

The State of Organic Seed in Europe



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Introduction

Organic farmers need cultivars well adapted to a range of different soils and agroecological conditions (for example robust varieties growing well at low fertility levels), capable of competing with weeds, with good tolerance to disease and pests, as well as offering unique qualities valued by consumers (such as taste and colour). However, it is estimated that 95% of seed used in organic production is based on varieties bred for the conventional sector, whilst there are only a few varieties that were specifically bred for organic farming systems. The technical infrastructure and the funds required for developing new cultivars and getting them on the market often constitutes an important barrier, especially for smaller seed companies.

Using organic seed is an essential requirement of the European Organic Regulation (834/2007) and important for a fully organic cycle. However, there is a chronic lack of organically produced seed on the market, both in terms of overall quantity and range of varieties available. Furthermore, information on which cultivars have organic seed on the market and how they perform under organic conditions is unavailable or difficult to access in many countries. This situation is aggravated by a derogation system which allows farmers and growers to use untreated conventional seed if they can prove that no organic seed is available for the cultivars they need.

This booklet will present the information collected through research of the LIVESEED project in order to shed light on the actual situation of organic seed use in Europe. In particular, it will focus on the following questions:

1. How does the farmer know what varieties are available as organic seed? How do organic seed databases work in different EU countries and how could they be improved?
2. How much non-organic seed or planting material is used in EU organic farming? How many derogations are granted in different EU Member States and Switzerland?
3. Which are the factors encouraging or discouraging farmers to use organic seed? Which farm and farmer characteristics influence adoption of organic seed? How can organic plant breeding contribute to 100% organic seed use?
4. How has the organic seed market developed in the last years? According to seed suppliers' perspective, what factors hamper the further development of the organic seed sector?

To answer these questions, researchers in the LIVESEED project applied integrated research tools and methodologies: a comparative review of the different databases on organic seed in 28 EU countries; an integrated analysis of national derogation reports to measure the current use of non-organic seed in Europe; a survey among farmers, to understand their perspective on the use of organic seed; and finally a survey among seed suppliers to evaluate trends in the offer of organic seed on the market. A quantitative model was used to estimate the potential demand for organic seed in Europe on the basis of the data collected.

Booklet Outline

Organic seed databases

Databases are mandatory in European countries with the aim of providing information on the availability of organic seed on the market. Such information is needed to allow organic certifiers to grant authorization, also known as derogation, for the use of non-organic seed by organic farmers. This section analyses how different types of organic seed databases currently work in different countries, and how this affects their effectiveness in maximising the use of organic seed (Part One).

Derogation reports

National competent authorities manage the information about authorizations granted for the use of non-organic seed in EU and Switzerland (i.e., derogations). This information is compiled in national derogation reports representing a primary source of information to analyse the organic seed market. An overview of the European situation is presented in Part Two.

Farmers' survey

Factors encouraging or discouraging farmers to use organic seed were explored through a survey among farmers from 17 European countries and representing a wide range of organic farm types. Answers from 839 farmers who voluntarily participated in the survey provide interesting insights which reflect their perspective (Part Three).

Seed producers' survey

Breeders and seed companies are among the major actors in the organic seed sector. Through a large survey the project analysed the current situation and trend of the organic seed producing sector across Europe. Many aspects of organic seed production were included: from geographical distribution of seed production and sales, to policy measures to increase production of organic seed and attitudes towards organic breeding (Part Four).

Combined analysis to estimate total demand of organic seed

Combining the organic land area¹ with the estimated average crop seeding rate, it is possible to estimate the total demand of organic seed for each crop in the different countries. Combining this information with the results of the farmers' survey on percentage of organic certified seed, non-organic untreated seed and farm-saved seed we obtained for the first time estimates of present use of organic seed in Europe for the strategic crops (Part Five).

¹ Willer, Helga and Julia Lernoud (Eds.) (2019): *The World of Organic Agriculture. Statistics and Emerging Trends 2019*. Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM – Organics International, Bonn.

Part One

- Comparative analysis of European organic seed databases

Authorizations for the use of non-organic seed are considered an exception to the rule and therefore should be granted only to those individual farmers who can demonstrate that no organic seed is available for the required cultivar in the national organic seed database before sowing time. According to the Organic Regulation² each Member State must establish a computerized database for listing the varieties for which seed (or seed potatoes) obtained by organic production methods are available on its territory. The organic seed database provides the legal basis for granting derogation, as organic farmers are obliged to use organic seed if it is available in the organic database. The computerised database is an important tool to promote the use of organic seed and to ensure transparency in the EU organic seed market. Its effectiveness is therefore critical for the development of the EU organic seed market. The EU legal framework gives only minimal indications for the development and implementation of national organic seed databases.

1.1 Organic seed databases in Europe: an overview

The information collected on organic seed databases reveals the presence of many different systems among EU Member States. LIVESEED's comparative analysis of the databases in place in the 28 EU Member States and Switzerland looked at functionalities

and shortcomings, as well as effectiveness and efficiency of each database. The analysis started with the collection of information regarding the management, content and functions of the organic seed databases from the database managers or experts in each country. A second phase of the analysis focused on the perspective of database users, such as organic control bodies, seed suppliers and farmers in terms of accessibility of the information contained in the databases. Three main aspects were considered in order to assess the quality of the databases: ease of use, comprehension and completeness. A total of 546 users who declared to have used the national online organic seed database at least once in the last year provide their feedback; among them 464 were organic farmers, 41 were seed suppliers and 41 were control bodies.

An important aspect that needs to be noted is that some Member States developed an interactive database, where farmers can perform an actual query for any available organic seed, while others simply provide a static database such as pdf or excel file.



² (EC) No 889/2008 article 48

TABLE 1.1 Functions of *organic seed databases* in EU Member States and Switzerland in 2018³.

COUNTRY	Interactive Database/ Search Function	Seed Offer Upload Method	Virtual Helpdesk	User Guide/ FAQ's
AUSTRIA	Yes	Seed supplier & database manager	Available	Not available
BELGIUM	Yes	Direct by seed supplier	Available	Available
BULGARIA	No	Database manager	Not available	Not available
CROATIA	No	Seed supplier & database manager	Available	Available
CZECH REPUBLIC	Yes	Seed supplier & database manager	Available	Available
CYPRUS	No	Database manager	Not available	Not available
DENMARK	Yes	Seed supplier & database manager	Not available	Available
ESTONIA	No	Database manager	Available	Not available
FINLAND	No	Database manager	Available	Available
FRANCE	Yes	Seed supplier & database manager	Available	Available
GERMANY	Yes	Direct by seed supplier	Available	Available
GREECE	Yes	Database manager	Not available	Not available
HUNGARY	Yes	Database manager	Available	Not available
IRELAND	Yes	Direct by seed supplier	Available	Available
ITALY	Yes	Direct by seed supplier	Available	Available
LATVIA	Yes	Database manager	Available	Not available
LITHUANIA	Yes	Database manager	Available	Not available
LUXEMBOURG	Yes	Direct by seed supplier	Available	Available
MALTA	No	Database manager	Not available	Available
NETHERLANDS	Yes	Database manager	Available	Not available
POLAND	No	Database manager	Not available	Not available
PORTUGAL	Yes	Direct by seed supplier	Available	Available
ROMANIA	No	Database manager	Not available	Not available
SLOVAKIA	No	Database manager	Available	Not available
SLOVENIA	No	Seed supplier & database manager	Not available	Not available
SPAIN	Yes	Database manager	Not available	Not available
SWEDEN	Yes	Direct by seed supplier	Available	Available
SWITZERLAND	Yes	Direct by seed supplier	Available	Available
UNITED KINGDOM	Yes	Direct by seed supplier	Available	Available

