DYNAVERSITY

CSA AND CULTIVATED BIODIVERSITY: A MISSED RENDEZ-VOUS?

Front page picture: Consumers helping a farmer - ASAT Network / Picture above: Collection of local tomato varieties - ASAT Network

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Introduction

This study has been done through the DYNAVERSITY project which aims to increase capacities for on farm and in-situ conservation of plant genetic resources by mapping and bringing together all stakeholders involved in the dynamic management of plant genetic resources. The project intends to develop new management and governance models, establish new forms of seed networking and exchange and promote socio-environmental practices. Urgenci (the international network for Community-Supported Agriculture) is part of this DYNAversity project which seeks to identify the actors involved in plant genetic conservation for agriculture, in order to shape new models of networks and to develop new schemes of governance. In this project, Urgenci seeks to identify "best practices" of on farm and *in-situ* management of plant biodiversity in CSAs and CSAs networks.

The potential of CSA for Agrobiodiversity revival

Ex-situ and *in-situ* management of biodiversity are complementary approaches (Brush, 1989) and there is an increasing recognition of the importance of developing a dynamic management of on farm and *in-situ* biodiversity (Hammer et al., 2003). The interest and specificities of on farm and *in-situ* biodiversity management in agricultural systems, home gardens, seed saving and seed swapping systems have been the subject of several recent studies (Osman and Chable., 2009; Reyes-García et al., 2013; Bocci-Rey and al., 2014; Coomes, O.T and al., 2015; Jarvis and al., 2016; IPES FOOD., 2016; Coolsaet., 2016; ECPGR, 2017). Moreover, cultivated diversity is the foundation of sustainable food systems and offers means to foster agroecological and organic food systems (Döring et al, 2011, DIVERSIFOOD-Booklet 6, 2019).

Some scholars suggest that food systems based on a close partnership between producers and consumers may also provide a strong support to *in-situ* biodiversity (Galt et al., 2012; Minvielle et al., 2011). Biodiverse crops match very well with the concept of farm shops and local markets, mainly when the farmer is engaged in a network for genetically diverse crops. Direct marketing provides plenty of opportunity for communication about the specific quality of the crops and products (DIVERSIFOOD-Booklet 7, 2019). Community-Supported Agriculture is one of such food systems. CSA has been defined by the European CSA Research group in 2016 as *a "direct partnership based on the human relationship between people and one or several producer(s), whereby the risks, responsibilities and rewards of farming are shared, through a long-term, binding agreement"* (URGENCI, 2016). This model has also often been described as a local, solidarity and contract -based direct selling model. It generally includes up-front payment of the harvest by members. Indeed, the Community-Supported Agriculture (CSA) movements set as an objective the reinforcement of plant and animal diversity. This is reflected for example in the Amap (French version of CSA) charter that was re-written in 2014: principle 2 is about an *"agroecological practice, encouraging vegetal and animal biodiversity (...), contributing to maintaining and developing peasant seeds"* (Miramap, 2014). The European CSA Declaration from 2016 also emphasizes as one of the key leading principles for the European CSA movement the *"Responsible care for the soil, water, seeds and the*

other commons through the agroecological principles and practices as found in this declaration and the Nyeleni Declaration 2015[1]" (URGENCI, 2016).

Another example comes from Belgium, where the Gasap charter (written in 2011) states that one of the Gasap's founding principles is *"reinforcing the diversity of (preferably indigenous) animal and vegetal varieties"* (Gasap Bruxelles, 2011).

To our knowledge, there are few studies about the kinds of seeds that are sown by farmers in Europe. These studies had been performed in order to understand the bottleneck and to manage the availability of organic seeds to the organic sector (see a review in LIVESEED, deliverable D4.1 - https://www.liveseed.eu/resources/publications/). There is a common understanding, especially within the CSA movement, that the proportion of homogeneous varieties of vegetables (pure line or F1 hybrids) sold in professional catalogues has been on the rise during the last decades. Generally speaking, the vegetable growers do not produce their own seeds nor their seedlings. They tend to grow young seedling of modern varieties from producers specialised in seedling production. Concerning field crops, there is a growing tendency of re-sowing part of the harvest (up to 60% in soft wheat production[2]) but these *"farm saved seeds"* can be of any type of varieties and are most often modern varieties.

Are the close partnerships between farmers and consumers a source of social innovation for on farm and in-situ management of biodiversity?

Methodology

Thanks to URGENCI member organisations, an online questionnaire was launched and in-depth interviews were conducted by telephone and face-to-face in order to assess the practices developed within CSA partnerships to manage agrobiodiversity on-farm. The online questionnaire was completed both at the level of single CSA groups and at the level of CSA networks: general info on the CSA, species cultivated (vegetables, grains, legumes, etc.), agrobiodiversity management practices (cultivation/conservation/breeding strategies), the role of consumers and producers in on-farm management of agrobiodiversity (type of partnership, initiative launch person), history of the initiative and its social dynamics, the limits and challenges encountered.

In the questionnaire, we asked the CSA groups what kind of actions supporting cultivated biodiversity had been launched, with which types of production, and with which type of seeds (modern, heirloom, and peasant). We also asked whether the CSA farms produce their own seeds and, if so, how are consumers associated to seed production or activities. Diagrams and tables were designed with Microsoft Excel.

Concerning the online questionnaire, it is quite detailed, requiring a deep knowledge of the action to be answered. The questions are very precise in terms of characterizing

each action: the same series of questions (what seeds are used, who initiated the action…) are repeated for each type of production. This is probably a reason for the limited number of fully completed questionnaires (around 65). The questionnaire also contains some open questions at the end, to leave space for modes of action that might have not been foreseen. Regarding the dissemination of the questionnaire, one can say that the link was widely circulated among the movement. We can notice a high number of uncompleted answers. This might show that a lot of respondents started answering but realized they were not able to complete the questionnaire. The messages and reminders about the questionnaire were largely spread through social media as well as during the 4th European Meeting of CSA movements in Thessaloniki, Greece.

Thanks to the in depth semi-directed interviews, comprehensive case studies were written in order to present some inspiring initiatives. The Transformative Social Innovation (TSI) theory (Balazs and Aistara, 2018) was mobilized to set the analytical frame of these case studies.

Key objectives of the study

This study focuses on on farm and *in-situ* management of plant biodiversity practices developed in consumers-producers partnerships at the European level. The aims are to get an overview of the current practices and to identify some CSAs' specific *in-situ* biodiversity management practices. As stated above, one of the key objectives was to test the assumption that the CSA model is a good model to put consumers and farmers closer, especially on biodiversity issues. In the questionnaire, we asked the CSA groups what kind of actions supporting cultivated biodiversity have been launched, with which types of production, and with which seeds (modern, heirloom, peasant). We also asked if the CSA farms produce their own seeds, and if yes, how are the consumers associated to seed production or activities.

Representativity of the sample

The decision was explicitly made at the beginning of the research process, that the questionnaire should document actions that are already implemented rather than the intention or the potential of doing something. The whole European CSA movement counts, according to the 2015 Census, around 5,000-6,000 initiatives (URGENCI, 2016b). The goal was not to cover all of them, but only those working on the issue of *in situ* conservation, as it was clearly stated on the welcome page of the questionnaire. How many CSA vegetable growers and fruit producers are active on the issue of agrobiodiversity? This information is missing. But the fact that we collected a sample of 75 answers (65

completed answers and 10 uncompleted but exploitable answers), from 13 countries[3], some sent in the name of several initiatives (by CSA networks for example), combined with the fact that the total number of initiatives in Europe is no more than 6,000, points out to a number of a few hundred of CSA groups actively committed to the issue of cultivated biodiversity. In that case, our sample, although not proportionally representative of the whole movement, nevertheless seems to be a basis strong enough to highlight some trends The translation of the questionnaire, originally written in English, into 6 other national languages (French, German, Italian, Greek, Hungarian and Romanian), was a major coordination and translation effort and that enlarged the group of respondents.

