



DYNAVERSITY

Organic Seed Alliance (USA)

Case study analysis

DYNAmic seed networks for managing European diversity:
conserving diversity *in situ* in agriculture and in the food chain



DYNAVERSITY project received funding from the European Union's Horizon 2020
Research and Innovation program under Grant Agreement n. 773814

PART 1: DESCRIPTION

1.1 Contextualising the case

The Organic Seed Alliance (OSA) grew out of another non-profit, the Abundant Life Seed Foundation, and was established in 2003 when US laws on organic agriculture made the use of organic seed mandatory. The question of organic seed therefore became OSA's main scope. In that context, OSA was created as a national organization, and not as a national federation coordinating pre-existing local or regional initiatives (as is the case for a number of European national or trans-national initiatives). Rather than directly supplying them with seed from a collection as formerly done by Abundant Life Seed Foundation, the executive committee decided to favour the advancement of organic seed by supporting people to develop new varieties, save their own seed, and produce organic seed for commercial distribution. Starting from the issue of organic seed, the focus evolved to what was being produced, i.e. what varieties were being offered to organic farming systems. From the start, OSA's activities were based on three pillars: education, research and advocacy, although the latter was developed a bit later.

OSA's activities mainly focus on vegetables in the Pacific Northwest of the USA, including sweet corn, although some of their work has also focused on small grains (wheat, buckwheat, quinoa), especially in California. OSA partners with several institutions and organizations, allowing to reach out to other regions and extend the range of crop types, including other vegetables and grains, and has been working closely with the Culinary Breeding Network in Oregon and the Seed to Kitchen Collaborative in Wisconsin to develop methods of selecting for flavour. As of 2019, OSA has a staff of 10 employees.

1.2 « Doing »

1.2.1 Properties WITHIN the initiative (closure)

The first activities developed by OSA were training and research. Training mainly aims to share knowledge and know-how on seed saving, seed production and related issues, including the economics of seed production. OSA's applied research includes variety testing and breeding, but also monitoring the state of organic seed availability and development. For numerous crop types, vegetables in particular, OSA's first approach is to test available varieties in organic conditions in a given region. As a second step, if no appropriate varieties are found, OSA may start a breeding programme, based either on "variety improvement" or on crosses. Variety improvement consists of selecting for required traits within an existing variety through mass selection. As we will see further on, OSA partners with and participates in other networks to explicitly breed for taste.

Although grains are also an area of interest, OSA focuses most of its activities on vegetable crops, including sweet corn. Activities are particularly dynamic in the Pacific Northwest, where OSA's headquarters are based. The farms directly or indirectly partnering with OSA through collaborations which we have visited are all organic, but with very different economical structures, strategies and sizes. This goes from sub-acre farms specialized in starter plants (Voss Organics, Madison) or farm-to-kitchen production (Side Yard Farm, Portland) to a farm growing a multitude of crops on 700 acres (Nash's Farm in Washington State).

1.2.2 Properties BEYOND the initiative (outreach)

Varieties that have been released out of OSA breeding projects can be multiplied by independent seed companies for a voluntary "royalty" paid to OSA, that amounts to 5-10% of seed sales, depending on the agreement. This amount provides income to OSA, mainly to maintain the varieties that have been bred, and profits to share with co-developers, including farmer-breeders. OSA and its partners are not comfortable with the term "royalty", as it evokes intellectual property rights (which are not claimed by OSA). One partnering seed company has named them "liberties" on a humorous note. 'Who gets kissed?' sweet corn and 'Abundant Bloomsdale' spinach are two examples of varieties released by OSA's participatory breeding projects.

