanced, but also at this level more can be done for enhancing productivity and preventing diseases. One of the technical aspects that is more mentioned in all the cases, both in farming and processing phases, is variability. Another deficiency of knowledge concerns the healthy and nutraceutical features. A lot is known but, as the geneticists in the Italian cases maintain, more evidence is needed to understand potential links between some features of the genetic resources and some claimed health and nutraceutical benefits.

Limits in the existing knowledge are the consequence of other shortcomings concerning the process of quality definition. **Knowledge generation in participatory research is highly resource intensive**. The resources include the time needed to carry out real experiments, including all the time needed for networking and trainings with actors that have different background, carry out different activities, and talk different languages. Connected to this, another scarce resource is that of **facilitation**. Facilitators play a crucial role in interconnecting the different actors and guaranteeing that the knowledge generation moves forward. However, these figures are often not recognised for this function and, in turn, it is hard to find resources to pay their services. Moreover, the skills and equipment needed in these processes are very peculiar and not easy to provide too. They should allow considering a multiplicity of factors - such as agronomic, organoleptic and nutritional aspects - all together. Moreover, they should be defined in a participatory way and usable by all actors involved (see the France case).

Another reason behind the limited knowledge available on the quality features of genetic resources and products is that the **resources available for quality definition are limited** too. So, quality definition of genetic resources and derived products requires many resources and, at the same time, attracts scarce resources. As pointed out in the Italian and UK cases, several researchers are still working on conventional varieties and the most part of public funds is still invested in this. From the Italian case, it also emerges that private businesses (e.g. those working on organic and sustainable products) are not investing in producing knowledge on these genetic resources and derived products. Finally, in the case of the UK it is pointed out that also attracting the involvement of practitioners, such as farmers and bakers, is not an easy task.

4.3.2.4 Summary of the findings and feedback from the workshop

Table 7 summarises the findings from the comparative analysis of the cases regarding the process and definition of the quality attributes that were further discussed by the stakeholders in validation workshops.

Table 7: Quality definition: summary of the findings

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Deliverable 5.1 – Case studies of the marketing of products from newly bred lines and underutilized crops

	Functioning	Achievements	Shortcomings
Quality definition	Participatory, multi-actor research	Knowledge on agronomic, organoleptic, healthy and nutritional-nutraceutical features	Need for further knowledge, especially on the technical aspects for processing and health properties
	Some key figures: researchers (breeders/geneticists), civil society organisations, farmers, millers and bakers, institutions	Development of methods and tools for participatory, multi-actor, multi-discipline research	Resource intensive processes and peculiar resources required
	Formal research programmes – publically funded; informal studies based on volunteer commitment	Empowerment of farmers and creation of collaborative environments	Scarce interest from private and public actors to take the work forward without altering the guiding principles and appropriating the benefits deriving from the achievements

The shortcomings with respect to quality definition include the following.

- There is still need for **knowledge** about the technical features at the processing stage.
- The **technical aspects** at the agronomic level are more advanced, but also at this level more can be done for enhancing productivity and preventing diseases that hamper the results for famers.
- Other need for further knowledge concerns the health and **nutraceutical features**, looking for other scientific evidences of effects on health.
- The limits in the existing knowledge is the consequence of the **little resources available** compared to the resources required, which are high and peculiar.

The following are possible ways forward.

- **More funds** should be invested, by both public institutions and private businesses, **in participatory and multidisciplinary research**. The available funds should be invested in: suitable equipment; research about the processing phase; knowledge spreading, particularly among farmers and processors.
- Besides funds, **existing initiatives**, such as “community seed houses”, “community seed banks” and development projects for areas dedicated to organic productions and related activities, **can contribute to knowledge generation and spreading**. They should facilitate the distribution not just of the material but also of information, not least on the variety characteristics. They can also make the movement more visible and push institutions that might be slow. Milling plants and millers can play a similar role.
- Furthermore, technicians in consolidated and professionalised food chain can be of some help when seeking for **mobilising knowledge**, especially on the technical aspects. Their solutions can be then adapted and might also contribute to define more standard practices.

4.3.3 Marketing and communication

4.3.3.1 The functioning

The marketing and communication in the studied valorisation strategies takes place by defining ways to formalise the quality of the final products, including the process to achieve it, and to communicate this quality among the involved actors, from production to consumption, as well as to market the products through proper channels. The studied initiatives move in between informal and formal quality assurance systems. Informal systems include informal agreements among producers and between producers and consumers to follow certain practices and achieve certain standards; forms of participatory guarantee systems where the actors involved in the initiatives check on each other; information sharing events where the quality of products are communicated from producers to consumers. These informal processes, especially those involving producers, are closely linked to the

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interactions concerning the quality properties of genetic resources and derived products. Formal systems include using recognised labels, such as organic, and biodynamic, and private ones (such as collective trademarks), with the associated certification systems, production protocols and associated trademarks.

When looking at the market channels, the bread and some other final products are sold through: local markets including farmers' markets, farm shops, box schemes and GAS specialised shops of both small and medium dimensions; conventional channels such as middle-sized supermarkets; and school canteens.

The UK case is the least developed with respect to this stage of the valorisation strategy because the initiative had not developed a final product when the case study research was done. However, when talking about quality formalisation, existing labels, such as organic labels, are mentioned as well as the importance to find space for the varieties to fit into the European registration system or other traceability systems. When thinking about the market, potential consumers and market entry points are seen in all those single consumers and campaigns for healthy eating, self-baking and rediscovering or traditional bread. On-line communication and tools to communicate the complexity of the products and of the work behind them in simple terms are seen as relevant to develop the market.

In the French case there are already products to sell and a market structure. Each baker or farmer-baker defines and runs his/her market strategy. All of them rely on local markets, namely farmers' markets and farm shops, and use personal relations to communicate the quality of their own product and of their own work. The initiative does not seek to enter other market channels, because its aim is to create a new, locally based sustainable food system. Boost to the maintenance and further development of this system come from raising awareness of the initiative among civil society and policy makers. A further stage of development, that might help awareness raising, visibility and clarifying information, might come from the development of a specific trademark.

The Italian initiatives all have developed market channels and strategies to formalise and communicate quality. Most of the market channels are built on the basis of pre-existing ones or through snow ball processes. For the quality assurance and communication, informal and formal systems are used, such as production protocols, trademarks, private labels and face-to-face control and communication.

One of the bakers at the MOWA started from some medium size supermarkets and some bakeries he used to supply with convention bread before. He has explained the features and the work behind the new bread and has been able to convince his existing contacts to introduce this new bread too. They have been interested mostly to have a quality product with provenance compared to the industrial bread. Other supermarkets and specialised shops got to know about the bread through consumers and seminars, where the products and the MOWA initiative were presented. The MOWA bread is also sold to a school canteen, for which the collaboration between the Municipality, a school catering company and Slow Food was essential. They were working for several years to bring "good, clean and fair" food to school canteens, and got to know the MOWA project and the quality of the bread through local, organic farmers.

MOWA uses a protocol for production for quality assurance which covers farming and processing and was developed by the agronomist working for the MOWA, the geneticist at Florence University, the farmers and bakers. All those associated with MOWA have the possibility to join the annual visit to check the respect of the production procedures. Those who follow the protocol may use the trademark associated to it, which is distributed by the mill in relation to the amount of flour bought for production purposes. This organisation builds on a system of informal relations through the MOWA members, which allows an effective circulation of information. Some producers also use formal certification, such as the organic one.

A similar story holds for Floriddia. The farm has built up its own farm shop, after starting with the production of bread. Moreover, initiatives of the farm itself and of RSR have raised awareness on their project and have contributed to attract the interest of some specialised shops, box schemes and GAS that Floriddia now supplies with its bread. These events and the circulation of scientific publications about the quality aspects of the bread have also been useful to reach some doctors and attract people with health issues, which has further contributed to increase the consumption. Floriddia is now well-known in its local markets and its private label is recognised as guarantee of quality. Besides personal trust, Floriddia also has certification for organic and biodynamic farming.

In the case of Virgo bread, there is the same combination of market channels built on pre-existing ones and new markets developing. This includes specialised, small and medium scale shops as well as farmers' markets, farm shops, box schemes and GAS. Also in this case, a production protocol and an associated trademark have been developed. Bologna University is in charge of checking with respect to the protocol; Biodynamic certification is recommended. The trademark is mainly used by the leading farmer, but it appears less important to the other members trading in the small-size markets where the products are sold. The Virgo bread bakers have developed their market channels and build up trust and information with their consumers autonomously and on a personal basis.

4.3.3.2 The achievements

The initiatives have succeeded in the **development of market channels** and **quality assurance** system through which they have been able to differentiate their products. Through the definition of production protocols, they are able to take into consideration the peculiarities of each initiative and production conditions. Moreover, in most of the cases, they have been able to **actively involve the producers and the consumers** in the quality assurance and guarantee system. By introducing participatory systems of control as well as by investing in face-to-face information and awareness raising activities they have been able to communicate in detail the features of their products.

4.3.3.3 The shortcomings

The main shortcoming of the described ways to manage marketing and communication is that they are based on a niche-market model. This works on small-scale and where personal relations (including those ones that are personally mediated) are possible. This is particularly evident in the MOWA and Virgo case. When the bread gets into the medium-size supermarkets or specialised shops, there is the risk that not all the information about the bread features reach consumers. Only a small number of attributes are apparent that make the bread special and the consumers willing to buy it. It might be the territory, like in the case of MOWA, or the health issue, like in the case of Virgo. In the latter case, the bread is not perceived by consumers to be different to other whole wheat breads and it is reported that consumers confuse the two. Moreover, in the case of Virgo and the French case it appears that the initiatives behind the bread are completely lost, when the bread gets to the market. Summing up, the ways to communicate the quality that are currently used prove to be not fully effective in conveying information about the products and processes behind them, and this is even more evident for people who are not involved in the initiative.

In this regard, the ways adopted assume an active involvement of all actors, but this is not always the case. Not all producers and consumers make the effort to join public events and training or to wonder what is behind a trademark or a label and this may represent a critical factor.