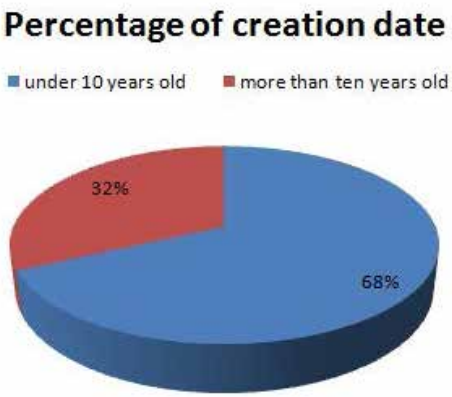

Figure 1: Percentage of CSA creation date

Among the main features of our sample, one should note the fact that the large majority of responding CSA have been recently established. Only a third have been established more than 10 years ago. This is partly a reflection of the dynamics of the movement, which is growing rapidly. In France, now a country with one of the oldest and most established CSA movements, the first CSA was created in 2001. In 2009 (10 years ago), there were around 1,500 Amap groups (Miramap, 2009), and there are currently well over 2,000 CSA[4]. This means that, in France, at least 25% of the CSA are under 10 years old, but this proportion is probably much higher as some Amap groups have disappeared, replaced by new partnerships.

Four steps to follow

1. Agrobiodiversity on CSA Farms: Some Trends Regarding the Varieties Produced and Cultivated in the Responding CSA
2. Evaluating the Direct Participation of CSA Members in Seed Production and Conservation
3. Two Initiatives where Committed CSA Members are Taking an Active Part in Agrobiodiversity Preservation
4. Recommendations

1. Agrobiodiversity on CSA Farms: some trends regarding the varieties produced and cultivated

Heirloom, Landrace and Peasant Variety: Definitions used in the study

At the beginning of the survey, the definitions agreed within the Dynaversity project were given on the welcome page. These definitions have been translated in 6 different languages, taking into account the specific national context. It is hard to make any assumption regarding how familiar to these definitions were the respondents to the questionnaire. In particular, it is possible that the difference between heirloom and peasant varieties was not obvious for everyone. During the online survey preparation process, we chose to ask about cultivation and production of heirloom and/or peasant seeds, because one of the aims of the project is to evaluate the amount of peasant varieties preserved, selected and cultivated as an indicator of the breeding activity of farmers. The definitions selected for the project Dynaversity, and used for the online survey, are the following. They were first coined by Osman and Chable.

"If "variety" is considered as a legal term, the variety is registered and strictly defined and tested: DUS [Distinctness, Uniformity and Stability]*, for agriculturally important species and VCU* [Value for Cultivation and Use] *and grants rights to its breeder, whereas landraces lack formal breeding and are defined by historical origin while being genetically more diverse.*

An heirloom variety or landrace is an old or traditional population of cultivated plants that is maintained by small-scale seed companies, gardeners and farmers; it is locally adapted and associated with traditional farming systems. It has historical or regional origins and is usually bred true-to-type with variable levels of homogeneity, using natural processes that are very different from formal crop improvement; it is often an open-pollinated variety i.e. it pollinates naturally.

A new population variety or peasant variety is bred by farmers within rural communities or within participatory plant breeding programmes. It has diverse genetic origins and homogenous characteristics that are specifically adapted to territories and enhances the local economy. It is bred using methods that respect natural processes and it is not subject to intellectual property rights. It is managed collectively and owned by farmers."

Definition of modern varieties given in Dynaversity D1.1 list of concept:

"Modern plant breeding is often defined as improving the genetic potential of plants, therefore varieties that have been bred with scientific techniques or for commercial purposes are often referred to as "modern" or "improved" seeds or plant varieties. There is considerable debate about this term, however, as these varieties often require very specific conditions in order to perform well, and may perform much more poorly than landraces or old varieties in other conditions."

Main Agrobiodiversity Characteristics of the Responding CSA Farms

We will present here 5 main features identified from the answers. First, the CSAs that have completed the survey questionnaire are **highly diversified in terms of types of production** as shown on figure 2. 82% (62/75 cases) of the answering CSA farms are combining *"actions for in situ management of diversity"* (as labeled in the survey) on at least two types of production among the following: Vegetables, Fruits trees/berries, Cereals, Legumes, Oleaginous, Herbs/Wild plants, Flowers. Figure 2 shows the percentage of positive answers to the question *"What type of production does your action(s) for in-situ management of diversity concern?"*, bearing in mind that each respondent could choose several types of production.

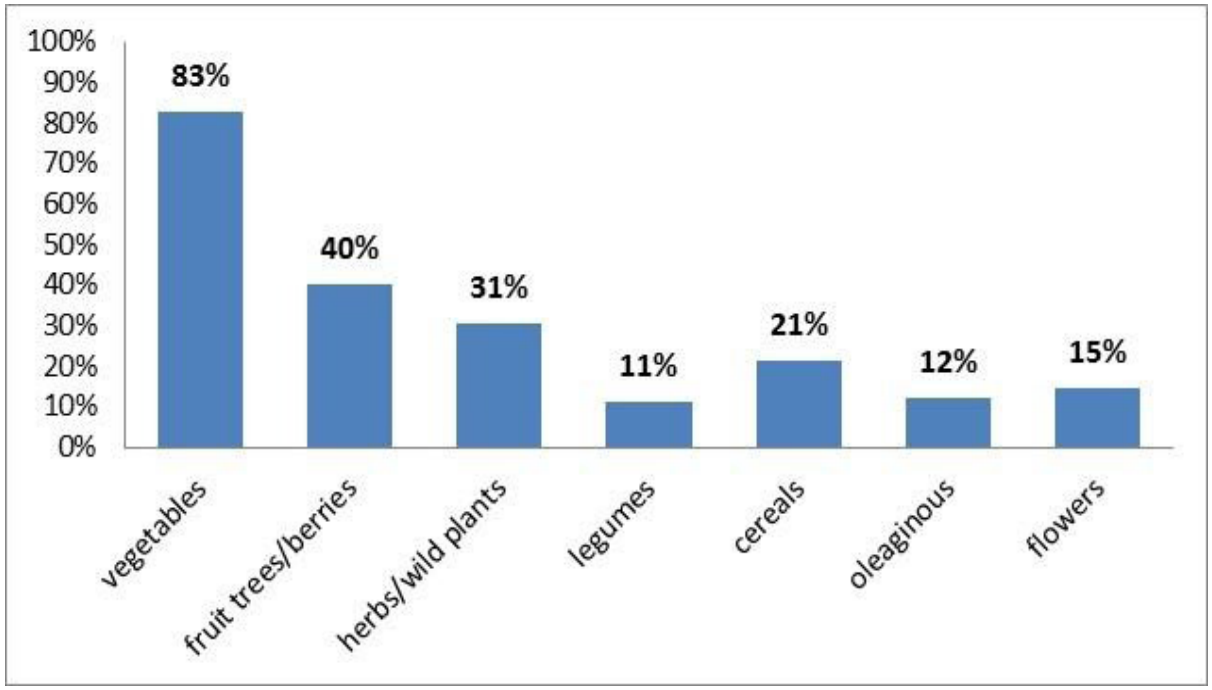

Figure 2: Types of production in the CSA

Another important characteristic of our sample is that **most of the respondents are not only cultivating but also producing their own seeds**. Figure 3 shows, for each type of production the percentage of positive answers to the first series of questions *"do you cultivate modern seeds?; do you cultivate heirloom seeds?; do you cultivate peasant seeds?"* and to the second series of questions *"do you produce modern/heirloom/ peasant seeds?"*.