1.2.3 Transformative effects beyond the initiative

Among the participating farmers, one important motivation is weariness about seed companies dropping the F1 hybrid varieties that they appreciate and are used to working with. As new F1 hybrids are bred and become available on the market, seed companies often drop older varieties in order to stay competitive and avoid the costs of maintaining a too large number of varieties. Sometimes, seed production of a given hybrid variety also becomes too difficult because of the low vigour of the inbred parent lines. Often, the varieties being dropped are the ones adapted to a specific region, environment or market, which may have a limited profit potential compared to broadly adapted varieties. By focusing on

open pollinated (OP) varieties, OSA empowers farmers' saved seed. This also means that a farmer always has the possibility to use farm-saved seed of a variety that is no longer available on the market, thereby reducing dependency on multinational companies. OSA makes knowledge available through a large number of publications that can be downloaded from the organization's website. This goes from how-to guides on seed saving, to planning and budgeting tools for various aspects of seed saving, to the State of Organic Seed report, as well as webinars and presentations from different conferences.

1.3 « Organizing »

1.3.1 Properties WITHIN the initiative (closure)

OSA is governed by a board composed of seven members (as of 2019). Five of them are seed-producing farmers, one member represents a multinational organic seed company and one is an activist for local, sustainable food systems. OSA endeavours to strategically develop regional hubs in places where a need for research and training on organic seed production and breeding is expressed, or where relevant competencies are available. Although this regionalization strategy is part of 10-year plan, it is not straightforward to implement. For instance, the part-time position of the Research and Education Associate for the Mid-West, established 1.5 years ago, was possible mainly due to the extensive grant-writing experience of the associate, and thus her ability to support the financing of her own position through grants, as well as her prior and on-going activity with UW Madison, an important partner of OSA.

OSA organizes the Seed Growers' conference, a bi-annual networking and knowledge-sharing event. The 10th edition will be held in February 2020 in Corvallis, Oregon. What started out as a rather confidential get-together for organic seed growers now brings "together hundreds of farmers, plant breeders, researchers, certifiers, food companies, seed companies, and others from across the U.S and around the world".

1.3.2 Properties BEYOND the initiative (outreach)

Although OSA has its own staff, core competencies and even a farm, it is all about networking, connecting people, sharing of knowledge and know-how for the advancement of organic seed. It connects with public plant breeders and organic farmers interested in seed and breeding issues, in particular. The NOVIC project, the Culinary Breeding Network and the Seed to Kitchen Collaborative are meaningful examples of how OSA networks with academic institutions and other organizations for the advancement of organic seeds and breeding.

Through bi-lateral relations with researchers or institutions, or through multilateral projects, OSA forms part of a more or less formalized web of partnering actors engaged for organic seed. The organic breeding project NOVIC (Northern Organic Vegetable Improvement Cooperative) is a good example for this. OSA partners with 4 academic institutions in this project, which has been running for 9 years and is currently in its 3rd edition of 4-year periods of funding, currently secured through 2022. NOVIC is dedicated to trialling and breeding 9 crop types, with one academic researcher taking the lead for each crop type. The consortium uses the Mother-Baby trial design, a tool for decentralized research which allows to combine data from both replicated trials on university sites and non-replicated subsets on farm. One of the NOVIC researchers, Jim Myers (Oregon State University), has previously experienced this trial design while working in Africa.

The Culinary Breeding Network (CBN), coordinated by Lane Selman, Professor of Practice at Oregon State University, and the Seed to Kitchen Collaborative, coordinated by Julie Dawson, Associate Professor at UW Madison, are examples of less formalized collaborations and partnerships with OSA. OSA participates in these networks as a partner breeder providing varieties for field trials, tastings and variety showcases, as do many other public or private breeders with whom OSA has privileged collaborations and partnerships, such as Bill Tracy and Phil Simon (UW Madison), Jim Myers (Oregon State University) and Frank Morton (Wild Garden Seeds), among many others. These collaborations also provide the opportunity to share and co-develop methodology, and to co-organize training events and field days.