³ A complete list of weblinks of Organic Seed Databases of EU Member States & Switzerland is available at: <https://www.liveseed.eu/tools-for-practitioners/eu-organic-seed-databases/>
https://ec.europa.eu/info/food-farming-fisheries/farming/organic-farming/becoming-organic-farmer/organics-country_en

According to the survey, there are two main methods adopted by the Member States to update the seed offers on the national databases:

- **directly through seed suppliers.** Seed suppliers have direct access to the database and can upload their own offers using their private account.
- **through a database manager.** Seed suppliers report their seed offers to the database manager, who is in charge of verifying data accuracy and updating the database.
- **both seed suppliers and the database manager.** In Denmark for instance, seed suppliers can directly update the seed offers, but the database manager finally needs to approve the changes before the data can be displayed. In Austria all seed which is certified by the national seed certification agency is automatically displayed in the database (i.e. the organic seed database interfaces directly with the seed certification database), while the seed multiplied outside the country needs to be manually added by the database manager.

The frequency of database updates varies a lot among EU Member States. In countries where seed offers are uploaded directly by seed suppliers, the database can be updated in real time, as seed suppliers can constantly update their organic seed stock. In other countries, the database may be updated less frequently, varying from daily to weekly or even monthly. In Bulgaria and Spain, the update occurs twice a year, following specific dates of compulsory update established by the competent authorities, based on the growing season of each crop. The comparative analysis revealed several additional functions and features that can facilitate the successful implementation and

usage of organic seed databases by operators, such as the following:

User instructions and virtual helpdesk

The presence of a link with a downloadable user-guide explaining how to use the organic seed databases or a list of frequently asked questions is available in about half of the EU databases, while almost all database websites provide contact details of the database manager or a dedicated help-desk who can support users to navigate through the system (see table 1.1).

Additional information on organic seed

In several European countries (i.e., Belgium, Denmark, France, Germany, Hungary, Ireland, Lithuania, Luxembourg, Poland, Sweden, Switzerland, and UK), databases allow inserting additional information on specific seed characteristics, such as quality and coating. In Bulgaria and Denmark, the database also provides information on the results of official cultivar tests for suitability in the country or specific regions. As for seed availability, the survey revealed that only few databases (i.e., Austria, Bulgaria, Czech Republic, Greece, Hungary, Latvia, Lithuania, Romania, Slovakia, and Spain) provide information on the available quantity of seed, however, in most cases the amount declared does not reflect the real amount available, because seed producers consider this information as sensitive business data. Some databases (i.e., Belgium, Denmark, Estonia, Germany, Hungary, Ireland, Luxembourg, Poland, Slovenia, Sweden, Switzerland, and UK) implemented a “history of seed availability function”, allowing farmers and control bodies to trace back at what date the seed was available.

Possibility to apply for a derogation request

According to the survey, the function that allows to directly apply for a derogation through the database is currently implemented in ten countries (i.e., Belgium, Czech Republic, France, Germany, Ireland, Latvia, Luxembourg, Poland, Switzerland and UK). In all these databases, except for those in Czech Republic, Latvia and Poland, this function also gives control bodies and competent authorities the possibility to manage authorisation procedures online (i.e. simply “responding” to the application, to grant or reject the derogation request).

1.2 Derogation categories included in the organic seed databases

As of today, Annex X⁴ at EU level is still empty. Some countries (Austria, Belgium, Estonia, France, Germany, Italy, Latvia, Lithuania, Luxembourg,

the Netherlands, Sweden, and Switzerland) developed and implemented a derogation regime for which crops are divided into three categories: category 1 or National Annex (species and varieties out of derogation - see Table 1.2), category 2 (species and varieties concerned by a single derogation) and category 3 (species and varieties under a general authorisation to use non-organic seed).

In France a fourth category (the so-called warning list) identifies crops to be added to the category 1 list in the coming 2 - 3 years. The aim of this warning list is to provide seed companies and farmers the opportunity to be informed in advance on the future situation in order to plan their business more efficiently⁵.

Italy has also recently developed a derogation regime for which crops are divided into three categories; however, the category 1 list (also called red list) is still empty.



⁴ Annex X lists all crop species for which sufficient organic seed is available in the EU and derogations cannot be granted in any European country. To date, Annex X hasn't been implemented. For more information please consult LIVESEED booklet #1 “How to implement the organic regulation to increase production and use of organic seed”.

⁵ See LIVESEED Booklet#1 “How to implement the organic regulation to increase production and use of organic seed” for more details on seed categories and the French warning list system.

TABLE 1.2 Crops included in the National Annex (category 1) by country (November 2019). Crops on this table for which all sub-crops belong to category 1, are **highlighted in bold**. For all others, only certain sub-crops apply*.

COUNTRY	Category I (organic seed available of sufficient cultivars, no derogation)
BELGIUM	Beetroot, Cabbage, Celery, Cress, Cucumber, Endive, Onion, Pumpkin, Purslane, Spelt , Swiss Chard, Triticale
FRANCE	Bean, Carrot, Celery, Cucumber, Eggplant, Endive, Fennel, Gherkin, Grain Maize, Lettuce, Onion, Parsley, Pumpkin, Radish, Soft Wheat, Spelt, Squash, Triticale
GERMANY	Blue Lupine, Buckwheat , Clover, Cress , Cucumber, Endive, Grain Maize, Mustard, Oat, Onion, Potatoes, Pumpkin, Radish, Runner Bean, Rye, Ryegrass, Sugar Beet , Sweet Pepper, Vetch
LUXEMBOURG	Blue Lupine, Buckwheat , Clover, Cress , Cucumber, Endive, Grain Maize, Mustard, Oat, Onion, Potatoes, Pumpkin, Radish, Runner Bean, Rye, Ryegrass, Sugar Beet , Sweet Pepper, Vetch
NETHERLANDS	Barley, Bean, Beetroot, Buckwheat , Chicory, Clover, Cress , Cucumber, Endive, Fennel, Fescue, French Tarragon, Fresh Pea, Garlic , Gherkin, Grain Maize, Grass Mixtures**, Herbs, Kohlrabi, Leaf Celery, Lettuce, Lovage, Lucerne , Mustard, Oat , Onion, Parsley, Peppermint, Phacelia, Potato , Pumpkin, Purslane, Radish, Rye, Ryegrass, Shallot (sets), Soft Wheat, Spelt, Squash, Strawberry, Sugar Beet, Sugar Pea, Sweet Pepper, Swiss Chard, Timothy, Tomato, Triticale, Turnip, Vetch
SWEDEN	Barley, Clover, Fava Bean, Fescue, Field Pea, Oat, Ryegrass, Soft Wheat, Timothy
SWITZERLAND	Barley, Cress, Emmer, Grain Maize, Mustard, Oat, Onions, Ornamentals***, Phacelia , Rye, Ryegrass, Soft Wheat, Soybean, Spelt, Triticale, Vetch

*Most crops species listed in the National Annex are divided into sub-crops (e.g. bread wheat, fodder wheat). This allows a step-wise approach when moving crops from category 2 to category 1.