For example, *"Do you cultivate heirloom seeds?"* was understood as referring to the seeds the farmer either buy, exchange or self-produce and that are sown in his field to produce vegetables, flowers, grains, etc. *"Do you produce heirloom seeds"* refers to the self-produced seeds independently from the farmer's own use.

Whatever the types of production on the farm, more than 75% of the respondents are cultivating heirloom and/or peasant varieties. If we take a closer look, for vegetables, the best represented type of production in our sample, 71% of the responding CSA farms and groups *produce* heirloom seeds and 50% *produce* peasant seeds.

A third striking result is that **the responding CSA farmers are using a combination of seeds, as the proportion of positive answers regarding the cultivation of modern varieties is also high in all production categories**, from 33.3 % for the production of oleaginous, until 64.5% for the production of vegetables. This shows that, in our sample, CSA farmers cultivating and producing heirloom or peasant varieties are often also cultivating modern varieties. The percentage of respondents (the vast majority being CSA farmers) cultivating peasant plants and seeds is lower than the share of farmers cultivating heirloom ones for every category but still significant (26%-55.5%).

In France, the CSA movement is large and diverse in terms of practices related to seeds. But the few figures we have recorded show that it hosts farmers engaged in the conservation and selection of the cultivated diversity. We have seen no correlation nor exclusion between the cultivation of modern varieties of vegetable and the production of heirloom and/or peasant vegetables seeds. This is in line with previous knowledge on the combined use of different types of varieties and seeds according to the needs in terms of yield, price setting, relative vulnerability of the different varieties to specific climatic conditions, to pest and diseases.

Without drawing any assumption regarding the representativity of each, we can however distinguish different profiles of farmers among those who answered this questionnaire: some are clearly politically committed to the conservation, selection and use of heirloom and peasant seeds. They therefore make the choice of producing only with this type of varieties. However, this population appears to be quite marginal even within the answering CSAs. Most of the answering farmers cultivate a mix between modern and heirloom/peasant varieties. We should also mention that our research does not allow to identify seed production or grafting operated by the farmer with modern varieties.

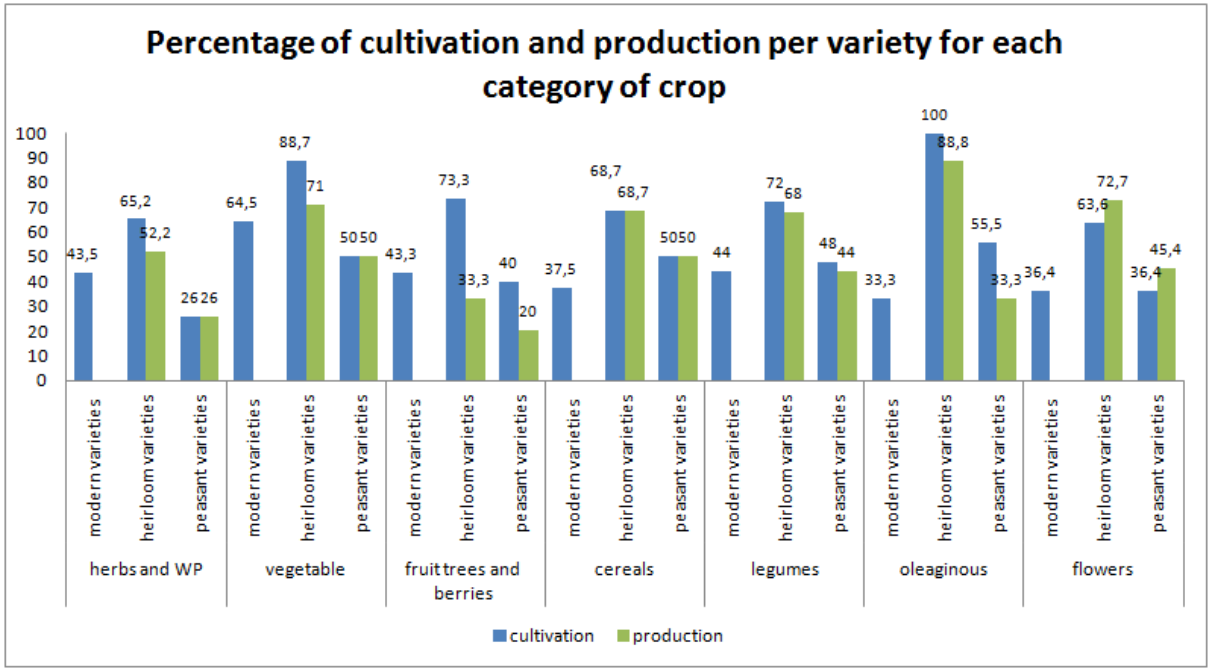

Figure 3: Percentage of positive answers to the question *"Do you cultivate…?"* and to the question *"Do you produce…?"*, for modern varieties, heirloom varieties and peasant varieties, for each category of production.

Another question helped to characterize the challenges faced by CSA farmers actively involved in agrobiodiversity: *"What are the main challenges you are facing when it comes to cultivation?"*. The answers provided appeared to be quite diverse: among top ranking replies, one can find *"the weather or climate"*, *"adaptation to local conditions (soil, farm, climate...), "weeding"*, *"insects"*, *"access to energy"*. The productivity and the quality of heirloom/peasant seeds was also mentioned as an issue (*"yields and homogeneity"*, *"resistant varieties"*, *"seed storage"*). Among other topics mentioned, one can identify "*land price" and "equipment"*. Moreover, the *"struggle against pest and weed"* is a commonly mentioned challenge. The crops have to be *"tamed"*, which is challenging especially on the farms with such a large diversity of crops. *"We need varieties with a satisfying global behaviour are necessary, that is to say rustic and hazard resistant, with a quality harvest"*. Another challenge is *"understanding the behaviour "way" of new species or*

varieties we apply, and our coordination with them".

Besides, other criteria are mentioned such as *"finding productive varieties, resilient to climate change, with high agronomic, nutritive and tasting quality"; or having "a better management for these cultivations to have the least possible phytopathogenic attack, prime yield by using natural fertilizers and preserving their authenticity by isolation techniques from adjacent commercial varieties".*

2. Evaluating the direct participation of CSA members in seed production and conservation

In the CSA partnerships, farmers are initiating the agrobiodiversity actions

One of the key objectives of this study was to explore the level of involvement into agrobiodiversity activities of different categories of CSA actors. During the online survey designing phase, the decision was made to distinguish between 4 types of actors. Type 1, the **farmers** are obviously the ones cultivating and producing the CSA shares. This category is unchallenged. But on the CSA members' side, there are a few nuances, especially when it comes to the questions related to *"who took the initiative of launching the action"*. The respondents could either reply ***"the consumers"***, e.g. the persons who buy and pick up the shares, at least some of them, or the ***"facilitator"***, which means a person who is coordinating the group and taking responsibility for the relationship between the rest of the group and the farmer. Moreover, during the online questionnaire writing phase, the decision was made to allow respondents to answer as a ***"collective"*** and not as an individual. In that case, the initiative of acting in the field of agrobiodiversity with new tools would be shared between the CSA members, including the facilitator(s) and the producer(s).