Breeding for taste: The Culinary Breeding Network (CBN) and the Seed To Kitchen Collaborative. After having experienced that common breeding programs pay little or no attention to taste, and that organic on-farm breeding was able to produce very tasty vegetable varieties, Lane Selman decided to focus on taste in variety evaluation and breeding, with the final objective of making tasty vegetables and grains available, and to motivate people to eat more fresh foods instead of processed food. To do so, she mobilized a group of chefs which she previously knew from a pepper evaluation they attended in 2010. As soon as the following year, chefs were involved in taste-testing breeding lines. In this way, the connection between breeders and chefs was made. Based on the networking of chefs and breeders, the coordinator decided to go a step further and include independent seed companies and consumers in the network. The first "Variety Showcase" event was held in 2014. 14 tables hosting different crop varieties and breeding projects were presented to participants, who had the opportunity to see and taste crop diversity. Since then, 5 "Variety Showcases"

have been held in total, 3 in Portland, 1 in New York City and 1 in Hawaii. Approximately 100 participants had attended the first event, with a free entrance. The most recent one, in 2018, welcomed around 540 participants, who were all willing to pay a \$50 entrance fee. In order to favour a broad diversity of participants, farmers, minorities and people representing social movements are usually given discounts.

A similar network engaged in variety evaluation and breeding for taste was established in the Midwest, coordinated by Julie Dawson at University of Wisconsin-Madison (UW Madison), called the Seed to Kitchen Collaborative. This collaborative network aims at connecting chefs with organic breeding projects to improve taste in crop varieties, while also testing available varieties for their adaptation to regional growing conditions within a network of about 80 farms. Although both these networks have similar objectives, they have different approaches in several aspects. Firstly, the CBN is focused on sharing taste experiences and rather qualitative evaluations and feedback, while the Seed to Kitchen Collaborative aims at collecting data which can be statistically analysed in the breeding process. Secondly, these different perspectives also lead to different approaches to technology. While the CBN focuses on discussions and the exchange of experience in a rather informal manner, the Seed to Kitchen Collaborative uses a smartphone application via a partnership with SeedLinked to simplify the randomization of tasting samples and the digitalization of data.

1.3.3 Transformative effects beyond the initiative

The network of people and competences built by and around OSA empowers farmers to make more informed decisions about the seed they use, to save seed and breed crops, if they want. Regional hubs enable farmers and other actors to identify and tackle regional needs concerning varieties for organic farming while the national network provides the opportunity to share knowledge across regions and provides national leverage for advocacy and policy initiatives.

Its partnership with other networks also allows OSA to reach out and share knowledge further than within its own organization. For instance, as partner of the culinary breeding initiatives named above, breeders (be they public breeders or farmer-breeders) profit from access to new selection criteria. Breeding and seed issues are also brought to a broader public. As the CBN coordinator in Oregon puts it: "Flavour is a high priority for organic farmers, so organic breeders have often evaluated the flavour of the various lines they're working on. But breeders aren't chefs, and those flavour evaluations usually take the form of "bite testing" raw crops right in the field. It's a romantic picture, but it's not how most of us eat vegetables."

In the CBN, independent seed companies also get a privileged access to new or upcoming varieties and contacts to seed users. Consumers are offered an opportunity to experience crop and food diversity, which they will want to share with others. Through sensory experiences and meetings with chefs, the objective is to motivate them to cook and eat fresh produce. In both the CBN and the Seed to Kitchen Collaborative, participating chefs are given the opportunity to support local farming and breeding communities and to help shape the diversity that is available to their kitchens.

PART 2: ANALYSIS

2.1 Knowing

2.1.1 Properties WITHIN the initiative (closure)

The main objective of OSA is to make organic seeds that are free of property rights (IPR) available to farmers and lift barriers to people for re-appropriating seed. OSA is not against F1 hybrids *per se* and considers that they can meet some of agriculture's needs. However, in its own breeding work, OSA focuses on open-pollinated (OP) varieties.