**Mixtures made with crops species of category 1 and category 2, where organic supply is available

***Includes more than 140 ornamental crops species or sub-crops listed on Swiss category 1



1.3 Effectiveness and efficiency of current databases

Most database users were satisfied with the clearness of the information presented in the database (Comprehension), as well as with the ease to use the databases' features (Easy to use), while less end users consider the current databases as complete. Database users were asked to rank in a five-point scale (from 'Strongly agree' to 'Strongly disagree') a number of statements relating to the organic seed database. The distribution of scores for the items in terms of level of agreement is presented in Figure 1.1.

Database completeness, accuracy and update are perceived by the EU organic seed users as the most critical aspects.

The interactive system is preferred over the static list, whilst those updated by seed suppliers are considered more complete, accurate and updated than those updated by database managers. In addition, data completeness and accuracy are the most important qualities that influence the frequency with which farmers use the databases. Even if it is compulsory for farmers to consult the database before applying for any derogation, farmers who consider the database as incomplete, not up to date and inaccurate are less likely to consult it when they need specific information on seed availability.

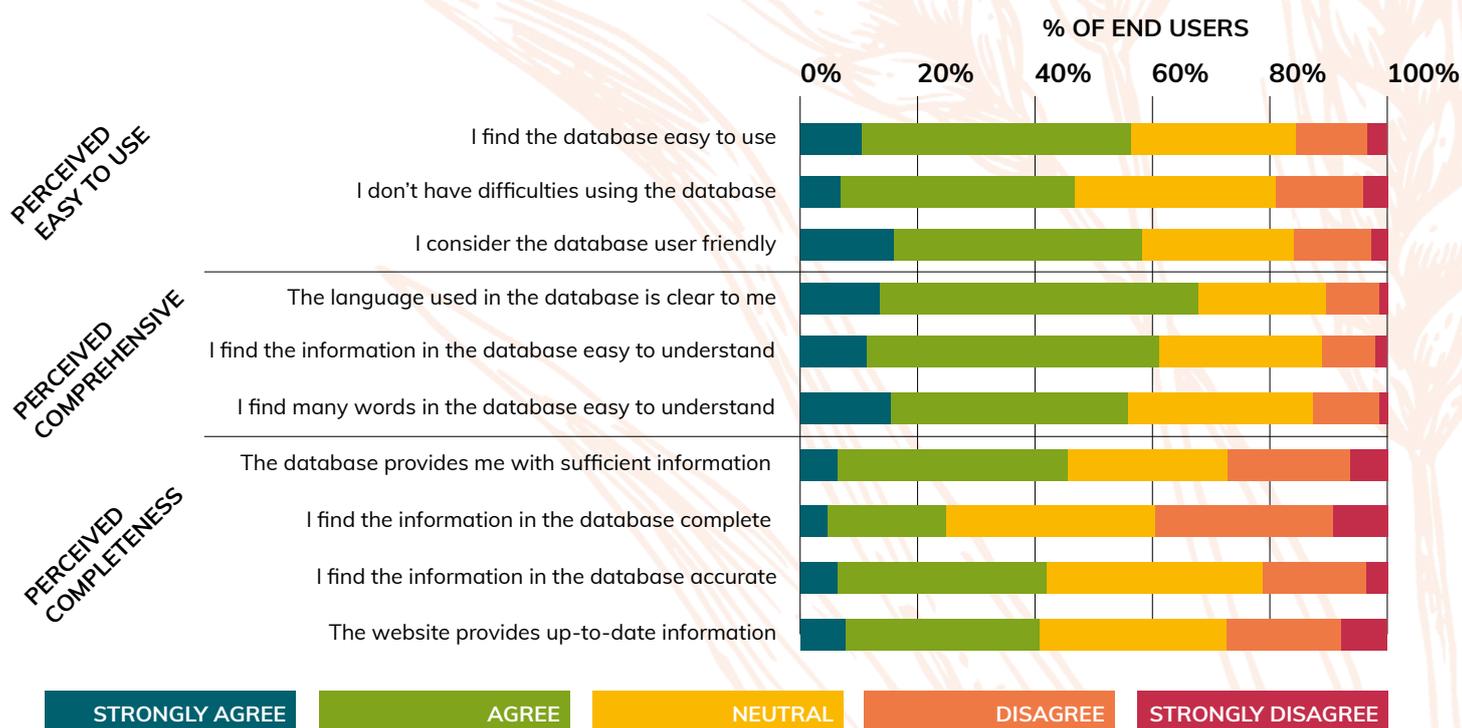


FIGURE 1.1 Perceived database usability from the end users' perspective.
Easy to use: the extent to which a user believes that using the database would be free of effort;
Comprehension: the extent to which a user believes that the database content and information can be understood easily and interpreted appropriately;
Completeness: the extent to which a user believes that the information in the database is not missing and is of sufficient breadth and depth for the task at hand.

Part Two

- Use of non-organic seed in EU Member States & Switzerland

The national annual authorisation report⁶ (also referred to as derogation report) provides information on the number of derogations granted and the volume of non-organic seed used by organic farmers. The derogation report is compiled by the same authorities designated to grant authorisations (e.g. in the UK, the Soil association compiles the report on behalf of the Department for Environment Food & Rural Affairs; in Italy, the CREA-DC compiles the report on behalf of the Ministry of Agriculture, Food and Forestry). Competent authorities should ensure that the information included in the derogation report are publicly available and a summary of the report is sent to the European Commission and to other Member States before the 31st of March each year.

According to article 54 of the EU Organic Regulation EC No 889/2008, for each species concerned by a derogation, the annual derogation report shall contain the following information:

- (a) the scientific name of the species and the variety denomination;
- (b) the justification for the authorisation;
- (c) the total number of authorisations;
- (d) the total quantity of seed or seed potatoes involved;
- (e) the potential chemical treatment for phytosanitary purposes⁷.

2.1 Quantifying non-organic seed use in Europe

National derogation reports for the years from 2014 to 2016 for 27 EU Member States⁸ and Switzerland were collected. The data were combined in a new dataset containing the derogation amounts (kg of seed or number of plants) and the number of derogations for a total of 35 crops⁹ considered strategic for the EU organic sector. Countries were grouped into four geographical regions (Figure 2.1). Figures 2.2 and 2.3 show the trend in number of derogations for arable and vegetable crops from 2014 to 2016. The results show that many more derogations were granted for vegetables than for arable crops. Southern EU countries have a higher number of derogations compared to other EU countries for both arable and vegetable crops. However, the data on the number and volume of derogations are, to a considerable degree, dependent on the country-specific average farm type and therefore cannot be considered as a perfect indicator of the relative country performance in terms of dependence on non-organic seed.

⁶ art. 54 and art.55 of the Regulation (EC) No 889/2008.