The key question in the survey to determine who is accountable for launching the initiative was: *"do the consumers participate in the production and/or conservation/on farm management of heirloom or/and landrace / open-pollinated seeds?"*. A clear majority of the respondents gave a negative answer to this

question, whatever the type of production. This is illustrated by the figure 4.

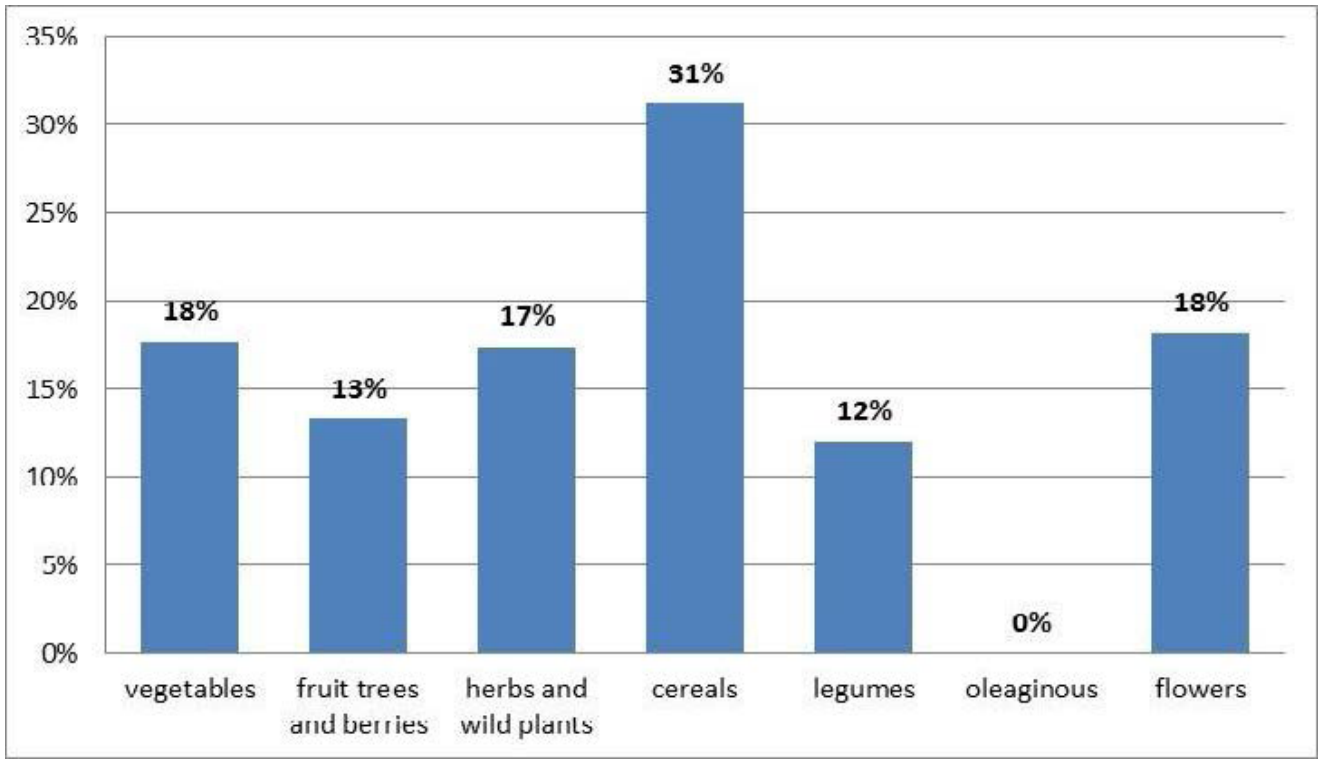

Figure 4: Percentage of consumers' participation in heirloom and landrace seeds production/conservation

For example, in the survey, on the total number of CSA growing vegetables, only 17.7% of respondents answered “yes” but 31,2% in the case of cereals.

Another set of questions was specifically about the type of actors who launched the action. It was formulated followingly: *“Who launched the on farm and in situ conservation action(s)?”* Several answers were possible: “Farmer”, “CSA- Collective Decision”, “Facilitator of the CSA”, “One member or small group in the CSA”, “Other”. The same question was asked for each type of production. The result is illustrated by the figure 5.

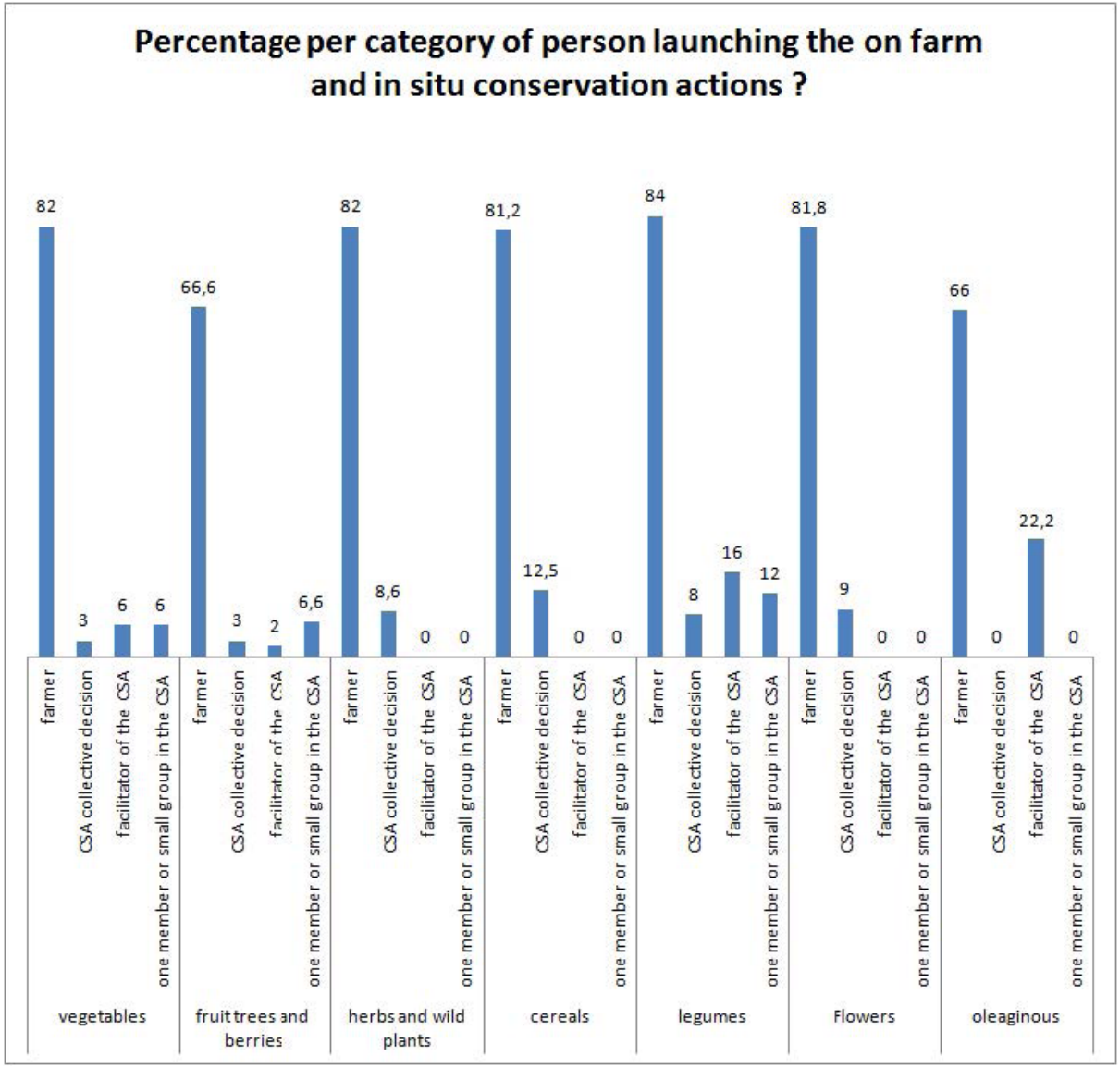

Figure 5: Percentage per category of person launching the on farm and *in situ* conservation actions