The training sessions described in part 1.2 are an obvious way in which knowledge is shared within the OSA network, but certainly not the only one. The regionalization strategy, mentioned in part 1.3.1, enables the creation of regionally relevant knowledge and activities. For example, Kitt Healy, OSA's Research and training associate in the Midwest, based in Minneapolis, has been developing a network and activities in the Mid-West, with the objective, among others, to connect the resources and knowledge available in the numerous public breeding programs at UW Madison with interested farmers in the region, which is not historically a seed-producing territory: harsh winters and hot, humid summers make for a short, but intense vegetable growing season with peaks of activity that are even more pronounced than elsewhere in the US. Motivating farmers to add seed saving to their list of things to do is difficult there. This is perhaps why the Midwestern hub of OSA has focused on networking and varietal evaluation up to now. F1 hybrid varieties are included in variety testing, at least as checks, but also prioritizing organically produced hybrids. Typically, in this region, it may seem more important to support independent organic seed companies and breeders, than the re-

appropriation of OP varieties and seed saving by producers. Furthermore, Kitt Healy's work on organic seeds and breeding is illustrative of how OSA forms part and profits from a dense network of more or less formalized collaborations, as she works both for OSA and for UW Madison in Julie Dawson's team.

Another example for regionally relevant knowledge management and breeding is a participatory project to breed sweet corn for Pacific Northwest, i.e. a sweet corn which not only ripens, but also allows for quality seed production in the cool summer climate of the PNW. Two farms are involved in this project, which alternate in the breeding process: one smaller farm hosts taste evaluations, while another, larger-scale farm allows for more consistent production and selection of those plants that produce quality seed in the PNW season.

Being a national organization, rather than a federation of more local initiatives, provides OSA with a coherent network made up of fluid relations and connections, allowing it to tap into knowledge, know-how and experience that is locally present with farmers or academics and circulate it throughout the network.

The farm coordinator notes that managing a farm which functions as an experimental station gives legitimacy to OSA staff when collaborating with farmers through the practical experience it provides. As an example, when growing spinach for seed, OSA farm staff has had to discuss and arrange with neighbours who were also growing a spinach seed crop to avoid cross-pollination. In training sessions, or when advising farmers on seed production, they have the experience of what necessary isolation distances imply for human relations and being able to talk as practitioners gives them another form of legitimacy.

2.1.2 Properties BEYOND the initiative (outreach)

Although the importance of advocacy work was clear to OSA board members from the beginning of the association (2003), they decided to first engage in research and education at the practical level, and to obtain a legitimate voice through practice. Today, advocacy work is based on the practical experiences gained in the research and training programs, which provides examples on which to base that advocacy. OSA staff considers that this approach has paid off, as OSA voice on organic seeds and seed issues in general is well listened to.

Making data sharing more efficient: an corollary issue to participatory breeding beyond OSA. To make data sharing more efficient and immediate, some OSA partners, in particular researchers associated to OSA through projects, are partnering with a start-up company founded by Nicolas Enjalbert in Viroqua, WI, to develop an online application named "Seedlinked". One objective is to enable farmers and gardeners involved in participatory field trials to digitalize and share their data more quickly, and to favour direct interaction between them, especially as the application is available on smartphones. Another objective is to enable trial coordinators to collect data and monitor the level of participation in real time. A trial version of the SeedLinked application was launched in 2019.

OSA has understood the importance of training and supporting students to get engaged in organic seed production and breeding. Students involved in organic seed or breeding projects have themselves created the Student Organic Seed Symposium (SOSS), which has recently given birth to the Society of Organic Seed Professionals, for which OSA is operating as a fiscal sponsor.

2.1.3 Transformative effects beyond the initiative

OSA understands seed as "common good" (homepage on OSA website) and thereby challenges multinational seed companies and their IPR, but also allows for a renewed perspective on public plant breeding programs.

One strength of OSA is indeed to tap into the expertise and knowledge present among public plant breeders. According to one farmer-breeder, the work of public plant breeders, based on the generation of germplasm freely available to anybody for use, had become both discredited and constrained as breeding was increasingly ruled by intellectual property rights as private companies took over. The needs and values of organic farming, and the organic breeding network facilitated by OSA, has had the effect of reviving an interest in public plant breeding.

As external observers, we suppose that a tension might be arising between two confronting approaches to knowledge and knowledge sharing, in particular at the biennial Seed Growers conference. On the one hand, the Seed Growers Conference has built and maintained a culture of seed and knowledge sharing – as one farmer-breeder explains, there is a consciousness that organic, independent plant breeding "can make it if we share everything we have and know". On the other hand, multinational seed companies are increasingly interested in and attending the conference but come from a culture of IPR which does not favour knowledge sharing, at least in the long run. This tension has currently not been tackled, but at least one of our interviewees agreed that this is an issue OSA would have to think about in future.