All systems remain 'niche' considering the quantities that can be produced and commercialised. All the initiatives seem to have reached the maximum of their production capacity. Moreover, there are still only very few bakers baking and selling on daily basis. In the French and Italian cases, the majority of bakers do it weekly or twice a week. This is not a shortcoming in itself, but requires a significant change in consumer habits.

4.3.3.4 Summary of the findings and feedback from the workshop

Table 8 summarises the findings from the comparative analysis of the cases regarding the quality assurance systems and marketing activities that were further discussed by the stakeholders in validation workshops.

Table 8: Marketing and communication: summary of the findings

	Functioning	Achievements	Shortcomings
Marketing and communication	Small-medium, local selling points, specialised or alternative and conventional	Initiative-specific systems	Forms of marketing and communication that are effective in a niche system
	Coexistence of formal and recognised certification systems, formal and initiative specific quality control systems, informal systems of quality assurance and communication	Participated systems	Possible deficiencies in communicating all the values of products
	Involvement of researchers, organisations, producers, extensionists, consumers	Territorially based production-consumption systems	Not easy involvement of all producers and consumers
	Awareness raising, snow-ball, building on existing channels	Detailed information	Possible supply shortage; need of change in consumer habits

The shortcomings

- Marketing and communication are **small-scale** and based on **personal relations**.
- The tools used to communicate quality cannot communicate all the attributes of the initiatives so that they are not immediately recognisable by people who are not involved in the initiative. As a result, the market is not always able to understand the story that is behind the final product.
- It is needed to involve consumers more actively.

Possible solutions to overcome the mentioned shortcomings emerged as it follows.

- The story of the population is about the future not the past – it is not correct or useful to market the population as ‘heritage’, but marketing should **focus on the innovation, resilience and future potential of the population**.
- The story for the marketing should be distinguishable. The media, standardised communication, labelling, prices do not work because production and commercial contexts were products are developed and sold vary greatly from one to another. A possible way to formalise quality, communicate it and market products is **embedding it in the local context**, attaching the products with a **territorial identity**. An alternative could be focusing **on specific quality aspects** and present them to the interested consumers (such as potential health benefits).
- A particular tool could be **charge for the use of the population at the point of sale** of the cereal product (e.g. creating a brand name, or a trademark, and charge for use of that on sale of product, which would incorporate traceability into the marketing process), rather than at the point of purchasing the population seed.
- Supply chains for this kind of products, to be effective in formalising quality, must be really short; however, local should not mean closure. Importance of cooperating in a strategic way among producers. **Trust** is essential to choose whom to collaborate with.
- Communication should be complete, clear and to the point. Consumers should be provided with **specific and in-depth information** so that they can be able to differentiate and defend their choices. Producers and, especially, retailers, might play a role in this. All actors with a direct contact with consumers have a multiplier effect by spreading information outside the initiatives.

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- It is important to **help consumers to understand** since when they are children (schools are crucial). It is about engaging municipalities and educate kids who are not used any more to eat traditional, healthy food.
- One aspect to consider is the **timing**. Many different actors have recently dealt with the old wheats, including actors who use them just for commercial aims. Now communicating and marketing might bring with it the risk of being confused with experiences that do not work at the same level of responsibility and commitment with agrobiodiversity issues. When these experiences have gone, because the fashion is gone, it will be easier to communicate and market without risk of 'appropriation'.
- There might be the **opportunity to market and grow the population in the non-organic market**, especially regarding its potential for minimum tillage farming, and increasing market interest in alternative cereals and old varieties.

4.3.4 Interaction with other projects

4.3.4.1 The functioning

The interaction with other projects takes place all along the valorisation steps considered so far. It can take place through periodic meetings to exchange experiences, awareness raising events, and other occasions for research and information sharing. It can play a crucial role to mobilise the genetic resources, to define the quality of genetic resources and products, to formalise quality assurance and for communication and marketing activities. Interconnections might differ in distance, ranging from the local, regional, to the national and European level. They can be formalised in established network or build on informal relationships. The latter especially occur at the local and small-scale level. The process of interconnection involves, and might be led by, civil society organisations, researchers, extensionists, farmers and other producers.

The UK initiative has experienced interconnection mostly for the mobilisation of genetic resources and for the quality definition. It has been led by a research centre and one farmer. A formal network was not established at the time but is in the process of being developed now. Meeting were only held when necessary to organise activities or relied on chance encounters. The initiative has benefited from national and European funds for research that have allowed carrying on interactions for genetic resources mobilisation.

The French case has a more developed and established network compared the UK case. Everything started from few pioneers, some farmers and a researcher, who were collaborating to mobilise genetic resources. Thanks also to the availability of funds and actors' volunteering time, a broader network around this practice could be built up, involving farmers' organisations, a civil society organisation (RSP) and a research centre (INRA). The scope of the network has grown over time, extending to the quality definition. The broader network established procedures to facilitate meetings between the different actors and, thanks to the action of RSP and INRA, was connected with similar European experiences in Belgium and in Italy among other as part of the Lets Liberate Diversity (LLD) network. Meetings to exchange experience with breeding, farming and processing practices are part of the interactions at the European level as well as shared research projects and experiments. Some of these activities are funded through European funds, others through national funds.

Within the Italian initiatives there is a similar situation. In all the three studied cases everything started from the initiative of pioneers - some farmers and other producers, civil society organisation members and some researchers - who started collaborating for the mobilisation of genetic resources. Later on, the interconnection broadened in its scope, dimension and was often formalised into networks.

In the case of Floriddia, links with other projects has reached the European level and has been instrumental to genetic resources mobilisation, quality definition and marketing. Floriddia started

interacting with researchers from local Universities, through the mediation of the organic farmers' organisation in Tuscany and RSR. These early, local interactions were mostly about mobilising genetic resources, although within a broader framework of commitment to the agrobiodiversity issues. Floriddia got involved more and more in participatory programmes of breeding thanks to the mediation of RSR, within both national and European initiatives. Moreover, RSR facilitated the participation of Floriddia to several awareness raising events where members of networks of other countries (within LLD movement), other initiatives and institutions were involved. Floriddia started its own awareness raising events and extended its business: it built up its own network of farmers and strengthen its relationships on the local market. These interaction activities have in fact contributed to the growth of its visibility on the territory and outside it, facilitating the establishment of direct connections with consumers (especially GAS). Besides commercial activities, it established personal relationships with research institutes to study the final product quality.

In the case of MOWA interconnection with other projects developed mainly at the local and national level; it has been instrumental to genetic resources mobilisation, quality definition and marketing. The interaction with the University and the extensionist, the support of the Municipality and the facilitating role of the first president of MOWA have been crucial to build up the local network. Through the University and the extensionist MOWA got to know RSR and all other regional and national initiatives working on participatory breeding and supply chains development for the derived products. The first president of MOWA, as member of the Municipality, facilitated the participation of the association in several awareness raising events, where similar initiatives were invited too. Those events were all instrumental to quality definition and build-up of the market.

The relations between the Virgo Bread and other projects at the local and national level build mostly around the work of the geneticist of the Bologna University. He opened the way to interconnect with local institutions through the projects funded by the regional government. Moreover, the geneticist, by means of his relationship with the geneticist of the Florence University, put the initiative in touch with RSR. Another entry point of the interconnection between Bologna University and RSR derives from their partnership in European research projects. The relationship with RSR was important. Farmers and other producers within Virgo bread started knowing and joining the initiatives promoted by the organisation. They got to know other producers, organisations, initiatives and exchange of practices started; this favoured a process of awareness raising. Over the time, Virgo producers started organising their own initiatives and invited participants in the national network as guests to continue exchanging. Other interconnections, both at the local and national level, have been developed independently by the single participants in the initiative. Most of them come from previous experiences with organic, biodynamic and other civil society organisations or informal groups.

4.3.4.2 The achievements

Most initiatives are part of wider networks of similar initiatives at the local, national, and European level. They have been able to create spaces and moments for the exchange of information and experience, which have favoured processes of awareness raising, the development of the single activities and the engagement in shared projects.

There are formalised networks - MOWA and the farmers' network around Floriddia farm, the Virgo bread producers' association, RSR and RSP (the French farmers' organisation) - with their own schedules of meeting and other collective activities. Research projects (such as Diversifood) also include meeting opportunities

All this networking has increased the opportunities for the initiatives, for the market build-up and the motivational effects that it has on those involved in the initiatives as well as for the enrichment in terms of knowledge deriving from the interconnections. It has also been crucial to the development of common actions in other domains, such as at the institutional-juridical level, which is crucial to the

valorisation of the diverse products on the market. The Italian and the French initiatives are characterised by a significant engagement of producers in the activities associated with these issues (such as initiatives regarding seeds circulation).

4.3.4.3 The shortcomings

Common to all the initiatives is the considerable amount of resources that is needed in order to mobilise and maintain the interactions and the networks. These include human resources and funding needed to organise and promote networking events. There is a general agreement about the crucial role played by facilitators from civil society organisations, such as RSR and RSP and, in the French case, farmers' organisations. Several producers maintain that they could not be able to keep up with the interconnections with other initiatives without these facilitators. However, all agree that the resources to pay for their work are scarce. This shows a critical point: management could be more effective if more resources were available for the management of the network.

Finally, another common shortcoming is the instability of the interactions. Interests are variable and may change over time or may lose the chance to be expressed in the absence of supportive conditions. Finding shared narratives is crucial but not easy to do. It is important to create frameworks that guarantee over time that all actors can really participate and fulfil their interests, beyond the role played by strong leaders. The case of MOWA is an example. The interactions with the Municipality were very intense at the time of the first president, because she also covered a role at the Municipality. When she resigned from both roles, the interaction and support of the Municipality reduced a lot.

4.3.4.4 Summary of the findings and feedback from the workshops

Table 9 summarises the findings from the comparative analysis of the cases regarding the process and definition of the quality attributes that were further discussed by the stakeholders in validation workshops.