⁷ Non-organic seed or planting material can be used by the farmer only if it is not treated with plant protection products not included in the Regulation (EC) No 889/2008 annex II. In case of phytosanitary problems that may require strong protective measures against pests of plants, specific treatment can be prescribed by the competent authority of a Member State in accordance with Council Directive 2000/29/EC (16). As these measures are considered exceptional and in any case confined to a specific area, non-organic seed or planting material used by farmers in accordance with Regulation (EC) No 889/2008 article 45, 21) are to be considered untreated with substances not admitted by the EU organic regulations. Therefore, the term non-organic seed or planting material is used in this report referring to untreated conventional seed or planting material.

⁸ with the exception of Estonia and Ireland for which only 2016 reports were available and Malta that was missing data for the three-year period.

⁹ **Strategic crops for the organic sector.** **Arables:** barley (*Hordeum vulgare*), grain maize (*Zea mays*), lupins (*Lupinus* spp.), oats (*Avena* spp.), peas (*Pisum sativum*), potatoes (*Solanum tuberosum*), rape-seed (*Brassica napus*), rye (*Secale cereale*), soybeans (*Glycine max*), sunflower (*Helianthus annuus*), triticale (*Triticosecale* spp.), wheat (*Triticum* spp.). **Vegetables:** broccoli (*Brassica oleracea italica*), carrots (*Daucus carota*), cauliflower (*Brassica oleracea botrytis*), cucumber (*Cucumis sativus*), endives (*Cichorium endivia*), lettuce (*Lactuca sativa*), melons (*Cucumis melo*), onions (*Allium cepa*, *proliferum*, *fistulosum*), parsley (*Petroselinum crispum*), pumpkins (*Cucurbita* spp.), tomatoes (*Solanum lycopersicum*)

The biggest shortcoming of national derogation reports is that they lack data on non-organic seed of species for which a general derogation system (category 3) is implemented. Thus, the number of derogations is

likely not to reflect the total amount of non-organic seed used, which could be much higher. This hinders the comparison among EU countries and the monitoring of progress across different time-scales.

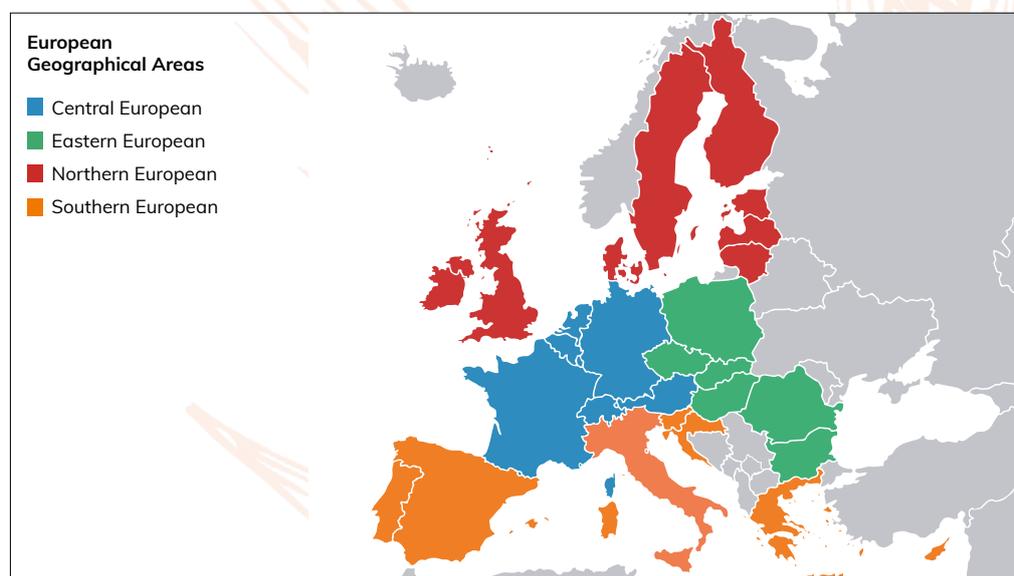


FIGURE 2.1 European geographical areas for LIVESEED surveys¹⁰.

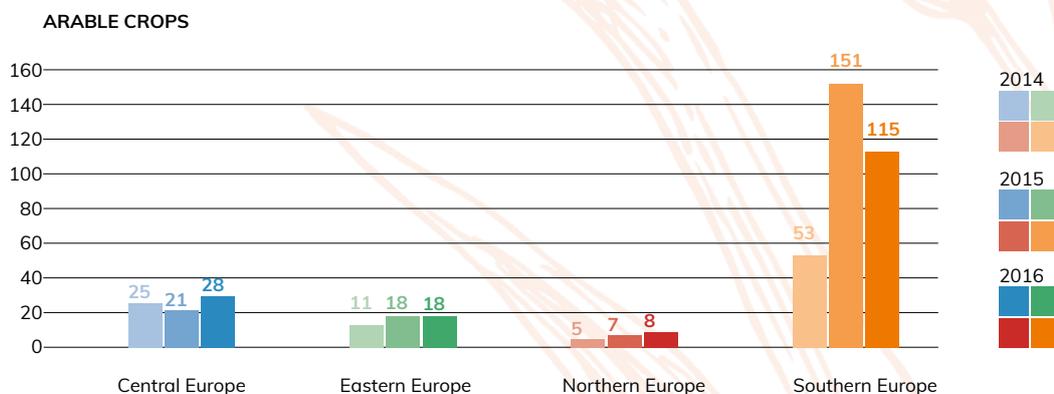


FIGURE 2.2 Number of derogations per 1.000 hectares of organic arable land by EU geographical region over the 2014-2016 period.

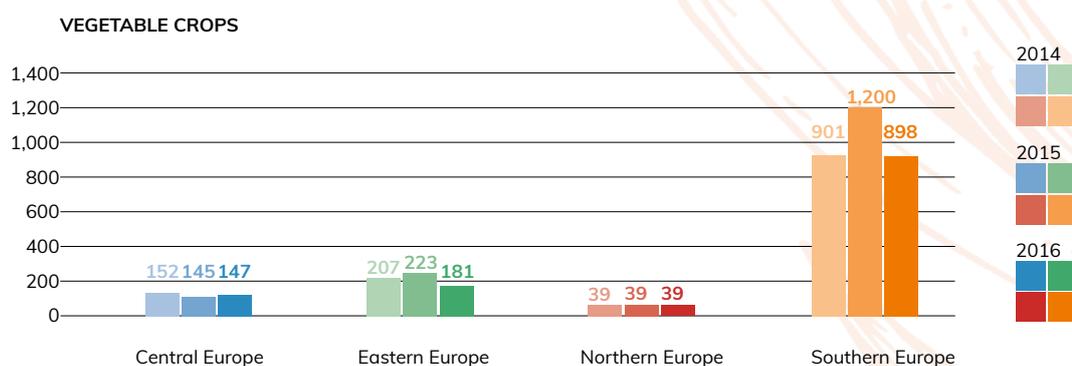


FIGURE 2.3 Number of derogations per 1.000 hectares of organic arable land by EU geographical region over the 2014-2016 period.