CSA members participate in indirect ways

As mentioned earlier, the different proposals for modes of action for the consumers identified by the survey designers (participation in the production or/and conservation of heirloom or/and landrace/ open-pollinated seeds or cuttings) generated negative answers. Based on the answers given in the open questions at the end of the questionnaire, it is possible to complete the repertoire of consumers' involvement in agrobiodiversity management with additional modes of action: *"planting, harvesting seeds or preparing them for the next season"*, *"providing seeds or participating in training on seed reproduction"*. Yet, CSA members' direct and active participation on the topic remains quite marginal.

However, in many CSA surveyed, consumers' participation seems to be indirect by *"requesting products from landrace or heirloom varieties"* or by *"asking for information about it"*. Here, we draw a distinction between, on the one hand, "direct way", meaning participating to the reproduction or the conservation of seedlings, exchanging seeds and seedlings, and, on the other hand, Indirect, meaning communicating on the topic or supporting the farmer. As asserted in the following quote by one of the responding farmers, all CSA initiatives supporting a farmer active on cultivated biodiversity, can be considered as actually participating to the preservation of agrobiodiversity in an indirect way.

"Consumers are helping in small and often indirect ways. Sometimes, they help harvest seeds, sometimes they help because they buy some seeds, sometimes they help because they ask why I am doing what I am doing (I hang seed plants up to dry in plain sight and also often harvest the seeds on public days) and then I tell the/a story of our seeds and the need to have open seed access etc. They help because without them they would not be a CSA and I would not be able to grow the common and the weird and wonderful veg and tell their stories."

Informal and invisible actions

A lot of actions on agrobiodiversity in the CSA certainly remain invisible. One of the authors of this report has a direct experience of this gap between what farmers are doing in the field of agrobiodiversity and what can be seen by the members. A lot of CSA vegetable growers have a deep consciousness of the pressing need to act for agrobiodiversity, but don't necessarily express this need. One of the authors of this article has been involved as a founding member of a CSA in France for more than 4 years. And it is only during a General Assembly of the CSA group that the vegetable grower explained to all members that he has been using only heirloom and peasant varieties (and not a single modern variety) from the beginning. This had been unnoticed by the majority of CSA members. This revelation launched a discussion on the topic of agrobiodiversity that was beneficial for all the 20 members.

Similarly, during an interview done with a member of an Amap in Saint-Denis, North of Paris, the interviewee explained that, in his group, a member is offering peasant and heirloom seeds and seedlings to all the Amap members, in an absolutely informal way. This member is delivering only minimal communication on the topic. She is just giving the basic information about the varieties she is offering and

how to grow them, but she is not giving any background information about why doing this is important and what are her motivations for offering seeds like this.

This is another illustration of the informal, often spontaneous, character of the actions to preserve the agrobiodiversity in the CSA movement. Obviously, invisibility makes the observation of these actions more dubious. But it also shows that the potential of CSA for agrobiodiversity is not cultivated: the strength of CSA is in its pedagogical and communication aspects. It could be a soundboard for the issues linked to agrobiodiversity. If there is no "verbalisation", no communication on the actions taken, then, the possibilities for education to the topic are limited.

1. Four initiatives where committed CSA members are taking an active part in agrobiodiversity preservation

In this part, we will deepen our analysis of four initiatives, where consumers are more involved in the on farm management of biodiversity.

The first example is the Romanian association for supporting peasant agriculture, called ASAT. This association is in fact a network gathering most of the existing consumers-producers partnerships in Romania, also called Community Supported Agriculture (CSA). The initiative started in 2007, but it was registered officially as an association only in 2014. In 2018, the *ASAT* network included 10 vegetable growers and 240 consumers.

The second example is a Spanish CSA initiative, called *Brotes Compartidos*, which was created as a result of 7 years of work to collect, multiply and adapt traditional varieties of vegetables and aromatic plants.

The third example is the AMAP-AURA network, the CSA network for the Auvergne-Rhône-Alpes Region in France, which conducted an awareness-raising campaign on the topic of "forgotten seeds".

The last example takes place in Turkey with a collective of villagers and facilitators founded in 2014 in Ankara which "*assist local farmers with ecological methods for vegetable*

raising with local, heirloom seeds".

In the four cases, we study how the consumers participate in the on-farm management of heirloom or/ and landrace/open-pollinated seeds, and investigated their potential specific roles.

In the four cases, we decided to keep the exact terms expressed by the actors during the interviews and in their networks. For instance, in the first two cases, "traditional seeds or traditional varieties" are written because these terms were used by the actors themselves. We included their own definition of it. However, it is worth knowing that the term "tradition variety" is really close to the term "heirloom variety" and is sometimes used without distinction by the actors. In fact, the actors interviewed with an in depth questionnaire, also answered the online survey using other terms without distinction such as "heirloom seeds", or "native seeds"...

In Romania, the consumers initiative for the 30% traditional seeds-obligation

We focus first on the case of ASAT, where the network was created by citizens who introduced an obligation for the farmers to cultivate traditional seeds. We have different categories of consumers in the ASAT network:

- The **network facilitators**, who were involved in the creation of the network, who are now part of the board, and are still involved in its functioning and in helping the creation of new partnerships. It is the case of Mihaela Vetan (the president of the ASAT network) and Brindusa Birhala (interviewed persons). These consumers were also, among others, at the initiative of the 30% traditional seeds obligation for ASAT farmers.
- The **core members** of a partnership, meaning the consumers who are less involved in the functioning of the network. These consumers may still interact with farmers to ask for specific traditional varieties or provide some traditional seeds to farmers. Their interest for traditional varieties is growing according to the ASAT "annual evaluation questionnaire" where one question is about traditional seeds.

The Transformative Social Innovation theory perspective highlights the role of objects, events, people and the links between them. We deem it useful to understand the incentives on agrobiodiversity by CSA networks (Figure 6). The annex of the partnership contract, which details the vegetables grown in traditional varieties with the obligation to reach at least 30% of the total of seeds used by the farmer is an example of a key object in this sense. The annual ASAT questionnaire always includes one specific question about traditional seeds is another one.

Moreover, some events are fostering consumers' involvement. For instance, in 2014, as stated above, the ASAT general assembly decided to introduce the obligation of 30% minimum seeds. Furthermore, there are 2 other social mechanisms pushing in favour of more consumers' involvement: the ASAT network meetings where consumers can help farmers to find traditional seeds, and the ASAT decisional process involving all the members that can take

part to seed issues discussions. This example shows that consumers can be really committed and be carrying the initiative of on farm management of traditional varieties. In the Romanian ASAT case, the consumers pushed the network to include this obligation in the partnerships contracts. Their implicit interest, which appears slightly in the qualitative interviews, was to clarify the notion of *agricultura taraneasca*, peasant agriculture, which is at the heart of each partnership. Following this clarification, 3 farmers left the network. The network also has a clear function of putting in relation farmers with traditional varieties producers if they cannot produce the seeds by themselves.