Table 9: Interaction with other projects: summary of the findings

	Functioning	Achievements	Shortcomings
Interaction with other projects	Interactions for genetic resources mobilisation, quality definition, marketing and communication, PPB, legal issues	Creation of spaces for interaction (meetings, awareness raising events, research projects and information exchange moments, network structures)	Considerable amount of resources needed
	Formal and informal networks, at local, national and European level	Enhanced development opportunities for the initiatives	Inefficiencies due to the shortage of resources
	Involvement of civil society organisations, researchers, producers, extensionists, consumers, institutions	New opportunities for awareness raising, development of initiatives and collective agency	Possible weaknesses in alignment Negative aspects of presence of leaders Lack of spaces to interact

About shortcomings:

- A **significant amount of resources is needed** in order to mobilise and maintain the network and the interactions within and outside this. In particular, the role of facilitators is crucial, but their importance is not always recognised and the resources to pay for this work are scarce. There are several organisational inefficiencies that could be reduced if more resources were available for the management of the network.

About possible solutions:

- One possible solution is **recognising and consolidating the role of facilitators**. This role may be played by civil society organisations, but also by single actors, such as chain agents (farmers, processors, retailers) and institutions. They can create opportunities where the initiatives and their network are presented to a broad public, and where the different parts of the supply chain are interconnected and informed and information is spread beyond the chain.
- Existing initiatives might be used to **foster interactions**, including forms of producers' association and territorial initiatives where relevant stakeholders are included. This might create favourable conditions for further connections at territorial level. Sharing through interactions would facilitate the creation of common views as well as it would create spaces for equal participation and avoid centralisation.

4.3.5 Effectiveness and sustainability

4.3.5.1 The functioning

Initiatives for the valorisation of agrobiodiversity through the establishment of food chains might consolidate in different ways. From the case studies the following can be detected. There are both horizontal and vertical interconnections along the food chain. The supply chains are rooted locally aiming for a close connection between production and marketing, but some of the initiatives are also able to develop national and extra-national relations. Concerning the production structures, the different actors can be involved in either one (e.g. farming) or in several or all the following stages (milling, baking, selling), even within the same initiative. The dimension of each initiative varies from small to medium and the marketing can be seen as niche, even if some of the initiatives might be connected with the conventional agri-food system through the chosen market channels.

The UK case is at its early stage and therefore not yet fully consolidated. Those who started the project – researchers and farmers – are still trying to develop more relationships with other actors – especially millers and bakers – to build up the awareness raising and the functioning of the initiative, which clearly started from research.

The French case has built a national network of civil society organisations, research centres and farmers for the research part of the initiative and for the awareness raising. The commercial part and partially the awareness raising one are managed by each single actor or group of actors autonomously. Mostly they are farmers that have decided to start producing bread and have built up local markets for their products. Some other actors decided to focus on farming and integrate vertically with other actors of the bread chain to produce and sell at the local level.

The Italian cases show some communalities and differences among them. They all build around one or few actors, which play a pivotal role. The other actors might choose different solutions, with respect to farm activities and the expansion of their businesses.

Floriddia is guiding a network of farmers who produce the variety mix developed at the main farm. At the beginning the mix was provided by Floriddia and, later on, each farmer reproduced it. The farmers are connected through a formal contract that establishes the way of operating; following it, each farmer brings the grains to Floriddia's mill, except the grains that are used for reproduction. Floriddia pays the grain at an established price and takes care of the processing and selling at the regional level using its label.

In the case of MOWA, the mill is the focal point. Farmers, millers, bakers and consumers are part of the association, which is ruled by a charter. All farmers sell their grains to the mill for an agreed price. The mill processes the grains into flour and is the main selling point for it. It is also in charge of preparing and distributing the seeds to those farmers who are new in MOWA or are not able to produce their own seeds. The flour, the bread and the pasta are sold with the MOWA trademark. The

miller is in charge of distributing the trademark to the processors, who buy the flour at the mill upon request and according to how much flour is bought. Each processor develops its own local markets independently. This is the only initiative where both the miller and one baker also deal with conventional products alongside the alternative supply chain.

The miller plays a crucial role in Virgo bread too. He is the only farmer in the association who has decided to invest in processing plants for milling and baking. He is also the main point of contact linking the researchers of the University with the practitioners for selection, improvement and reproduction of seeds. He has been the point of reference for all the farmers starting to work with the Virgo mix. Besides providing the seeds, the miller also offers trainings and services for the seed preparation and reproduction and for the farming and storing techniques. Each farmer and bread maker organise their commercial activity autonomously. Most farmers cultivate and bring their grains to millers to produce the flour that they will sell, while few also take on the production and selling of bread. The bakers refer to farmers to buy the flour and organise their own market. There is a trademark, but this is not used by most participating farms, so the Virgo project does not appear in the market.

4.3.5.2 The achievements

All the initiatives, except the UK one, have led to the development of supply chains for bread produced from old wheat varieties, landraces and populations and participatory breeding. These supply chains have reached the maximum of their production capacity and satisfactory economic results for the actors involved.

Some numbers about the Italian initiatives give an idea of the development of these alternative production systems and of their **environmental impact in terms of agrobiodiversity promotion**.

Floriddia has reproduced three varieties of durum wheat and six varieties of bread wheat. The latter are now part of a registered population that is particularly significant in the strategy to enhance agrobiodiversity pursued by the local farmer network. Nowadays, there are 13 farmers involved in the network around Floriddia, farming a total of 296 ha.

MOWA has selected and reproduced ten varieties of bread wheat and seven varieties of durum wheat. The association now counts 37 farmers, one miller, two bakers, some consumers. It works over 200 ha of farmed land.

The Virgo bread has selected and reproduced five varieties of bread wheat. In addition to those already in production, another 130 varieties are being tested and reproduced for possible inclusion in the commercial mixture. Also in this case, through the cooperation with a local seed company producing organic seeds, the mixture has given rise to a population that has been registered. Virgo bread association involves ten farmers in three provinces of Emilia Romagna who farm over 20 ha of land.

Besides the contribution to the promotion of agrobiodiversity, the use of organic, biodynamic and natural farming techniques also has **other positive environmental impact**. Moreover, there is a **socio-cultural benefit** deriving from the educational role played by these initiatives that raise awareness on issues related to health, environment, traditions and economic issues among consumers, institutions and civil society. Finally, a **positive impact on health** might be traced that derives from making available bread that has been recognised to have higher nutritional value and health properties (suitable for people with intolerances). Alongside the development of these production initiatives and parallel to the empirical evidences through consumption, studies from research institutes have started to demonstrate these properties.

4.3.5.3 The shortcomings

Despite the achievements, there are some shortcomings that cut across the different initiatives, even if in the UK case they are just prefigured and not actually experienced. These shortcomings constitute possible constraints to the long-term sustainability of these initiatives.

Despite some achievements, **viability** issues are mentioned in most cases. Farmers producing cereals have better conditions than in conventional markets and most of them are satisfied with what they earn. However, they are still the weakest link in the chain. They face **risks associated with the production processes** and what they earn is not enough to compensate for potential losses at harvest. The UK case underlines that it can be difficult to motivate farmers to get involved. MOWA is thinking about setting up an insurance system for farmers.

Another shortcoming is the **accessibility of the bread**, which is recognized to be limited to a market niche. There are logistical, cultural and financial barriers for a significant number of consumers to buy such bread. In this regard, better information is considered in each case to be the most important solution. It is assumed that better informed consumers would be more willing to buy the bread despite some logistical difficulties, or need for a habit change or, in some cases, the price. MOWA is trying the strategy to engage with conventional retailers, so to increase the **openness** of the initiative, as well as to combine with conventional production to reduce the costs and the prices of products.

Another shortcoming concerns **risks associated with scaling up and entering in wider markets**. Each initiative is struggling with the possibility to grow while maintaining the founding principles and features, and not being appropriated by other similar initiatives that have different principles. The best solution, as shown in the French and Italian cases, is to try to replicate rather than expand the initiatives. This requires investing in communication to be sure that the identity of these production systems is clear and well known and cannot be appropriated by other players. This might guarantee sustainability over time.

In general, as already underlined, the success and sustainability of these initiatives over time is linked to the existence of a network of relations where the chain actors can cooperate, related to breeding activity as well as marketing and communication of the added value. The capacity of the actors directly involved to acquire autonomy and the opportunity to continue cooperating on innovative research and experiments is crucial. And all this requires financial resources.

4.3.5.4 Summary of the findings and feedback from workshops

Table 10 summarises the findings from the comparative analysis of the cases regarding effectiveness and sustainability of the initiatives that were further discussed by the stakeholders in validation workshops.

The shortcomings concerning the effectiveness and sustainability of the initiatives concern:

- The **viability for farmers** who are not able to cope with the risk they face in the production.
- The **cultural, economic and logistic accessibility** of final products and the associated risk of niche consumption.
- The **dimension of the initiatives**. Each is struggling with the possibility to scale-up while maintaining the funding principles and features and not being appropriated by other similar initiatives that have different principles.

Table 10: Effectiveness and sustainability

	Functioning	Achievements	Shortcomings
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Effectiveness and sustainability	Integration in the chain; internalisation of processing/selling	Most often satisfactory economic results	Viability, risks of production Cultural, economic, logistic accessibility of bread
	Vertical and horizontal integration	Positive environmental impact – biodiversity and pollution	Openness
	Local, small-medium scale, local, combination of conventional and alternative	Societal impact – awareness raising and improved health conditions	Risks associated with scaling up and entering wider markets Need for financial resources to support cooperation and innovative research

Several (sometimes opposite) strategies were proposed to overcome the shortcomings:

- **Promote alternative production/consumption only**, have high prices and educate consumers to understand and accept the why. These options would allow for more coherence with the guiding principles of the initiatives that aim to increase autonomy of farmers involved in organic production on local markets.
- **Closer collaboration of alternative production with conventional**. This option might allow getting economies of scale that could help to keep prices of alternative products low; moreover, it might allow penetrating market channels and reaching out a larger number of consumers. So, the initiatives might benefit in economic terms and in terms of openness.
- **Develop the market for feed wheat in parallel** to that for food.
- **Strengthen public support**, in particular, by contributing to further research, making land available, subsidizing farmers, promoting market opportunities with public catering and other education campaigns.