¹⁰ Central European: AT, BE, DE, FR, LU, NL, CH; Eastern European: BG, CZ, HU, PL, RO, SK; Northern European: DK, EE, FI, IE, LT, LV, SE, UK; Southern European: CY, EL, ES, HR, IT, MT, PT, SI. Map credit: www.all-free-download.com

Shortcomings of current derogation reports

a) *Timeliness/Accessibility.*

Even though the annual publication of the derogation report within the national database is required according to the EU regulation, in some Member States, the report is not published regularly. Also, not all derogation reports are easily accessible online in the national organic databases of each country. To increase transparency and availability of data on the use of non-organic seed in the EU, all future derogations reports should be accessible online at EU level, directly from the European Commission's website in the sections dedicated to organic agriculture.

b) *Coherence and comparability.*

Most of the reports don't provide any information on non-organic seed of crop species classified under Category 3 (see 1.2 - derogation always granted due to unavailability of organic seed). Currently, only in Germany, Luxembourg and Italy, farmers need to notify the authorities and control bodies about the cultivars and the volume of non-organic seed used for crop species or sub-species included in this general derogation category. Also, in most of the reports, there is no record about which species and sub-species are listed under Category 3). Furthermore, different crop classification systems and measurement units of the volume of derogations, make data processing and analysis a challenging task. The amount of seed or propagation material should be reported using the same measurement unit for each crop (e.g. kg; no. of plants; no. of seeds; unit of seed).

c) *Accuracy.*

Data accuracy is a prerequisite for seed data comparisons and analyses. A number of inconsistencies were identified while processing the various national reports, most of which stemmed from typing errors or wrong measurement units.



¹¹ Willer, Helga and Julia Lernoud (Eds.) (2019): *The World of Organic Agriculture. Statistics and Emerging Trends*. Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM – Organics International, Bonn.

Part Three

- Use of organic seed from farmers' perspective

The factors encouraging or discouraging farmers to use organic seed were explored through a farmers' survey involving 839 farmers across 17 European countries. More than 50 responses per country were collected from France, Germany, Spain and the United Kingdom; and more than 40 from Italy, Greece, Hungary, Poland, Latvia, and Switzerland. From other countries (Austria, Belgium, the Netherlands, Bulgaria, Romania, Denmark and Portugal) responses from at least 20 farmers in each country were collected. Overall, the different crop sectors were well covered. The average farm size of respondents was 81 hectares (ha), ranging from 0.2 ha to 2,100 ha. In terms of market channels, the majority of the surveyed farmers sell directly to consumers, organic shops or intermediaries, including processors, trading, cooperatives and producer groups, while only 7.5%

of respondents sell to supermarkets. However, the latter have become the major market channel in Europe¹¹. Even if the results cannot be generalized to the entire organic farmers' population in Europe, the survey provides interesting insights on the factors encouraging or discouraging respondents to use organic seed.

3.1 Rate of organic seed and seed sources on organic farms

According to LIVESEED's survey, the highest share of organic seed use is with farms in Central Europe (median=92%), whereas the lowest shares are in the Eastern (median=50%) and Southern Europe (median=72%), across all crops¹². Differences in seed sources between countries are shown in Figure 3.1.

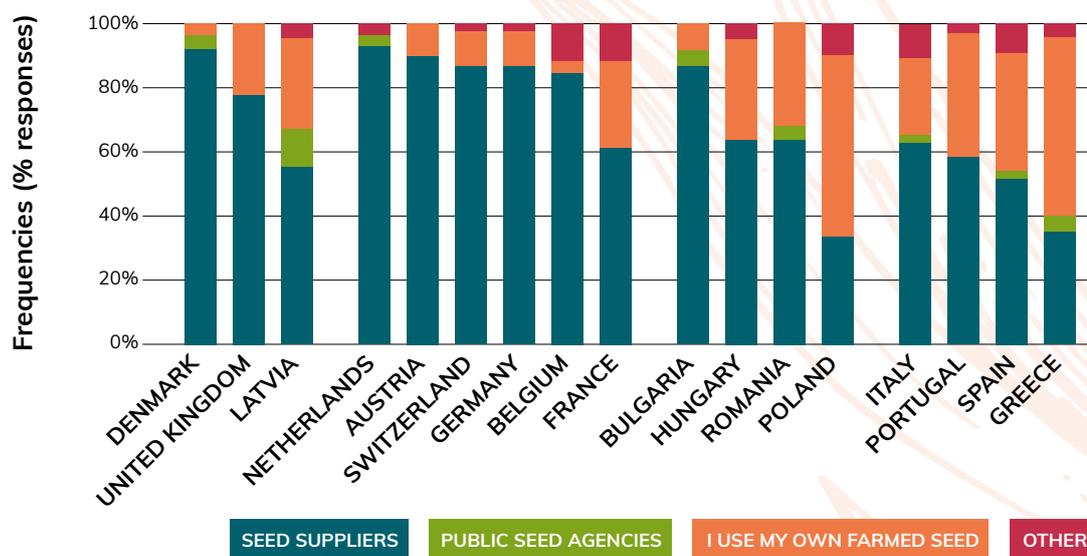


FIGURE 3.1 Main seed sources in percent (stacked bars).

¹² Source: www.liveseed.eu/wp-content/uploads/2019/09/LIVSEED-D4.1-Report-on-relative-importance-of-factors-encouraging-or-discouraging-farmers-to-use-organic-seed-in-organic-supply-chains.Cpdf_.pdf

There is a high use of farm-saved seed as main source of organic seed in Eastern and Southern countries, especially in Poland (with more than 57% of respondents), Greece (more than 55%), Portugal (37%), Spain (36%), Hungary (33%), France (27%) and Italy (23%). The situation is very different in Central European countries, where the use of farm-saved seed by participating farmers is very low and seed are mostly bought from seed companies.

3.2 Farm/farmer characteristics and use of organic seed

The level of use of organic seed by the surveyed farmers differs based on certain farm and farmer characteristics. As summarised in Table 3.1, the main distinguishing factors appear to be the farm location and the marketing channels that the farmers of our sample use to sell their organic food products. Farms in Central and Northern Europe, where most organic seed is available on the market, have a significantly higher rate of use of organic seed than in Eastern and Southern Europe. The type of value

chain involving the farm also has an effect on organic seed use: farms marketing their products directly to consumers and organic shops show significantly higher rates of organic seed use compared to those selling their products through long value chains (such as supermarkets). The percentage of organic plant reproductive material was lower in fruit-producing farms than organic seed use in arable and forage crop farms. The share of organic seed use (including farm-saved and purchased seed) varies between European countries and crops. For example, the percentage of organic seed for wheat ranges from 89% in central European countries to 67% in the eastern countries. The situation is more varied for other crops such as soybean with 35% and about 85% of organic seed used in the eastern countries, and the southern and central countries respectively. For potatoes, the highest rate of organic seed is with South and Central Europe with approximately 85%, against 66% in the eastern countries. As well, carrots have 79% of organic seed use in Central and South Europe, and 60% in the eastern countries.

TABLE 3.1 Overview of differences in organic seed use based on farm/farmer characteristics.