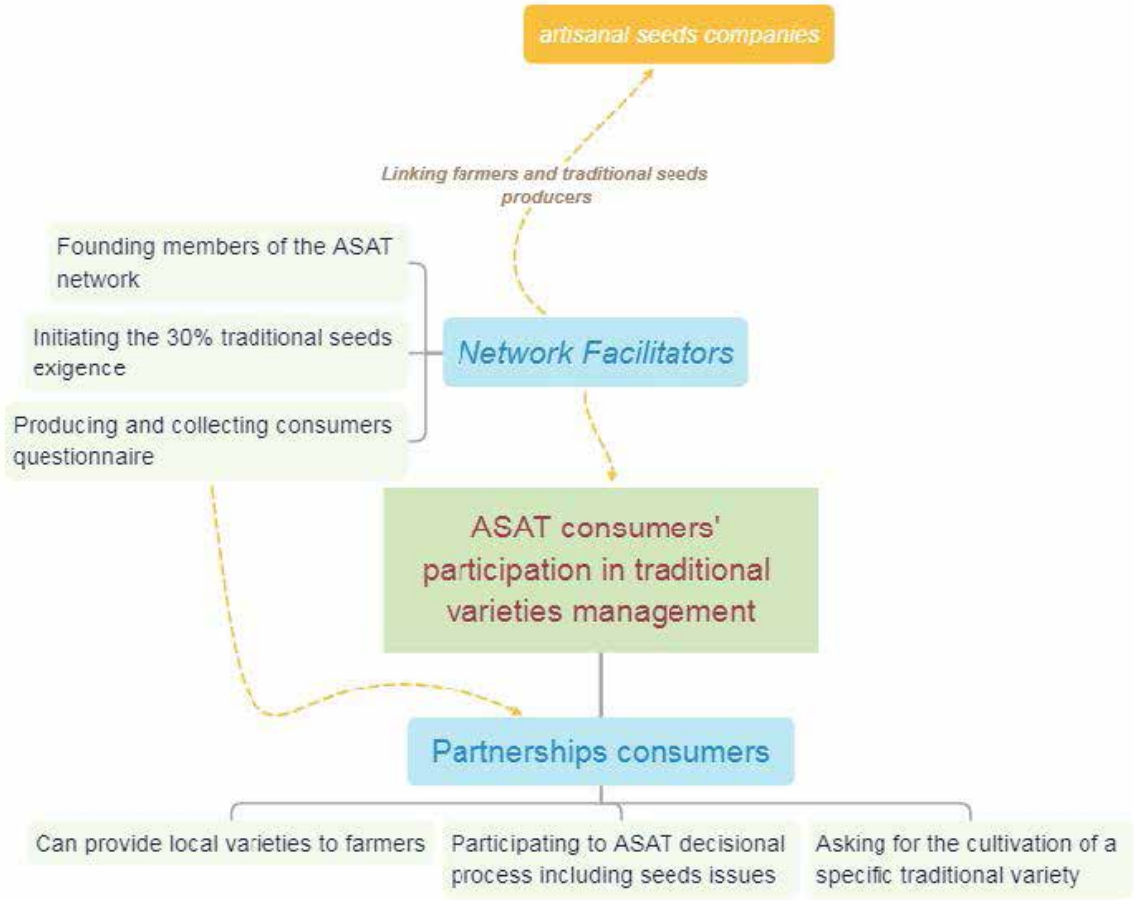

Figure 6: ASAT network stakeholders and consumers participation

In Spain, the role of CSA in supporting a farmer specialized in agrobiodiversity preservation

Brotes Compartidos, the CSA, has been created to strengthen a farmer's (Estefania) management and cultivation of traditional varieties. Estefania's first work was with a local seed bank, to create a Segovia seed network. This network's main objective was the maintaining and cultivation of locally adapted varieties. 6 years after the start of this project, Estefania created a CSA with consumers she already had close relationships with. This association provides her economic security, which allows her to keep cultivating and conserving these varieties within her working time. In the CSA, the consumers are involved in different ways regarding seed activities. First, they participate in the general assembly where they can choose all together the kind of species and varieties to be cultivated. Then, some specific on farm workshops and events with the Segovia Seed network (RDS SG) are organized on seed extraction. Moreover, thanks to the annual questionnaire, consumers can suggest new varieties to be grown on the farm. Furthermore, the CSA can sometimes give some seeds or seedlings to consumers who want to grow them into their own gardens. The CSA thus facilitates seeds exchange between the members.

In this case, the initiative is farmer led, as in most of the cases in our survey. However, consumers play a crucial role: through their regular upfront payments, they secure the management activities to cultivate traditional varieties. Moreover, during her interviews, Estefania stresses the need for consumers' involvement in seeds management. This involvement is encouraged during specific on farm workshops and events.