5 Conclusions and recommendations based on the case studies

The study confirms that a systemic approach is needed to contribute to the further development of initiatives, for the valorisation of biodiverse food products and for supporting agrobiodiversity. This approach should consider both the internal coherence of the initiatives and the external support, in relation to the different aspects involved and all the different stages of the valorisation process, such as maintaining and improving the genetic resources, the definition of quality attributes of the derived products and the market environment. In many cases, the development of production, marketing and communication strategies in line with the shared values is challenging and requires careful attention.

Our framework considering the stages of valorisation and drawing on the theory of marketing has been useful and highlights the need to carefully consider the social processes involved, the coherence of the initiative and the wider networks to which it may interconnect. In the valorisation or marketing of biodiverse products the collaboration of the people involved - from the fields to the plate - is central to the success of any initiative. The cases presented here support the conclusion of Schmid (2004) that *“trust generated by successful collective activity builds confidence and gets people involved in wider networks”*. The collective learning taking place within the interactions is crucial for the development of a common vision, shared knowledge and motivations and the translation of these in consistent practices. This social dimension is not fully covered in food marketing, but has proven to be very important in many of the cases investigated in the project.

In the following first conclusions and recommendations based on the case studies are presented related to the embedding of agrobiodiversity in the food system. These are broadly structured by the five stages of the framework (see Chapter 2) but place particular emphasis on important issues.

- In the mobilisation of genetic resources two issues were found to be important: the seed availability, access to seed and the legal framework (Section 5.1), and enabling farmers engagement alongside other actors (Section 5.2).
- In defining the specific quality attributes, the development of a common understanding throughout the initiatives appears particularly important. In supporting such initiatives, more attention needs to be paid to the internal coherence of vision, values and knowledge of the actors directly involved (Section 5.3).
- This provides the basis for communicating the core values of products and production systems outside the initiative including consumers. Many examples also illustrate that the consumers are not just recipients of products but as citizens are active participants of the initiative (Section 5.4).
- The focus on interaction with other networks and pathways illustrates the importance of relationships with similar initiatives elsewhere. All case studies have benefited from the support of researchers (e.g. in access to genetic resources, knowledge and funds) and of civil society organisations in terms of contacts and facilitation (Section 5.5).
- An appropriate business development strategy, based on a systemic approach considering all the different stages of the process and all the dimensions involved, provides the basis for supporting the long-term sustainability of the initiatives regarding the capacity to have a positive role in agrobiodiversity enhancement in the present and in the future (Section 5.5).

Recommendations for policy makers are further elaborated in the Deliverable 5.4 of DIVERSIFOOD (Policy Recommendations) and guidelines for practitioners are presented in technical booklet under WP6, illustrated with examples of the case studies.

5.1 Seed availability and legislative constraints

The research showed that the availability of seeds necessary to sustain initiatives working on underutilised and biodiverse crops is limited and/or unstable. Seed laws have been restrictive regarding heritage varieties and heterogenous populations. Derogations in current seed laws, such as the marketing experiment for the seed of heterogenous populations of cereals or the derogation for conservation varieties, can give projects an opportunity to legally buy and sell seed and thus experiment with product development from biodiverse crops. This also gives the opportunity to gain experience with more flexible approaches to seed regulation. However, the marketing of related seeds and final products remains limited. Greater flexibility in the seed laws would facilitate the preservation of plant genetic resources that may otherwise fall out of use, and through the valorisation empower farmers giving them new spaces of autonomy and market.

5.2 Enabling farmer engagement and development of capacity

In addition to lack of access to seeds, lack of access to other physical and institutional resources restricts the ability and willingness of farmers to engage in such initiatives and produce underutilised crops. In many cases not only the farmers but the whole supply chain has to learn more about adapting to produce and process the new products. Engagement of farmers and others in supply chains is time consuming, requires the development of new knowledge and skills and a degree of willingness to take a risk in handling an alternative crop as well as an appropriate marketing. The likely returns from niche crops are often considered not sufficient to compensate for potential losses. However, belonging to a network, having access to knowledge and mutual learning process might be also attractive and supportive for farmers and other supply chain actors to get involved.

Public support providing access to capital and on-going funding, through participatory research, extension, facilitation and training might provide the (literal or figurative) insurance for farmers on possible losses and encourage experimentation and innovation with regards to biodiverse crops. Funding criteria should ensure that such support is accessible also to actors in short supply chains.

This is further compounded by the research showing that market demand is not often the factor limiting business development for such initiatives (as is often assumed), but that production, processing and distribution capacity are often the main restraints to growth. Moreover, the development of these initiatives could contribute to increasing the opportunities in farming, highlighting implications for rural development policies in a broader sense.

When designing forms of support, the research has also highlighted the importance of favouring the active involvement of farmers and of the other players engaged in the initiatives of valorisation of biodiverse genetic resources, and in paying attention to the interrelations among the various actors in the (local) food systems.

5.3 Defining 'distinctiveness' of the crop/product

It is important that there is clarity in actors' common understanding of the distinctiveness, values and qualities embedded in the genetic resources and products, whether or not the initiative plans to market under an umbrella or individually. The participatory nature of many of the initiatives studied might suggest that this is inherent from their establishment. The research has however shown that this is not always the case, and that a lack of coherence can fragment the initiative and hinder market product and development. A common understanding of the distinguishing qualities of the products promotes coherence in the engagement of the various value chain actors (e.g. farmers, processors, retailers and others), facilitates the development of agreed marketing strategies, and supports effective external communication. The direct engagement of all actors of the initiative in determining

and agreeing on the defined attributes and in developing a strategy of valorisation is crucial for success. This can involve working to improve actors' knowledge about the various stages of the production process, from farming to processing, as well as learning about consumers' attitude and habits. The organisation of exchange with similar initiatives about farming and processing practices, and of cooking, baking and tasting experiments would provide feedback to producers on quality selection and optimisation.

Some cases investigated are linked to a place, be it a farm or a region. In terms of distinctiveness, this gives the products an authenticity when marketed locally or via gastronomy. Other cases attach a broader meaning to the local dimension, focussing also on the social factors linked to genetic resource management. Here, the product quality covers social dimensions like 'community' and seed and food sovereignty that the product stands for. So 'localness' can have the meaning of connection to a specific place or also refer to the existence of a social system supporting a specific local production system.

5.4 Communicating the qualities of biodiverse crops and products

Genetic diversity is difficult to communicate. A shared understanding of the qualities of the crop and the product is also an essential starting point for determining a communication strategy and is crucial for conveying the values embedded in crops and products to consumers in an effective way, i.e. for being able to tell the story of the product. Core messages can refer to a positive contribution of the consumption of the biodiverse products to personal health, but also the environmental, social and cultural benefits stemming from the support of the related production systems. Messages might also include technical aspects of farming or processing that are of interest for food businesses rather than consumers.

The complexity of the potential in terms of biodiversity conservation proves often challenging to communicate along the value chain. It is translated into tradition, cultural heritages, environmental adaptation, artisan processing, and better nutritional and organoleptic properties. In most cases the communication tools are selected carefully, depending on the market channels, with longer supply chains posing the greater challenge to communicate effectively. The cases deal differently with this issue: close collaboration with consumers, selling only locally in short supply chains, providing information at the point of sale or engaging with participatory guarantee systems and labelling (e.g. PDO label, own labels and claims).

What the initiative communicates and how they choose to do so should suit both the initiative itself and the consumers of the product(s), but there might be a lack of understanding of which factors consumers most identify with and 'buy into'. Among the case studies were some that emphasised 'innovative and new products' or 'heritage and tradition' as core values in marketing of the products. The attachment to traditions and cultures of heritage varieties as well as a desire for something slightly special or different were values that actors along the supply chain identified as important for their interest and involvement. This included the farmers who had been growing and saving seeds from heritage varieties for years, and restaurateurs, chefs and individual consumers looking for a unique taste and visual characteristics. Whilst the plant genetic diversity issues might be very clear and important to the producers and researchers, they may prove more challenging for consumers to relate to immediately. The framing of the product in terms of innovation, environmental resilience as a "future food", diet diversification and health properties, or even seed/food sovereignty are more accessible. This requires a careful definition of the communication activities, ideally based on direct engagement with consumers (for example through focus groups, demonstration events, tasting, training sessions), aimed at promoting learning processes rather than to just convey information. This contributes to developing a shared understanding of values in the whole initiative.

Also, a careful choice of suitable communication tools is required, which included face-to-face communication but also communication through websites with detailed product information, social media and interactive events or tastings.

Trademarks and labelling can also play an important role, allowing the differentiation and recognition of the biodiverse products. However, they should not be seen as a 'quick-fix' for communicating trust and origin. As a trust builder, a label or trademark will only work well if the meaning is well understood and valued by consumers (both ethically and economically), which usually requires substantial effort both in designing and in promoting the label or trademark.

5.5 *Networking and interaction*

What has been particularly clear from the research is the importance of researchers, civil society, and local institutions for enabling initiatives to work on preserving agrobiodiversity and producing biodiverse food products. In particular, universities and researchers collaborate with farmers and other practitioners in the following ways:

- The selection, reproduction and improvement of genetic resources (including seed treatment);
- The development of practitioners' capacities, by fostering on-farm experimental design; providing research on heritage, nutritional and organoleptic qualities, to complement the knowledge stemming from experience;
- Facilitating access to research and project funding on regional, national and international scales; and
- Providing links to similar projects, thereby facilitating the exchange of knowledge and experience.

Many of the cases studied showed the fundamental role of key actors (champions, leaders), able to facilitate the interactions between the different members and participants, helping to focus strategy, providing a point of contact, be an inspiration of 'best practice', or act as a spokesperson for the initiative as a whole. In many cases these are farmers or processors. In other cases, civil society organisations can, in working with farmers, play a crucial role in facilitating farmer involvement in participatory plant breeding and in establishing connections and exchanges with other actors and initiatives.

This role of networking, from the local context to broader connections, is also already recognised by innovation policies at the European level. The research showed the value of engaging with a variety of different actors (i.e. multi-actor networks) as well as interactions with networks engaged in similar issues in different contexts or at different scale. Some initiatives started mainly with producers but went through processes (and in some cases also through a crisis) but shared values kept them together. Interactions with other actors along the supply chain and with other networks favour the exchange of experiences, skills and knowledge. This creates an enabling environment for further developments by co-defining and implementing actions at institutional and political level, in order to give wider scope to practical and local actions.