Farm/Farmer Characteristics	Differences in organic seed use
Geographical Region	Farms in Northern and Central Europe have significantly higher use of organic purchased seed than in Southern and Eastern Europe, which in turn show a much higher proportion of organic farm-saved seed.
Farm Size	Organic seed use increases with the size of the farms in our sample. The correlation is statistically significant but very weak.
Farm Type	Farms predominantly growing fruit (apples, olives and grapes) use significantly lower rates of organic reproductive material than other farm types.
Time Since Conversion	The time since conversion has no significant effect on the use of organic seed.
Marketing Channels	Farms selling directly to consumers and organic shops have significantly higher rates of organic seed use than those who sell to retailers and supermarkets.
Training In Organic Farming	No significant difference was found between farmers who have participated in a training course in organic farming and those who have not.

Overall, the use of organic propagation material is lower in the fruit sector. It accounts for 40% and 65% for apples in South and Central Europe respectively, for 38% and 47% for grapes and olives in the Mediterranean countries where most production takes place.

3.3 Attitudes toward and experience of organic seed

Farmers were asked to rank in a five-points scale a number of statements relating to organic seed from 'Strongly agree' to 'Strongly disagree'. As shown in Figure 3.2 below, most of the surveyed farmers perceive that using organic seed improves the competitiveness of the organic sector, which suggests that the attitude towards organic seed is overall positive. Likewise, more than 50% of respondents rated as 'Strongly agree' and 'Agree' the statements relating to: the role of certification bodies in encouraging the use of organic seed; the good quality of organic seed they have been using on their farms; the increase in organic seed availability in the last five years.

Regardless of the crop sector, the most critical issues from the survey are the limited availability

of organic seed for the desired cultivars, and to a slightly lesser extent the higher price of organic seed. However, in some countries, in particular Denmark, France, Germany, the Netherlands and Switzerland, availability and price don't appear to be limiting factors to organic seed use. These are also the countries where most of organic seed production in Europe takes place.

Most farmers are satisfied with the quality of the organic seed used, while about 15% of respondents stated they experienced germination problems and about 10% seed borne pest and diseases. A high percentage could not judge the difference between organic and untreated seed (Figures 3.3a and 3.3b). More specifically, respondents identified more germination problems with organic than untreated conventional seed for carrot (15% of those growing organic carrots), cauliflower (13%), maize (12%), onion, tomato, soybean and lupine (10% of the responses gathered for each of the four crops). A slightly smaller number of respondents identified more seed borne pest and disease issues – the highest shares were 9% of those growing soft wheat, 6% with maize and olive.

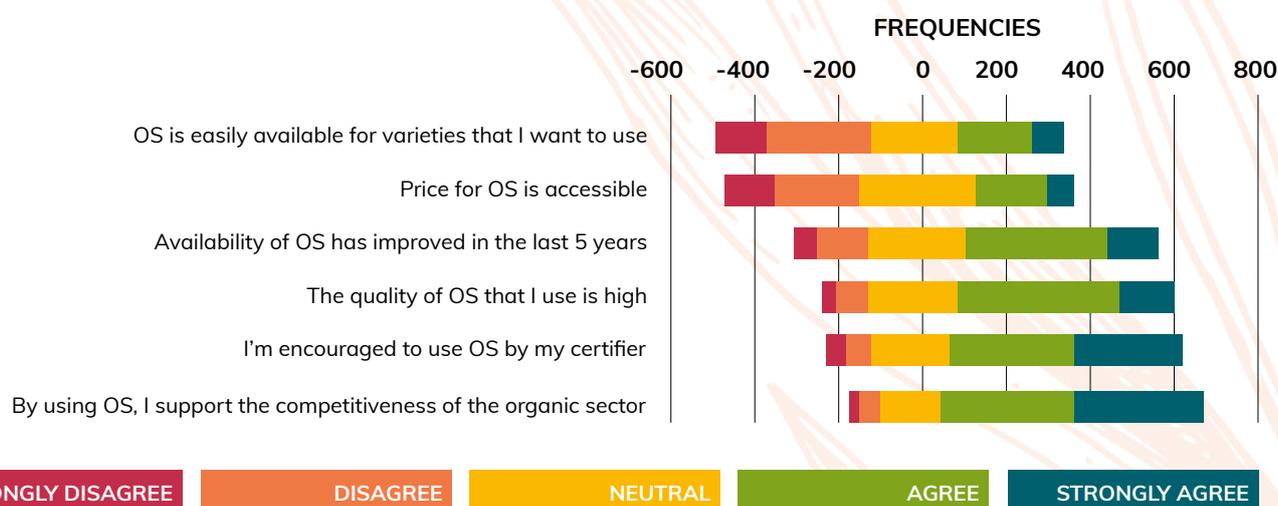


FIGURE 3.2 Attitudes towards organic seed (OS) ranked by the respondents on a five-points scale from 'Strongly disagree' in red to 'Strongly agree' in dark green.

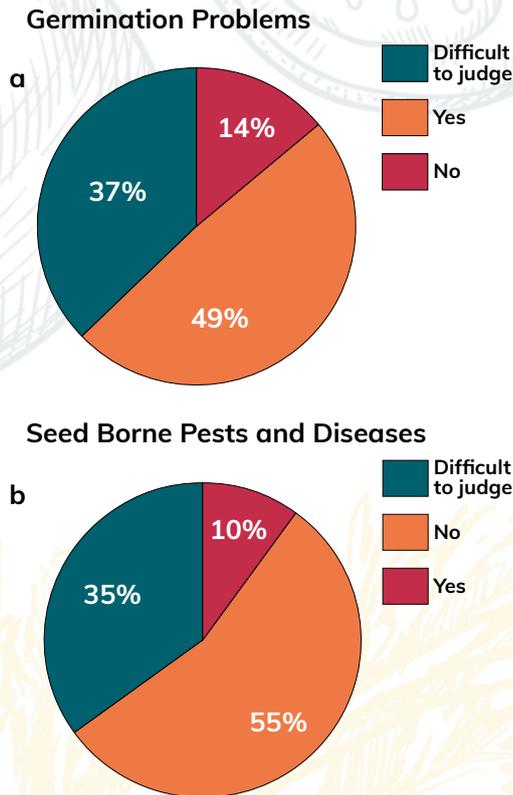


FIGURE 3.3 Seed quality issues experienced by farmers with organic seed, compared to untreated conventional seed: **a)** lower germinations; **b)** higher incidence of seed borne pests and diseases.

of organic seed (see Figure 3.4). The actions least preferred were 'More information on availability of organic seed on foreign markets' and 'Stricter national rules for granting derogations'. These patterns were similar regardless of the crop sector and the geographical area.

Farmers were also asked to rate the urgency with which breeding for organic farming conditions is needed. According to most respondents, such urgency is 'very high' or 'high' for all arable and vegetable crops considered. The situation is slightly different for forage crops, for which 'average' is the most frequent response, perhaps due to the fact that farmers might not be fully aware of the variety characteristics in the forage mixture they use.

In conclusion, the main current challenge seems to be the mismatch between organic seed availability and the requirement of suitable varieties.