2.2 Framing

2.2.1 Properties WITHIN the initiative (closure)

As stated on the website, OSA envisions “organic seed systems that are democratic and just, support human and environmental health, and deliver genetically diverse and regionally adapted seed to farmers everywhere”. This involves the exclusion of IPR. OSA’s activity is framed as supporting and empowering relevant actors, mainly organic farmers, to make this vision their reality.

2.2.2 Properties BEYOND the initiative (outreach)

As the Research and Education associate for the Midwest states, it is part of OSA’s missions to make seed issues, i.e. the people and work that are behind a seed batch, visible: “Just as it is necessary to show consumers that food doesn’t come from a grocery store, people, and farmers in particular, need to understand that seed doesn’t come from a seed catalogue.” The State of Organic Seed report certainly contributes to this mission by making available factual knowledge on organic seed in the USA.

OSA’s advocacy work, based on its experience in the field, further contributes to informing policy makers who are shaping legislative frameworks that are favourable to organic and OP seeds.

Beyond factual knowledge and advocacy, OSA contributes to communicating a feel for crop diversity toward the general public through its involvement in initiatives breeding for taste, in particular the variety showcases and food festivals organised by the CBN and a tasting event organized by the Seed to Kitchen Collaborative, the Farm to Flavour Dinner.

2.1.3 Transformative effects beyond the initiative

Organic seed is reframed as being not only organically produced, but also genetically diverse, free of IPR and accessible to farmers. Thereby, OSA seizes the opportunity to shape organic seed and its definition beyond what is defined in regulations for organic farming.

2.3 Networking

Throughout our 2-week stay with OSA and other partner institutions, we have identified a large number of “bridges” facilitating the creation and maintenance of a network for organic seeds and breeding in the USA. OSA itself is fully integrated into this network, sometimes building bridges and connections itself, at other times benefiting from existing connections within the wider network:

- Organic agriculture, as a framework, defines a domain in and for which OSA’s activities are developed.
- The Organic Seed Growers’ conference is a biennial get-together where relationships and trust are built and enforced, and knowledge exchanged.
- The establishment of regional hubs aims at densifying the network, either where particular competences (like public plant breeding programs) are present, or where there is a specific demand from organic growers.

Public research is both responsible for collecting and maintaining genetic resource collections in gene banks and for breeding. This is why public breeding programs can constitute a bridge between public germplasm collections and participatory breeding projects or independent breeders. This is favoured by public plant breeders’ experience and their knowledge of promising germplasm. In their interaction with OSA, public researchers play different roles according to their “mission” within their public institution. For example, Julie Dawson at UW-Madison has an appointment to do research and extension relevant to “Urban and Regional Food Systems”, allowing her to work primarily with organic and small-scale farmers. On the other hand, some public breeders have the mission to do “sweet corn” or “vegetable” breeding and are dedicated to breeding for all types of agriculture, spending only a proportion of their time on organic projects. OSA remains open to discuss and exchange with public researchers with different commitments (and therefore different obligations). Our hypothesis is that this is facilitated by the fact that OSA does not politicize the relationship to the conventional seed system and F1 hybrid varieties. In fact, OSA develops its activities independently from any open opposition to the conventional system, which may be expressed and articulated elsewhere within or outside the network.

Beyond OSA itself, students at partnering universities, in particular within public plant breeding, are an important element for advancing organic breeding in several regards. Firstly, graduate and postgraduate students participate in research teams almost as full staff members would. Getting involved with organic breeding projects give them the opportunity not only to get training regarding organic seeds and participatory research, but also to influence this research. For instance,

a carrot breeder and a sweet corn breeder at UW-Madison both mentioned Jared Zystro, a former student who, by his own motivation, had sparked their interest in breeding for organic agriculture. He is now OSA's Research & Education Assistant Director.