The importance attached to networking in turn shows the need to promote and support proper actions of facilitation, aimed at providing bridging and supporting knowledge exchanges, collective processes of awareness and new knowledge building, development of collective agency and communication capacity centred on the various benefits of agrobiodiversity. An important message is that such processes take time.

It is fundamental, therefore, that there is funding for such forms of interaction continues, incentivising multi-actor and trans-disciplinary research on plant genetic resources. The cooperation among practitioners and researchers from several disciplines requires careful facilitation of the social

processes underpinning the definition of the shared values of the initiative. They are at the basis of the development of the knowledge on cultivars and varieties, and of selection, reproduction and improvement work, supporting many of the structures on which initiatives working to produce and market biodiverse products rely on. It is important also to recognise the role of civil society and local institutions; public financial and technical support with various initiatives has supported the projects, and has encouraged the embeddedness of agrobiodiversity values in local society and culture, such as through tourism schemes and regional events.

5.6 *Strategies for business development*

Many of the cases studied reported ethical dilemmas in deciding how best to develop their initiative, without compromising their commonly shared principles based on environmental sustainability, embeddedness in local contexts and cultural heritage. The research has shown that there is not a one-size-fits-all approach for scaling, but that a combination of 'scaling up', 'scaling out' or 'scaling deep' allows for a more nuanced approach, to better suit the motivations and visions on which the initiative is founded, and the features of crop systems and products that they are trying to promote. For example, some of the cases are not interested in scaling up their business, but rather in sharing their experiences and allowing others to replicate them (scaling out), so strengthening the common strategy centred on biodiverse resources at territorial level or at a broader scale.

The cases show that the local dimension of business is a fundamental component of the development of the production systems and of the market valorisation strategies. It allows the interactions among the chain actors that contribute to the specific quality of products stemming from the management of the diverse genetic resources in the specific contexts. Local and short supply chains facilitate the interaction with consumers, and communication of quality, trust and transparency in the story of the product, so favouring a stronger engagement of consumption practices in the local food systems. The local dimension also provides a further model for scaling: a growth of the size of the production-consumption systems through an increase of the number of enterprises involved (farmers, processors, intermediate users, retailers). For many cases studied the local supply chains is considered the most appropriate solution, because of the value of the network and social interaction, whereas the link to specific place of production appears less relevant.

However, in some of the cases investigated, locality of the product is also important for the valorisation of niche/underutilised crops through longer supply chains. In these cases, methods need to be found that allow developing and maintaining a close relationship between productions systems and consumption and ideally also a common engagement. Among the case studies third-party certification, company names and label and organic certification (or a combination of these) are all used to communicate added value in longer supply chains.

The research has shown that it is good to challenge the assumption that initiative selling underutilised crops must select either a local/decentralised or a national/international marketing strategy. These two types of supply chains can work well alongside each other, and complement each other. Based on the seasonality of most of the products, some supermarkets might be interested in promoting some products for a limited time of the year, or only once a month. This could be in line with the ability of the producers to supply the supermarkets with their produce. The marketing via supermarkets can also be also seen as an opportunity the raise awareness and recognition among consumers.

Adequate support to the establishment of fruitful interactions among the various actors along the supply chain and between these and the other actors in some way involved in the production and valorisation activities (e.g. researchers, technicians, civil society organisations) can represent a first important enabling factor.

Support for business development - alongside support for research and collaboration and facilitation - in the longer term may reduce the reliance of projects on public finance, and encourage market sustainability. There are many ways in which local, regional and national governments can enable this. This could be through public procurement of local, quality food, by supporting the development of collaborative projects involving crop systems and/or processing activities, and by developing market and communication spaces, such as short supply chains and regional agro-tourism. This can involve private actors facilitating research and development projects and making use of the outcomes in developing their business.

Facilitating the establishment and implementation of private or public trademarks (e.g. collective trademarks, PDOs) can allow the marketing and promotion of cultural values outside a region and thus add social and financial capital to regional economies. Financial support or project money from rural development programs for processors, particularly small-scale or local processors, provides essential processing capacities for niche value chains, especially cereals, which would otherwise not be able to reach the market.

6 References

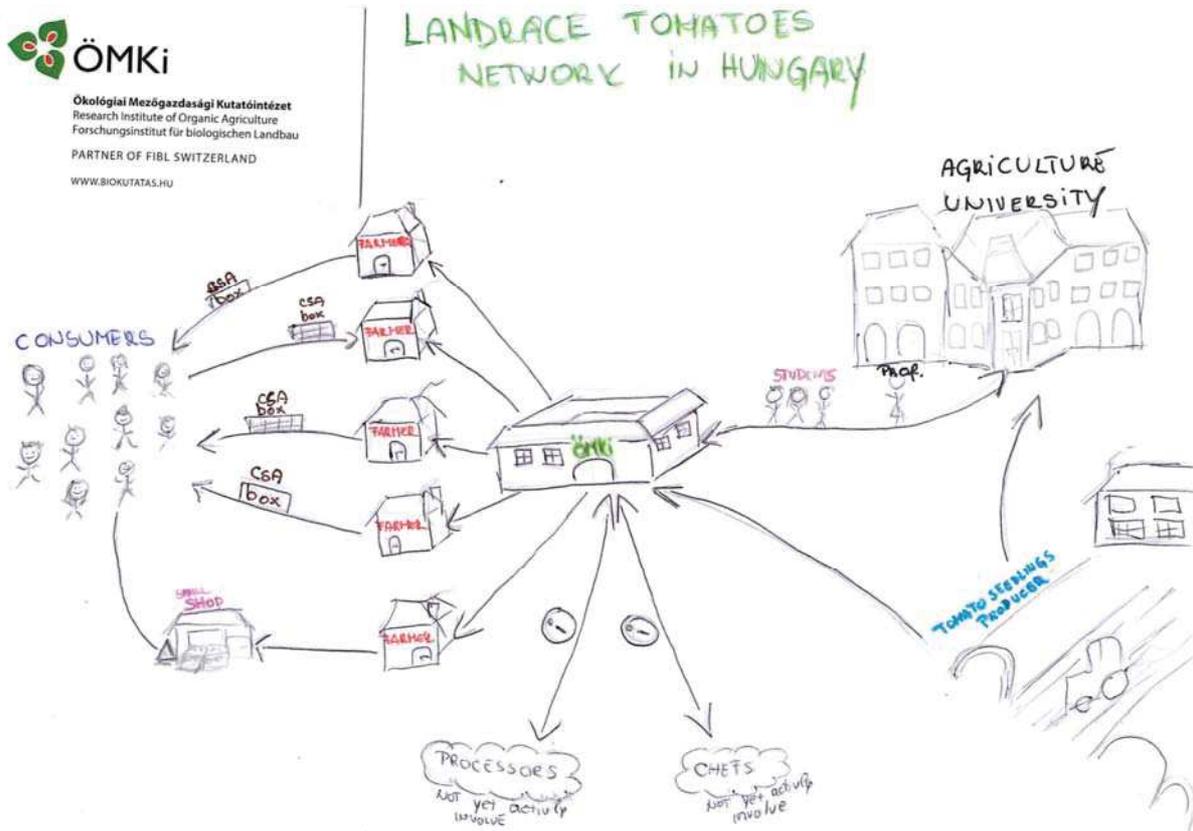
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Appendix: Rich Pictures of the studied initiatives