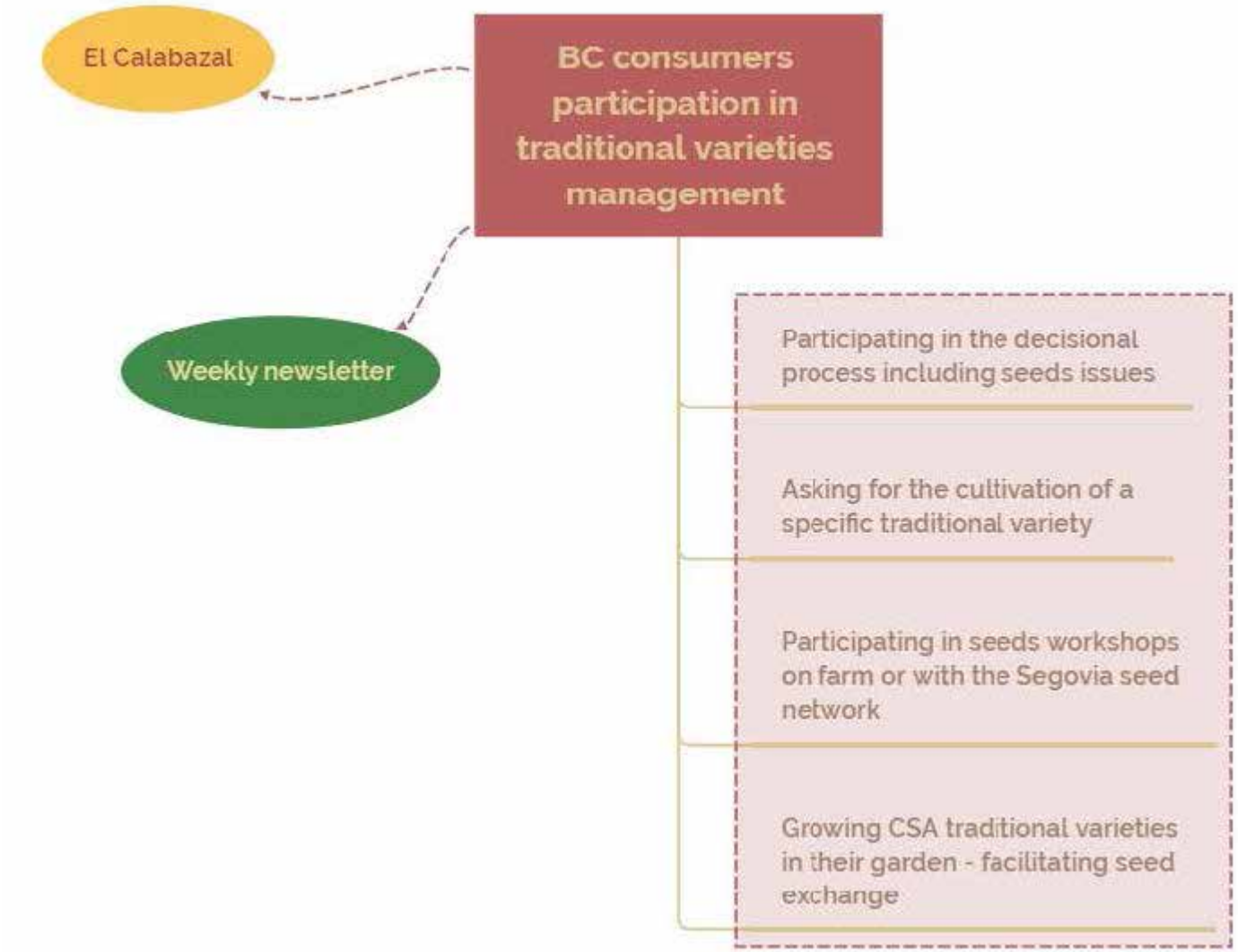

Figure 7: Brotes Compartidos network stakeholders and consumers participation

Some communication materials circulating in the CSA are either facilitating consumers' involvement in seed saving activities, or at least raising their awareness on the topic. For instance, the weekly newsletter inform the consumers of the type of varieties found in the vegetable boxes and also give some ideas of recipes. Moreover, a Journal called "El Calabazal" is a very good tool to communicate about seeds. For example, in 2018 October the 4th, "El Calabazal" is dedicated to traditional seeds and is entitled "*Variedades tradicionales. La importancia de la vida*".

In France, a network to support CSA agrobiodiversity initiatives

AMAP AURA is a CSA network based in Auvergne-Rhone-Alpes (AURA), a region in the South-East of France. This network is composed of 600 farms, 300 AMAP groups and 11,000 families. The network aims at supporting the creation of CSA on the territory through legal, facilitation and communication tools. In 2017, a group of vegetable growers started to work on peasant seeds, and decided to grow 5 peasant varieties of 5 different species during two years. The network played its role in producing communication tools to broaden this experiment out of the initial circle of vegetable growers and thus produced small flyers and 3-minutes-videos on each variety to explain how to cook them. The videos have been spread through their youtube channel. Moreover, the network also supports all CSA that would like to organize an event on the topic of on-farm management of agrobiodiversity, making available the following materials: a leaflet on the benefits of peasant seeds for farmers and eaters, some comics on peasant seeds, a board game and a movie named "Seeds for tomorrow".

Figure 8: Head of the peasant seeds AMAP AURA leaflet

Furthermore, the network is involved in a project to set up a farm specialized on the production of seedlings of peasant varieties, because such a farm is still missing in the region. The network is in charge of evaluating the economic feasibility of the project and of coordinating it.

Besides, the network is also involved in a research project with ITAB (the French Organic Technical institute), called Sensas'AB, on food nutritional quality, in order to measure the "terroir" impact on agronomic and gustative qualities of vegetable varieties.

This example shows the crucial role that CSA networks can have in producing communication tools to push CSA to deal with cultivated biodiversity issues on their farms. The AMAP AURA network has a role in producing communication materials on peasant varieties, recipes, leaflets, board games, or gustative qualities datas. Their website and their Youtube channel allow to find reliable information on agrobiodiversity issues.

In Turkey, a seed co-production with consumers, gardeners and farmers

We could identify one case of seeds co-production in Turkey. Indeed, Ceyhan Temürcü from the "Four Seasons Ecological Living association (FSEL)" explains that consumers (living in the countryside) have a clear role in helping seed multiplication and conservation because the FSEL is located in the city and lacks space to do seed multiplication. This is happening through a partnership called TADYA, which is a collective of villagers and facilitators founded in 2014 in Ankara. One of the objectives of this collective is to "*assist local farmers with ecological methods for vegetable raising with local, heirloom seeds*". In the online survey, Ceyhan Temürcü explains, "*we have a garden (5 decares – 0.5 hectare) where we primarily cultivate for seed multiplication. But we are mostly in the city and cannot look after the plants as much as we would like to. We are also working with villagers and encouraging them to use heirloom varieties, through a partnership (TADYA). But we cannot always supervise their actions.*" In this case, if a real collaboration on local seeds multiplication and production wants to be done, there is a need of supervision or facilitation to maintain the link between the association and the villagers.

Synthesis

The four examples rely on different dynamics. In the first case, the consumers are leading the initiative and introducing a specific requirement concerning traditional seeds. In the other case, the vegetable grower is leading the initiative about traditional seeds. She even seems to have created a CSA to strengthen her activities related to the management of traditional seeds. She is the one linking the CSA members with the Segovia seed network (RDS SG) and with an artisanal seed companies (*la Troje*). However, this example also shows that it is not because an initiative about traditional seeds is farmer led, that consumers are not participating. The third example is exploratory and seems to show the direction the CSA networks can take in order to support actions for on-farm management of agrobiodiversity. The last example is interesting because it is a really concrete consumer's

involvement in seed multiplication.

2. Recommendations to foster more consumers involvement in agrobiodiversity issues in the CSA

Among the open questions offered in the online survey, one was: *"What are the main challenges for cultivation of traditional or peasant seeds varieties?"* and another one was: *"What are the main challenges you are facing when it comes to selling the products?"*. Most of the answers give the lack of time as the main challenge. Here are some quotes of the answers provided by the respondents: *"At this stage of the farm we do not have sufficient energy to deal with seed saving"* (male vegetable grower, Hungary); *"I do what I can to produce my own seeds, with the help of volunteers and care clients. It costs a lot of time but I feel it is very important to do so and to do so publicly to tell the story, and also to obtain seeds that are more suitable to the specific soil that I am on"* (female vegetable grower, Netherlands); *"Proper time management"* is missing; elsewhere, the *"lack of time and hard to plan seed harvesting"* (Male CSA Facilitator, Turkey), and the *"Lack of workers and appropriate equipment"* (vegetable grower, Greece) are also mentioned as main challenges.

Consumers' education

In the qualitative interviews, there is a consensus on the fact that consumers can help to save time and increase the workforce on specific times. This works with the condition that the farm should organize a specific training to teach people who want to help on these tasks. Among the main challenges, another identified need is for education to the topic. Indeed, depending on the cases, education to agrobiodiversity and traditional/peasant varieties is needed for consumers and/or farmers. Concerning consumers, a list of quotations (coming from the open questions answers in the survey) identified among the main challenges to conduct actions for cultivated biodiversity, the *"adaptation to consumers preferences and taste"* (Female CSA Network coordinator, France), the fact that *"consumers want new products all the time"* (male vegetable grower, Ireland), the *"choice of quantities to put in the vegetable boxes" (Male vegetable grower, Germany),* the difficulty to *"convince consumers to use traditional varieties" (Male vegetable grower, France), "consumers ignorance and sometimes the lack of adventurer wanting to taste and live the experience" (Male vegetable grower, France)* the fact that *"products are not known and there is a reluctance among consumers" (Male vegetable grower, Romania).* However, as the case of *Brotes Compartidos* shows, CSA can be a perfect place for education: the journal or the workshops can teach the consumers and acclimate them to traditional vegetable varieties, also giving them some ideas to cook the vegetables.