The SeedLinked application may become a relevant technical bridge to connect farmers involved in participatory variety trialling or breeding projects directly, taking some weight off researchers as central turning plates for collecting and dispatching information throughout the US networks working on organic seeds and breeding.

Finally, OSA, and especially its partners involved in the CBN and the Seed to Kitchen Collaborative, have been developing tasting experiences as a way to bridge the gap between complex seed and breeding issues on one hand and chefs and the general public on the other. Experiencing good and diverse flavours is a sensory entry point into the topic of crop diversity and breeding.

PART 3: SUMMARY

Although enhancing the genetic diversity of varieties available to organic farming is explicitly stated among the aims of OSA, we think it may be worthwhile to further explore to what extent this is the case through OSA breeding programmes. OSA describes an important part of its breeding work as "variety improvement", based on selecting existing OP varieties, sometimes heirlooms, to adapt them to the needs of present-day organic agriculture or to more specific needs. According to the program director, more varietal and genetic diversity is brought into organic farming by pursuing the objective of creating regionally adapted, rather than broadly, nationally adapted varieties for standardized conditions. According to one public breeder collaborating with OSA, organic breeding introduces more genetic diversity into the agricultural landscape in two different ways. A first aspect is when "heirloom varieties" are used as parents in crosses. The second aspect, which according to him is more frequent and significant, concerns the introduction of germplasm into the USA that is not present or used in the USA, such as modern European varieties which do well in organic farming. Having this in mind, it seems relevant to not confound the varietal diversity made available to organic farms with genetic diversity, as several varieties can be released based on same or similar parents and backgrounds.

We have also identified an underlying tension between the culture of sharing and retaining knowledge at the Organic Seed Growers' conference, as multinational seed and breeding companies, who base their economic model on IPR, get increasingly interested in the conference, which is based on the open sharing of knowledge. From our point of view, the question of how to manage the presence of large, transnational seed companies at the Seed Growers' Conference remains pending.

Two breeding networks which have strong collaborations with OSA, the Culinary Breeding Network and the Seed to Kitchen Collaborative, are using taste as a way not only to differentiate the quality of organically bred varieties, but also to create awareness among the general public. This is coherent with a more general US wide trend of renowned chefs, like Dan Barber, getting interested and raising public opinion about sustainable, local food systems, and seed issues in particular. In Europe, such an interest from chefs has not arisen, or not as much by far, but public opinion on seed issues have rather formed over political and legal issues. We can form the hypothesis that this culinary perspective steps in to raise awareness more strongly in the USA than in Europe, partly because a legal framework restrictive of crop diversity has mobilized public attention in Europe. According to one interviewee, this attention from the culinary domain comes with two risks: firstly, attention must be paid for seed issues not to become an elitist topic; secondly, experience has shown that chefs are always interested in novelty, which is not easily compatible with the fairly slow process of breeding.

We have learned about the important role of undergraduate and graduate students within academic teams, including in public plant breeding, both as labour force and as a force that can drive research toward organic breeding in some cases. This is an opportunity for students to get trained in organic and participatory plant breeding, which could even further be strengthened. The OSA research and education associate in the Midwest noted a need for facilitation skills and techniques to "spark" local or regional dynamics on her own behalf, and it occurred to her that this would be useful to include in any students' curriculum. By supporting the Student Organic Seed Symposium (SOSS) and the Society of Organic Seed Professionals, OSA has seized the opportunity to get involved in the training and networking of young professionals in the organic seed sector.

Overall, during our visits with different OSA staff, farmers and partners, we experienced the importance of connecting to each other as people and building a community, which goes hand in hand with going out to the fields to work on seed production and selection. At a talk at the final conference of the Diversifood project in Rennes in 2019, OSA program

director Micaela Colley had mentioned how the research done at OSA, like in several European networks, is based on a community spirit and a feeling of belonging. It is through informal exchange and connecting that OSA staff get a feel for farmers' needs that should be pursued. It is the ability of OSA staff to favour community building that has without a doubt also contributed to building an extensive and fluid network.