Heirloom tomatoes (Bauernparadeiser), Austria

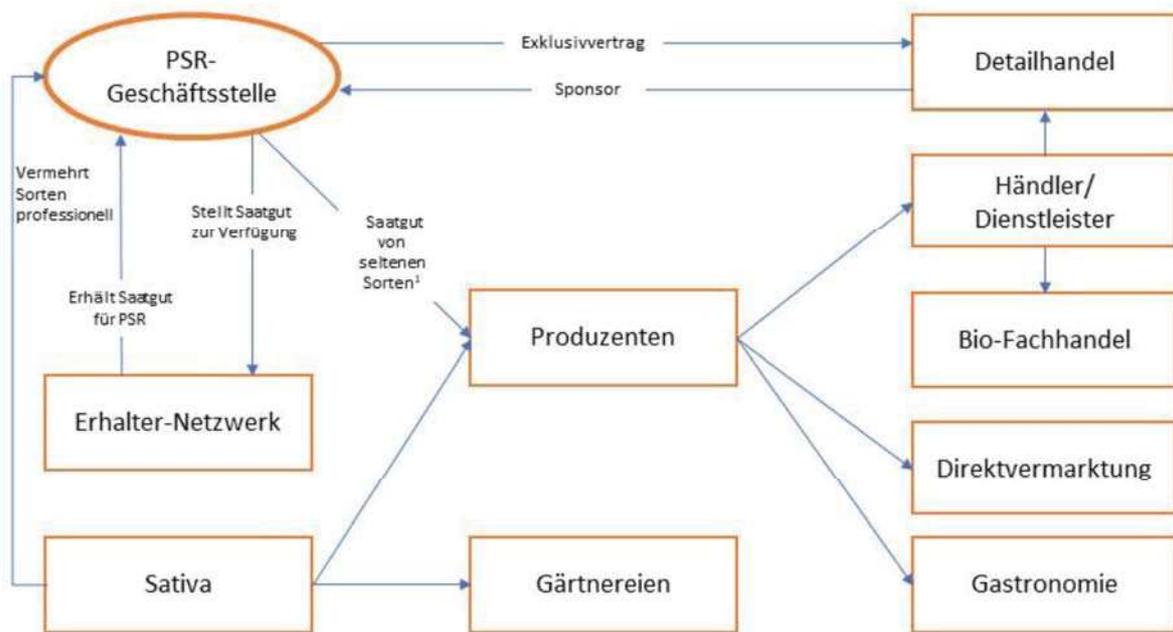


Landrace tomatoes, Hungary



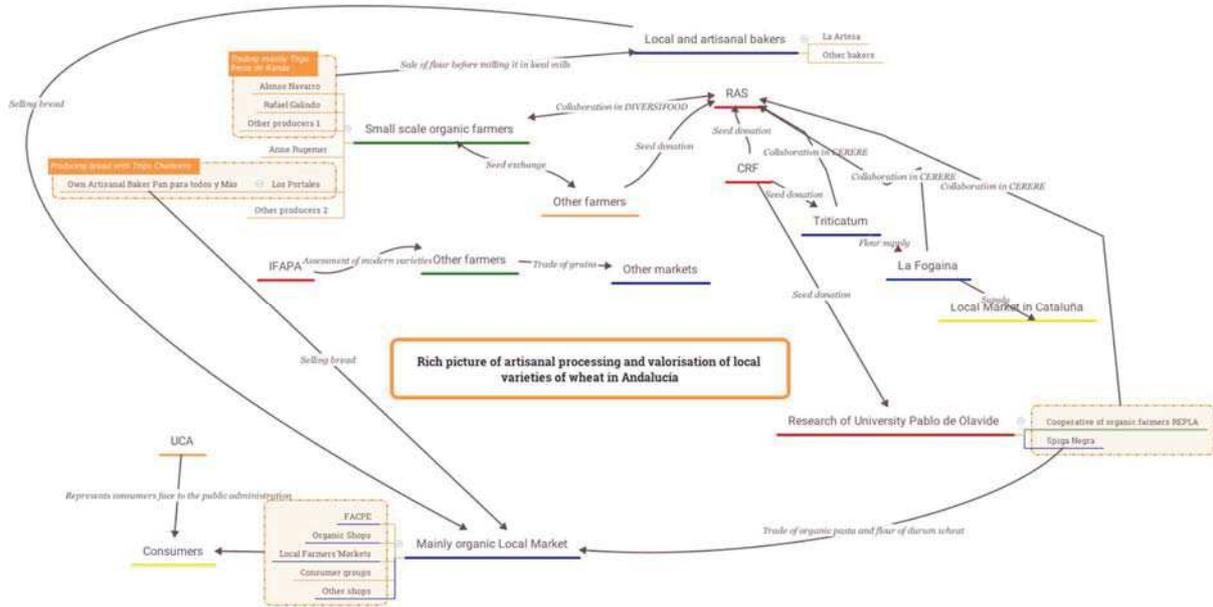
DIVERSIFOOD – GA n° 636571

Heritage vegetables, Switzerland

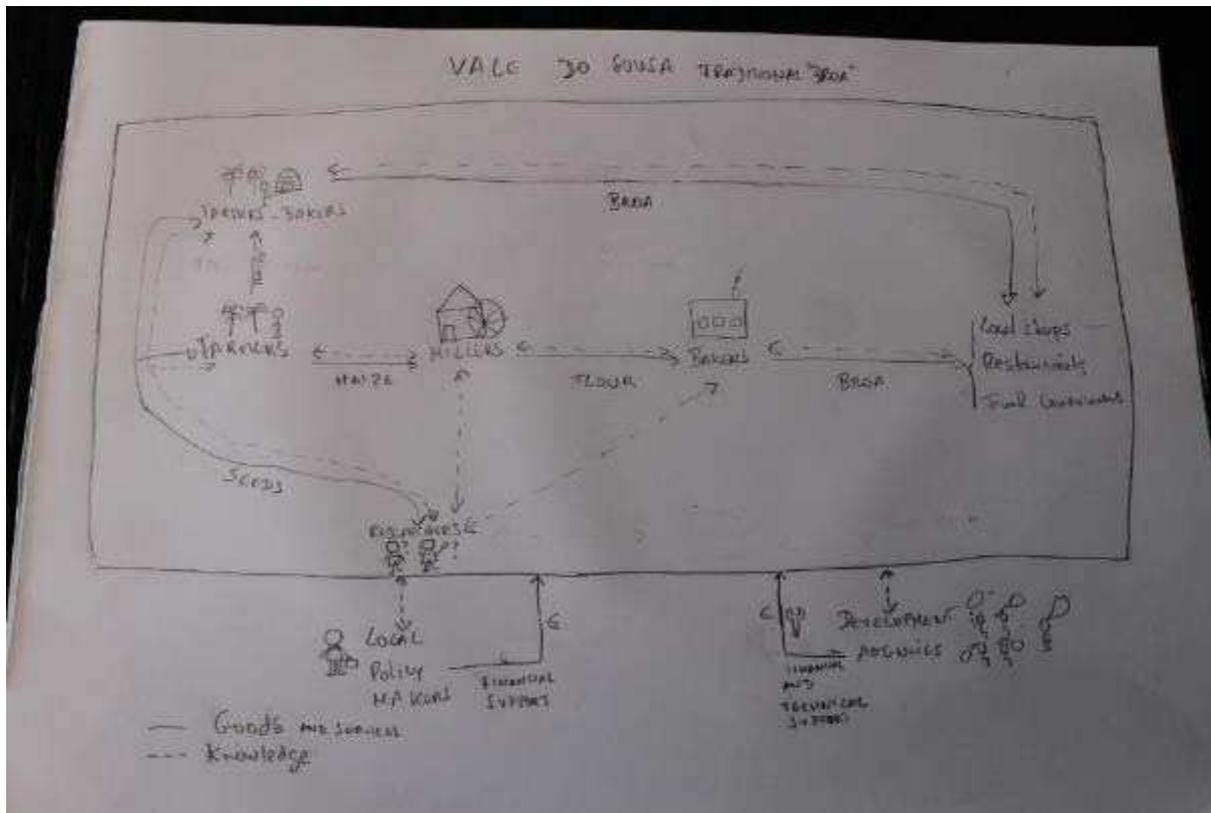


¹ Sorten, die Sativa nicht professionell vermehrt