Farmers' education

Concerning farmers, the ASAT network helps raising awareness among farmers. In that sense, some farmers such as Marcel has started to be aware of the seed issue

after entering the network. The open questions answers in the online survey also suggested that farmers need time and support to learn how to cultivate traditional and peasant varieties that can take time to get adapted to the farm. It's a true research and innovation process that need to be handle in the farm. We had the following quotations, "*domesticating the crop in itself is complicating giving the huge diversity, the research protocol per se is demanding*" (Male vegetable grower, France), "*Understanding the behaviour "way" of new species or varieties we apply, and our coordination with them*" (vegetable grower, Greece), "*The diffused but still insufficient know-how and inexperienced/unskilled young farmers*" (Male vegetable grower, Italy). CSA are safe places for farmers to experiment traditional/peasant varieties culture in their farm as it gives them financial security and support. Multiplying seeds is something that needs to be learnt again by farmers and their communities and it takes a lot of time, needing formation and to share experiences and work.

Going one step further

Proximity, as in a close relationship, is something important**.** The CSA *Brotes Compartidos* was created when enough consumers, friends, citizens around Estefania were ready for this way of eating and farming. Getting consumers involved into the decision-making process seems to be essential to make them aware of the choices. Ideally, the farmers could perhaps try to explain why they choose one variety instead of another, and the background of their decisions on the topic of cultivated biodiversity.

Here are two quotations, still from answers to the open question on the main challenges: *"Building trust and inciting participation of conscious consumers locally"* (Fruit Producer, Greece)*, "The consumers connect (get acquainted) with the value of these products and building trust between them and producers of these products" (farmer, Greece).*

At the scale of the CSAs, growing diversity in the farm is a great achievement or satisfaction for many of the farmers responding to the survey. Indeed, the last open question was "*What are your major achievements and satisfactions with the conservation and management of in situ cultivated diversity on your farm?*". Most of the answers to this question highlighted the satisfaction farmers can have while protecting biodiversity and being autonomous through the production of their own seeds. "*The times everything works well all through to the harvest of the vegetables we feel independent, free and strong. Being responsible for keeping and improving the varieties we use is very important for a*

farming culture that we can be proud to leave for the children of the future" (Male CSA Network Coordinator, Greece). The respondents also seem to appreciate both the process of learning required to become autonomous in terms of seed production, *"knowledge-sharing and motivating consumers and farmers"* (Male CSA Network Coordinator, Ireland) and the improvement of the taste and quality of their vegetables/fruits/cereals… Furthermore, the consumers' satisfaction does matter a lot to all the farmers in our sample. Many respondents stressed that one of their major achievements was *"taste recognition by the consumers"* (Male vegetable grower, France), *"Consumer satisfaction"* (Male vegetable grower, Romania), *"consumers' satisfaction in terms of taste"* (Male vegetable grower, Hungary). Consequently, CSA are relevant partnership schemes for farmers cultivating biodiversity because they can have a direct experience of the satisfaction of their *"eaters"*, thanks to the direct relationships created between farmers and consumers through CSA partnerships.

Conclusion

At the scale of the CSA networks, we argue that they can play a key role in helping raising awareness among consumers and farmers. For instance, in the case of ASAT, the network plays a double role in compelling farmers to use traditional varieties, but also in educating consumers. CSA networks can help developing agrobiodiversity management in the farm providing communication tools and materials to farmers and consumers. A deeper link between local farms and CSA networks or peasant seeds networks is needed to share experiences, and communication materials on the topic.

There is a need, generally speaking, for more communication tools to urge consumers to be more involved in on farm biodiversity management. For instance, the *Brotes Compartidos* Journal and the yearly poll conducted by the ASAT network should be adapted and disseminated within the CSA movement at national and European levels. The European Coordination Let's Liberate Diversity putting all together European networks working on on farm and *in situ* agrobiodiversity management could be a good place to communicate broadly. Furthermore, more formations on traditional/peasant varieties production and cultivation should be organized for farmers and consumers.

In fact, the study also points to a need for both awareness raising and training. Training is necessary: 1. For the farmers to be able to multiply the seeds and select the plants, thanks to the financial stability provided by the CSA; 2. For the CSA members to learn how to enjoy unknown varieties, to taste,

cook and preserve in a different way. This double training dimension cannot be implemented without a reinforced joint work with local and national seed saving networks. Common training workshops, supported by joint communication material, should be conducted, with the participation of CSA core group members.

5. Glossary (see D1.1 for more definitions)

CSA	***COMMUNITY SUPPORTED AGRICULTURE***	CSA has been defined by the European CSA Research group in 2016 as *a "direct partnership based on the human relationship between people and one or several producer(s), whereby the risks, responsibilities and rewards of farming are shared, through a long-term, binding agreement"* (URGENCI, 2016). This model has also often been described as a local, solidarity and contract -based direct selling model. It generally includes up-front payment of the harvest by members.
	HEIRLOOM VARIETIES	Heirloom varieties and heritage seed are usually open-pollinated plant varieties that are at least fifty years old, having been passed down from generation to generation.
	MODERN"/ "IMPROVED" SEEDS OR PLANT VARIETIES	Modern plant breeding is often defined as improving the genetic potential of plants, therefore varieties that have been bred with scientific techniques or for commercial purposes are often referred to as "modern" or «improved» seeds or plant varieties. There is considerable debate about this term, however, as these varieties often require very specific conditions in order to perform well, and may perform much more poorly than landraces or old varieties in other conditions.
	VARIETY	A term used in plant classification below the species level. Old and local varieties were selected from landraces over time, and often separated geographically, but modern varieties are developed using various plant breeding techniques. Stable and uniform varieties are important in order to market seeds and plants, but the maintenance of stable varieties can interfere with continued evolution and genetic diversity of seeds and plants.

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- Brindusha Birhala, ASAT, November, 10th 2018 in Thessaloniki (Greece) during the 7th URGENCI International Symposium, 60 min
- Mihaela Vetan, ASAT, February 2nd, 2019, phone call, 60 min
- Interview done by Mihaela Vetan with Marcel Has in Romanian and translated into English (march 2019).
- Estefania Egido (Brotes Compartidos), November, 10th 2018 in Thessaloniki (Greece) during the CSA international Meeting, 60 min
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Endnotes

[1] The "Nyeleni Declaration" can be checked using the following link: Food Sovereignty. « Declaration of the International Forum of Agroecology ». Forum for Agroecology, Nyeleni 2015, juin 2015. Food Sovereignty. (2015). Forum for Agroecology, Nyeleni 2015 - Declaration of the international forum of agroecology. [online] Available at: http://www.foodsovereignty.org/forum-agroecology-nyeleni-2015/ [Accessed 12 Juin. 2018].

[2] Here is an article from a professional newspaper for farmers, which seems to confirm this trend: https://www.pleinchamp.com/grandes-cultures/actualites/les-semences-de-ferme-seduisent-de-plus-en-plus-d-agriculteurs

[3] We got the following number of answers per country : Greece (7) ; Hungary (9) ; France (23) ; Italy (6) ; Germany (11) ; Romania (4) ; Ireland (4) ; Wales (2) ; Netherlands (4); Turkey (2); Sweden (1); Portugal (1); Spain (1).

[4] This is the figure provided by the French national Amap network on its website for the end of the year 2019: http://miramap.org/-Les-AMAP-.html

[5] More details: https://tahtaciorencik.org/info-page-on-tadya/

DYNAVERSITY