3.4 Priority actions identified by the farmers

Farmers ranked 'Improve availability of organic seed of locally adapted varieties' and 'Greater efforts in developing breeding programmes for organic farming' as the two most important actions to boost the use

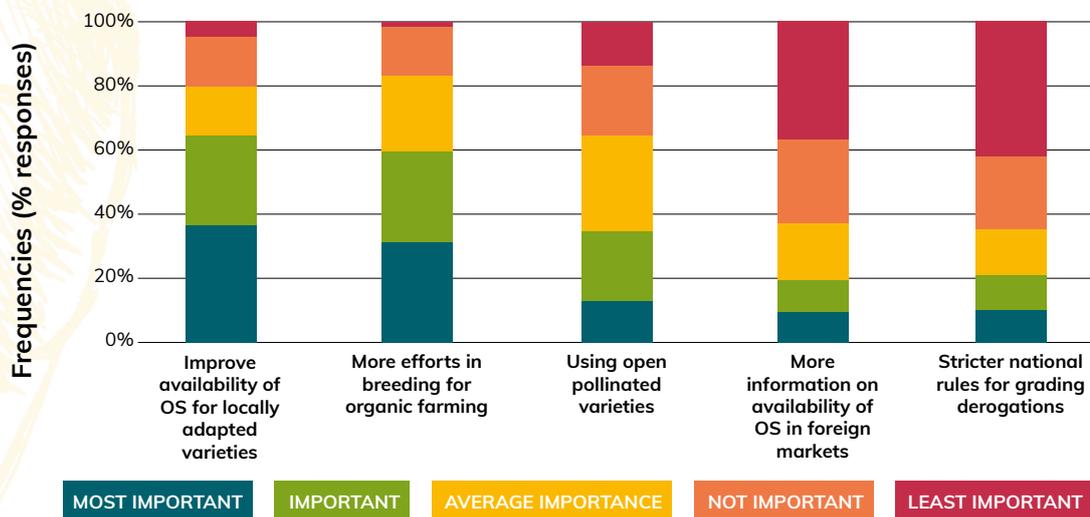


FIGURE 3.4 Ranking of different actions to boost the use of organic seed.

Part Four

- Organic seed production from the seed suppliers' perspective

To analyse the current state of the organic seed market in Europe, more than 800 seed companies and breeders all over Europe as well as members of Euroseeds and the European Consortium for Organic Plant Breeding were invited to participate in a survey. The survey focused on the dynamics of seed companies' organic branches, as well as on attitudes toward organic seed production and organic breeding. The survey revealed that companies are detecting a growing demand for organic seed and that there is an overall positive development of the organic seed sector across Europe.

Results indicate that organic seed production for the European market is mainly conducted within Europe, with France, Germany, Italy, the Netherlands, Austria and Denmark being the leading countries for organic seed production. Other European countries such as Poland, Spain, United Kingdom, Sweden, Czech Republic, Hungary and Romania were also mentioned (Figure 4.1). The main countries outside of the European region relevant for organic seed supply in Europe are Chile, USA, China, Thailand and New Zealand (in relative order of importance).

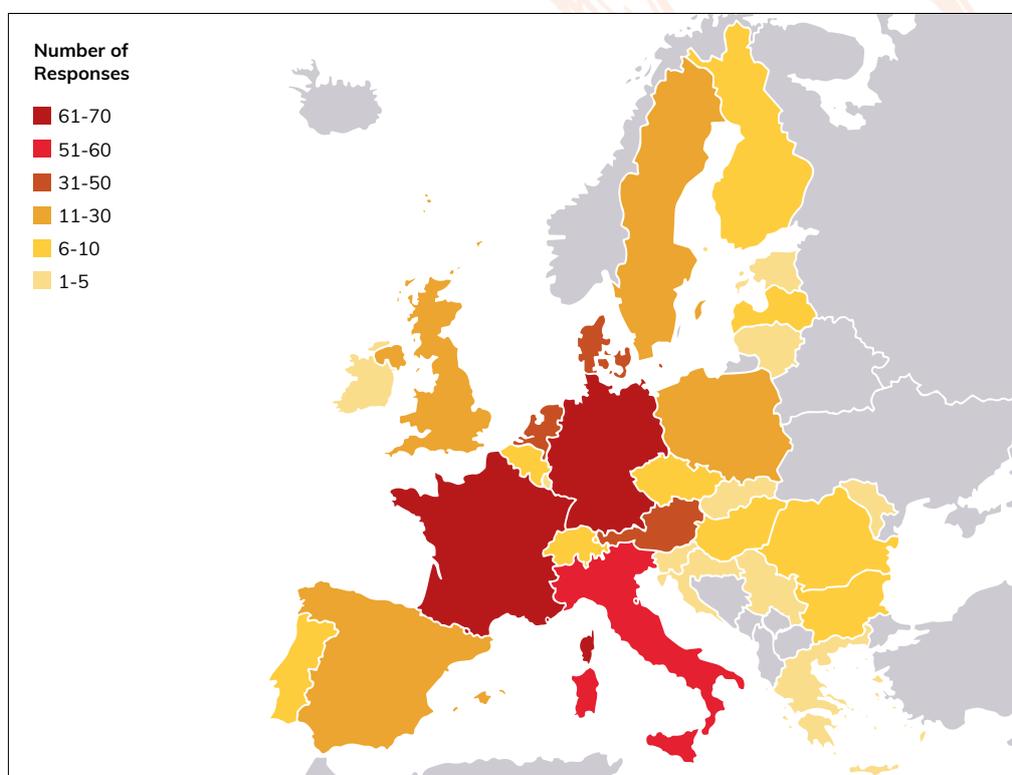


FIGURE 4.1 Geographical distribution of organic seed production as indicated by European seed companies (based on frequency of responses to question "Where does your company produce organic seeds or have them produced?").

Over the last five years, a positive development has occurred in terms of gross turnover from organic seed production and seed sales. The majority of seed companies that participated to LIVESEED's survey (69.6%) recorded a gross turnover increase varying from 1-20% of increase each year; 27% of respondents reported that gross turnover stayed the same and only 3.5% reported a decrease between 1-20% per year (Figure 4.2). These results indicate an increase in organic seed demand across Europe, although highest increases are recorded in central European countries such as France, Germany, the Netherlands, Belgium and Austria. Seed suppliers are reacting on these developments by adjusting their investments. Indeed, 56% of respondents reported an intention to increase their investments in organic seed production and supply in the coming year. About 27% plan to remain close to constant and 16% plan no investments. Only less than 1% is planning to decrease their investments (Figure 4.3).

Organic Seed Sales Turnover Variation

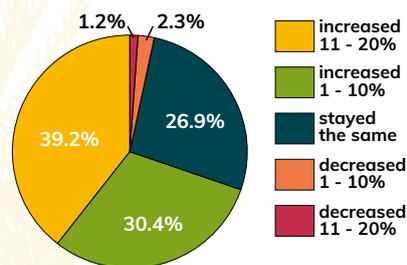


FIGURE 4.2 Yearly variation in organic seed sales gross turnover, based on a five-year period (2013-2017) (n=171).

Organic Seed Investment Prospects

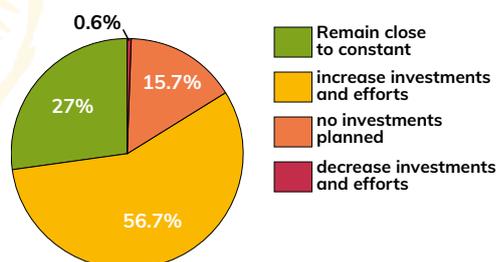


FIGURE 4.3 Planned investments in the organic seed sector by European seed companies over the next 5 years.