Heritage Cereals, Spain

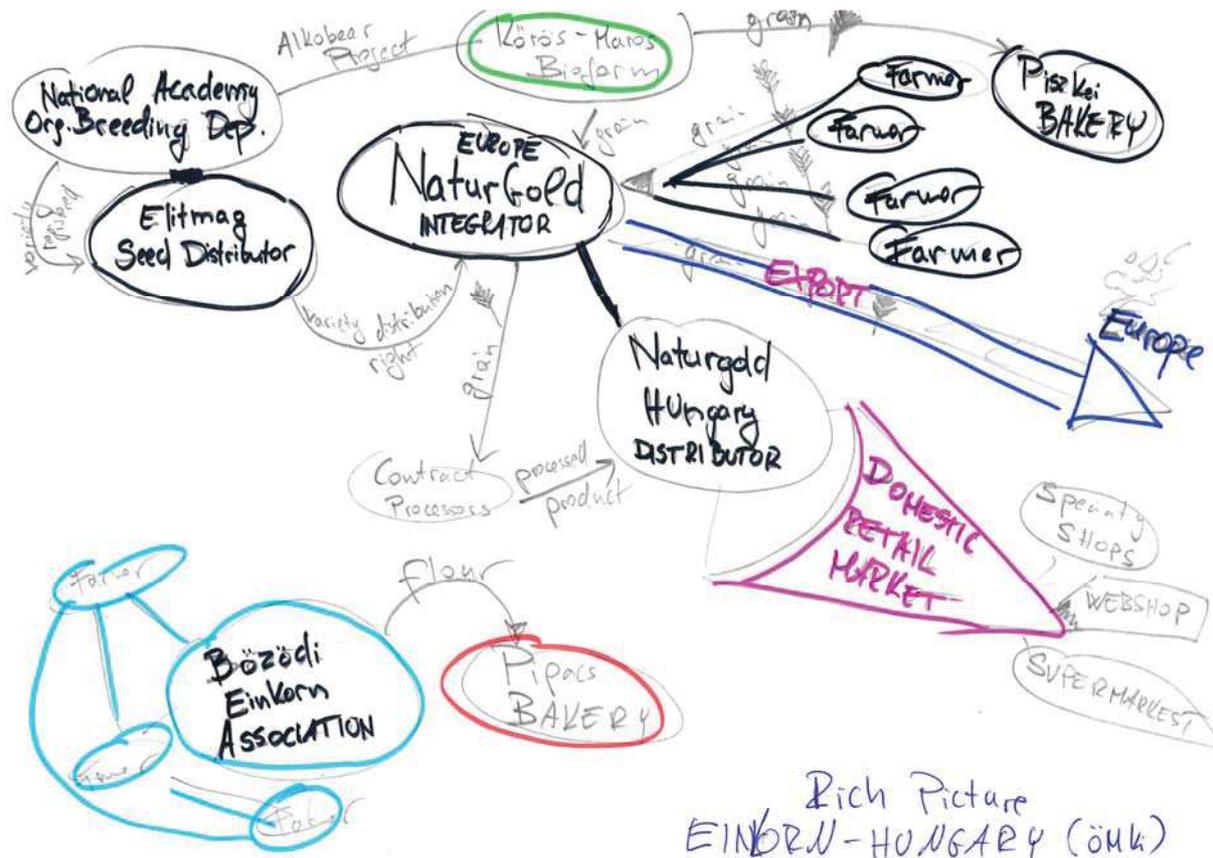


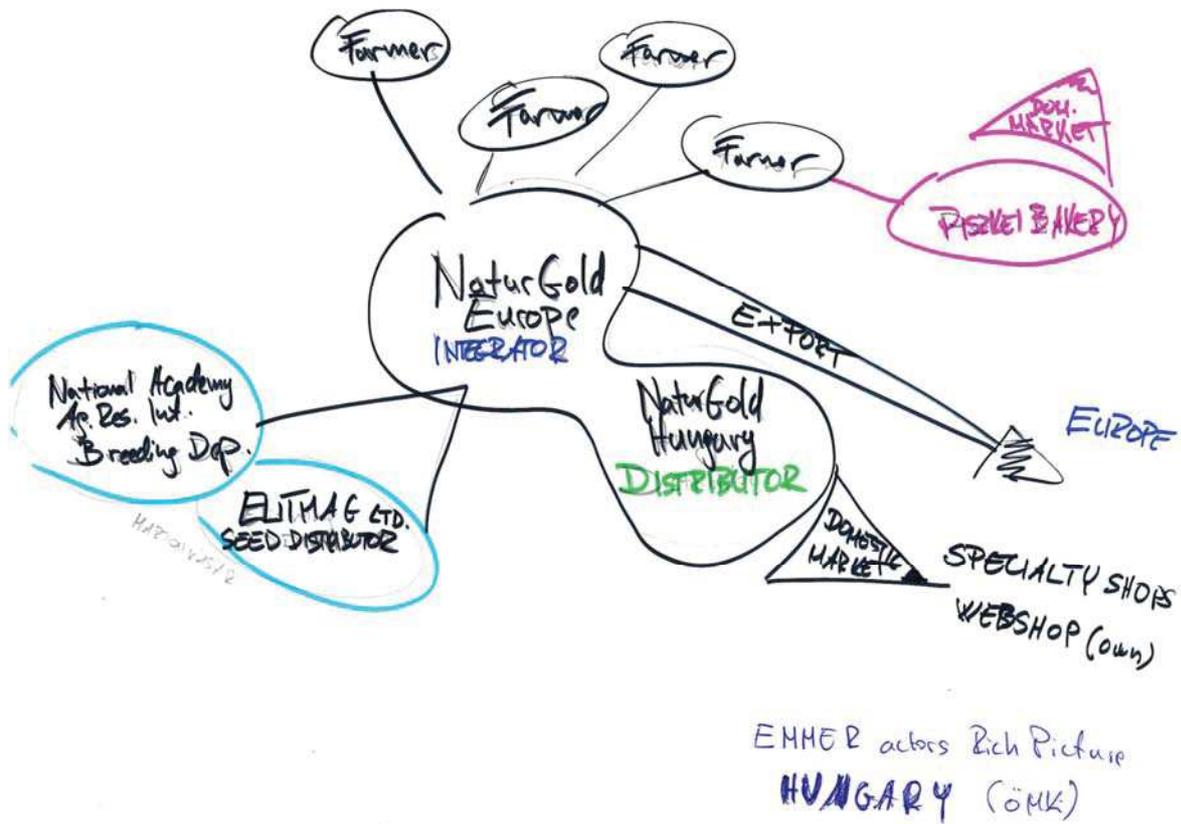
Broa Bread, Spain



DIVERSIFOOD – GA n° 636571

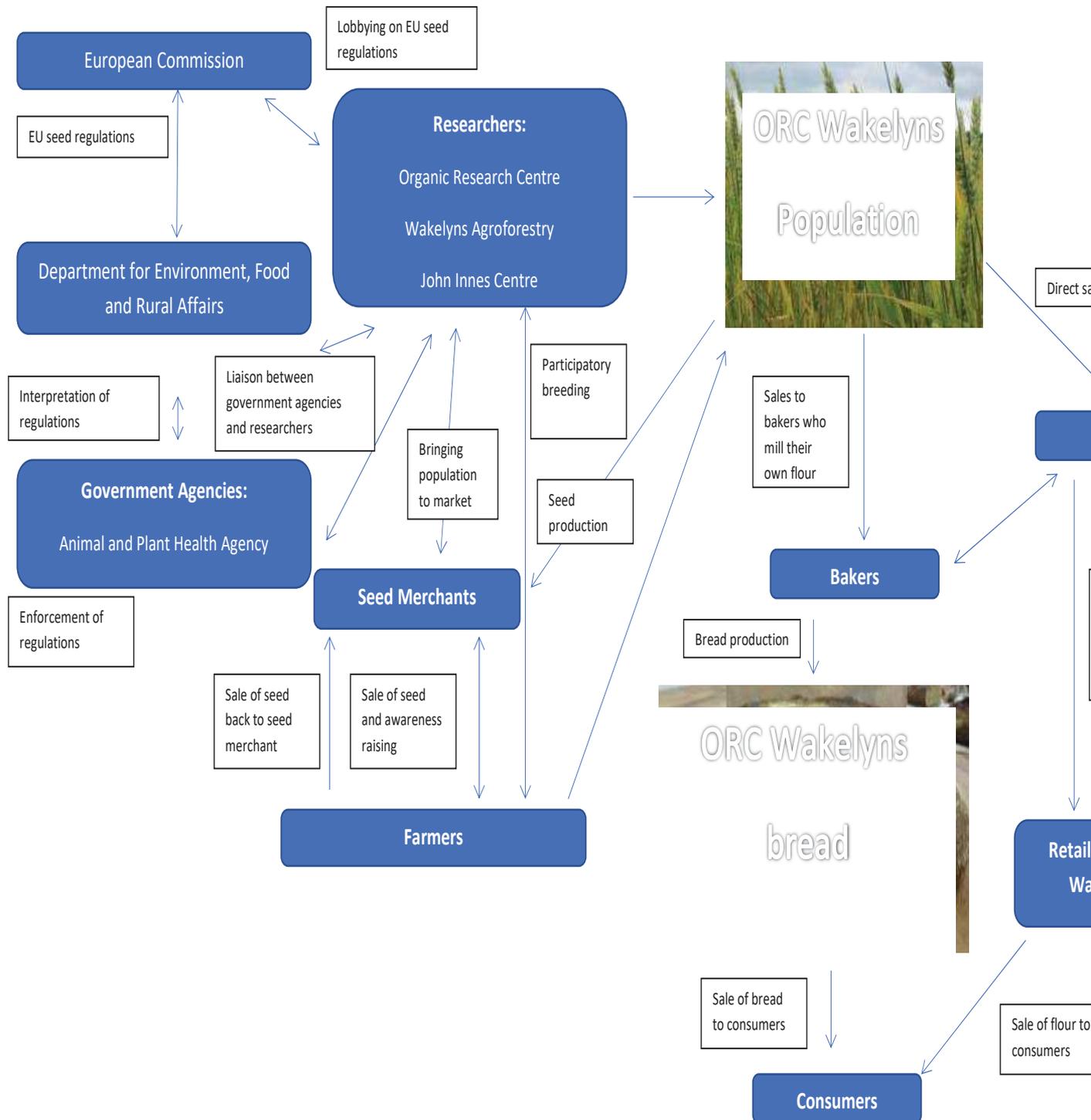
Einkorn and Emmer products, Hungary





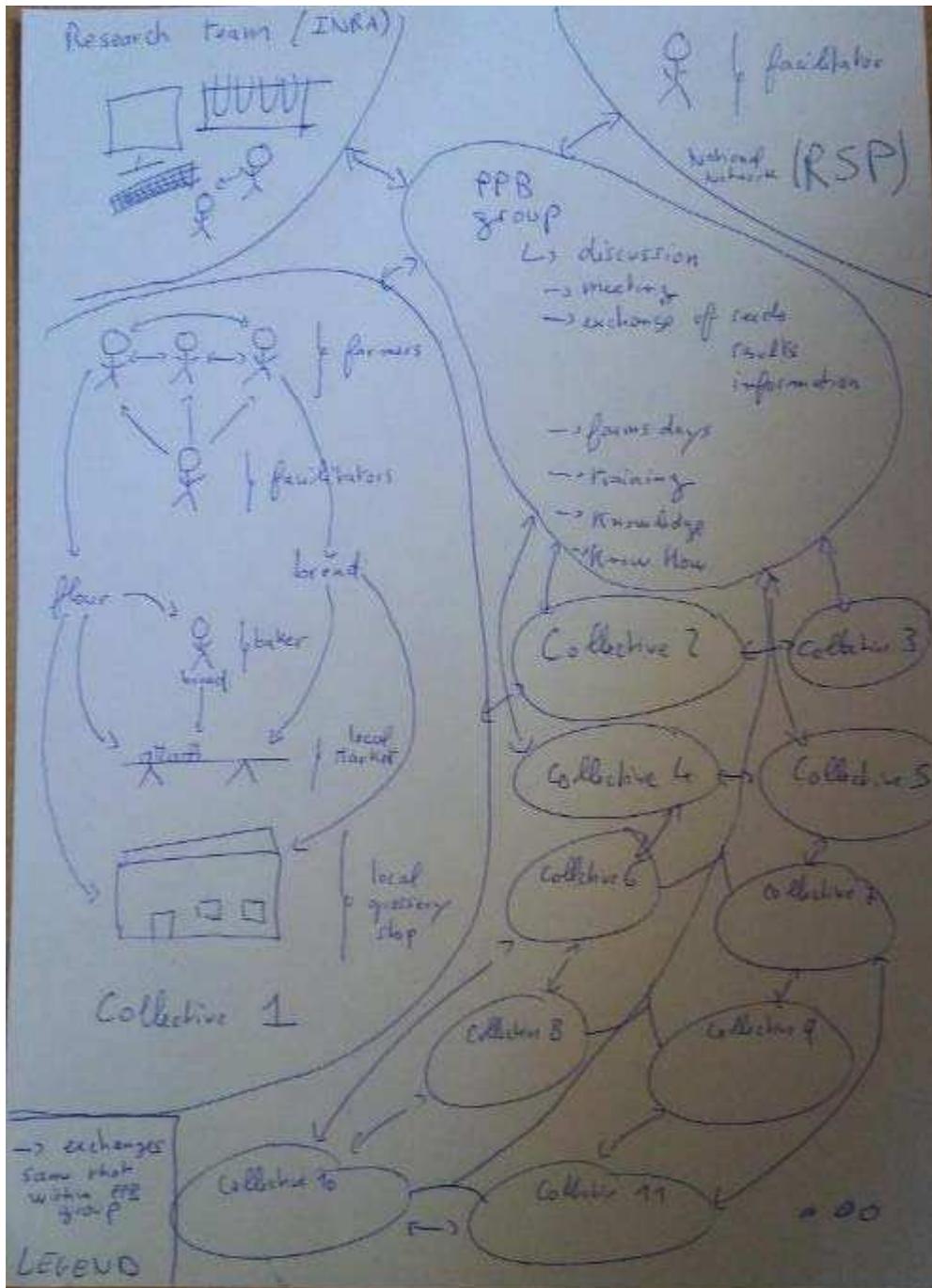
EMMER across Rich Picture
HUNGARY (ÖMK)

Bread supply chain for ORC Wakelyns populations, United Kingdom



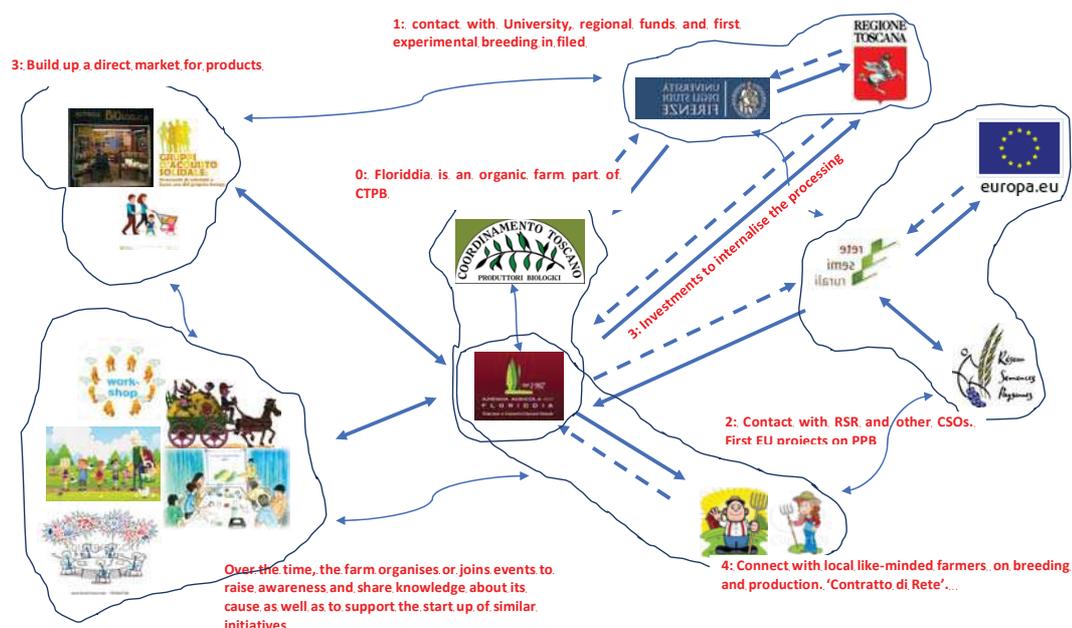
DIVERSIFOOD – GA n° 636571

Bread wheat from Participatory Plant Breeding, France.

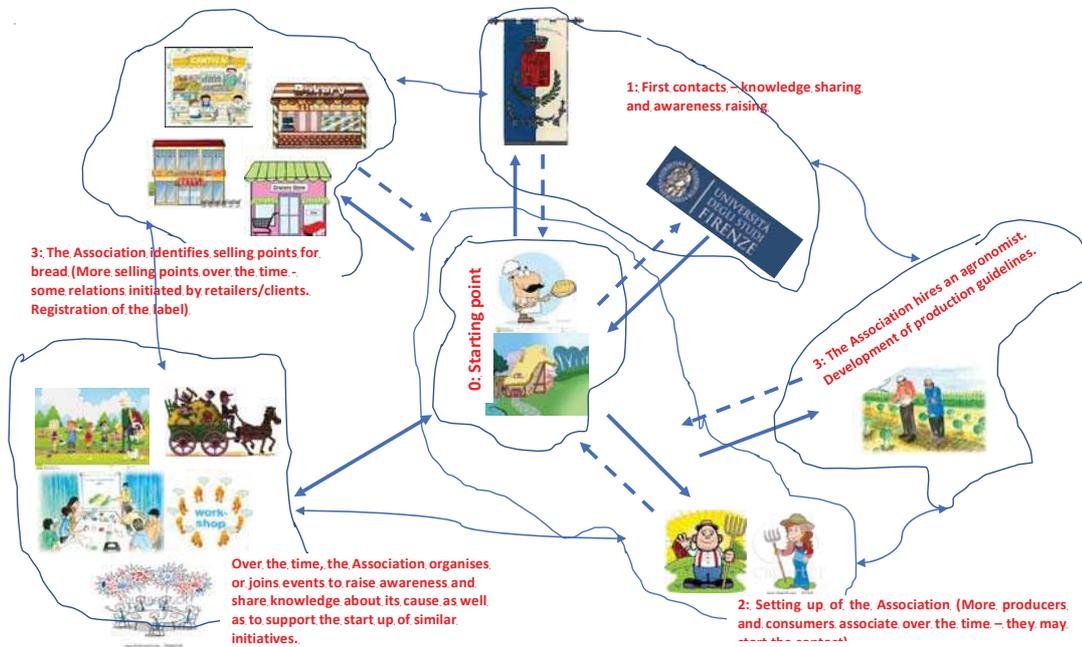


Alternative cereals, Italy

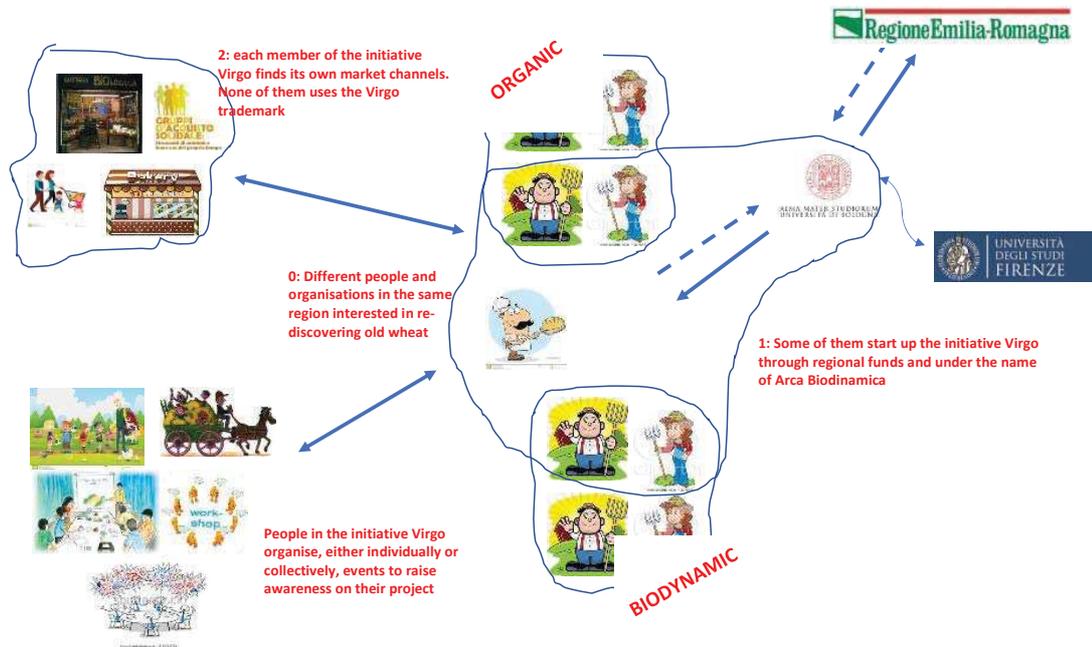
Floriddia's farm, Italy

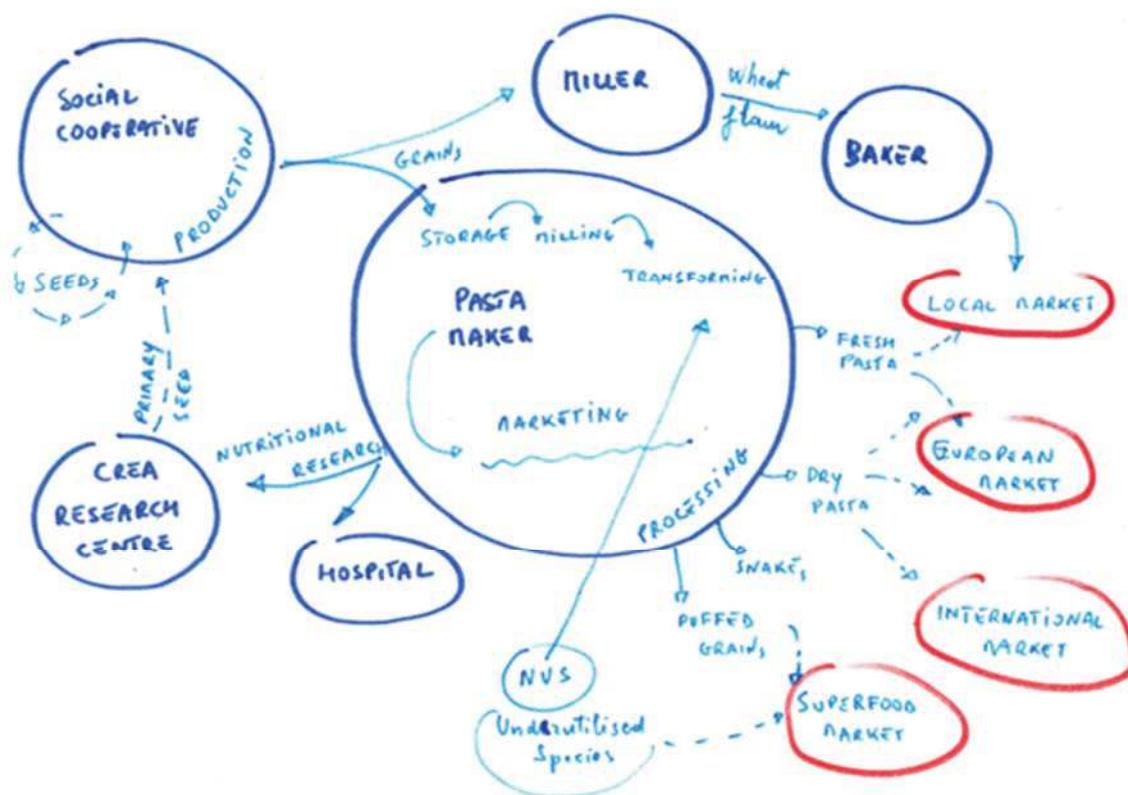


Montespertoli bread: Italy



Virgo Bread: Italy





DIVERSIFOOD – GA n° 636571

Deliverable 5.1 – Case studies of the marketing of products from newly bred lines and underutilized crops