While the survey detects a positive trend in the organic seed sector, there are many factors that still limit and hinder its development. Compared to the overall growth of the organic market in Europe, it can be estimated that the organic seed sector is not growing at the same pace. Increasing numbers of derogations granted EU-wide for the use of non-organic seed indicate that the organic seed sector is not fulfilling its potential yet.

The survey reveals that the main challenging factors for organic seed production are the high volatility of yields, yield losses and the risk of seed borne pests and diseases (Figure 4.4). Contaminations with weeds is also an important limiting factor. Beside technical issues, it can be difficult to find farmers willing to multiply organic seed under contract, as organic seed production is technically more challenging than conventional seed production. Problems related to storage and treatments, germination rate and size as well as hybrid propagation ranked as less important.

As shown in Figure 4.5, seed suppliers confirmed that organic seed production is more costly than conventional. Although seed companies tend to acknowledge the importance of organic seed within organic agriculture, seed companies appear not to be confident that farmers are willing to pay a higher price for organic seed and if organic seed production is currently a profitable niche market. They are a bit more optimistic that organic seed production is a growing market that might become profitable in the next 5 years. Logistic problems don't seem to affect companies' ability to offer both organically and conventionally produced seed.

According to seed suppliers, the most important policy measure would be to fund more research into increasing the profitability of organic seed, followed by phase out derogations for conventional

seed and implement stricter national rules in allowing derogation as well as provide more information on organic seed demand. In terms of possible policy measures, the following options were envisaged:

greater range of organically allowed seed treatments, introduction of (e.g. governmental) subsidies to support organic seed production and more training opportunities on organic seed production (see Figure 4.6).

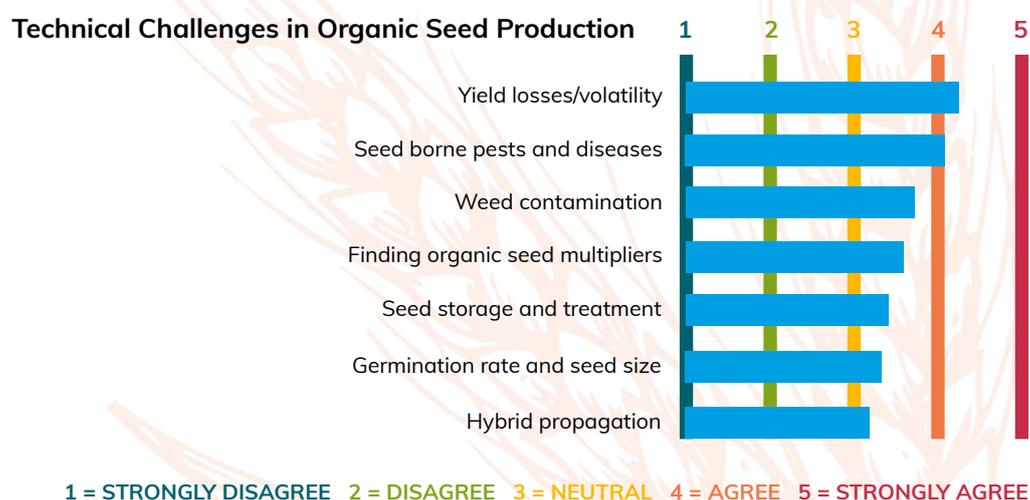


FIGURE 4.4 Seed companies' rating of technical challenges related to organic seed production

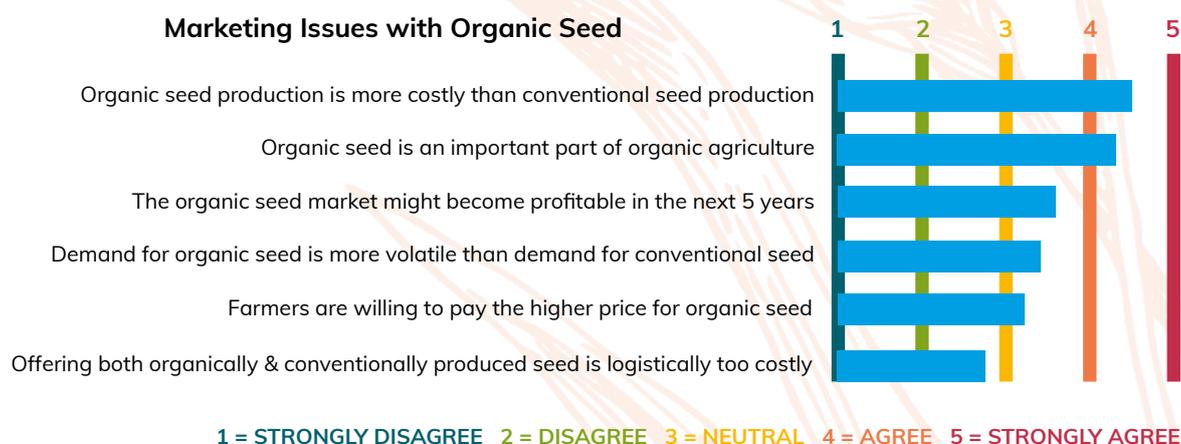


FIGURE 4.5 Seed companies' perception on organic seed marketing issues

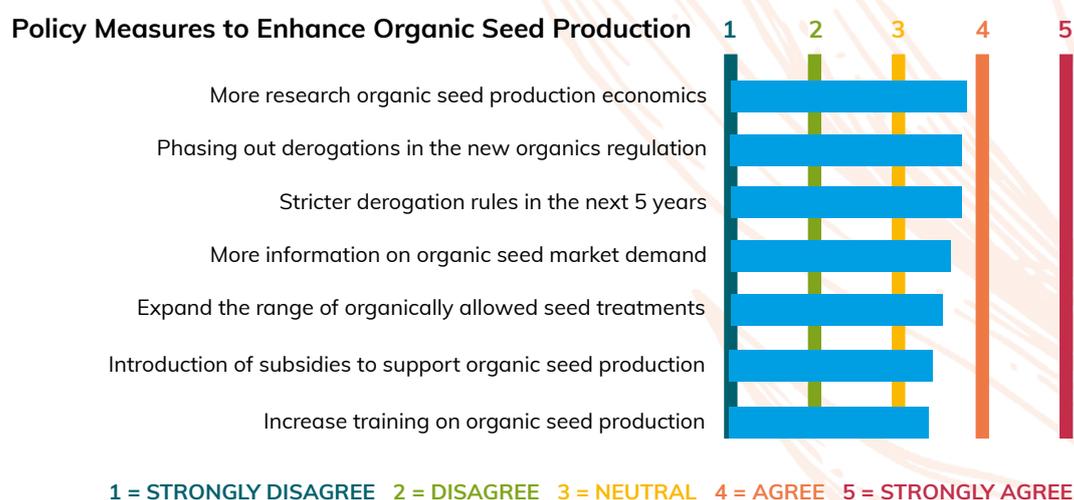


FIGURE 4.6 Seed companies' rating of policy measures addressing organic seed production bottlenecks

Part Five

- Estimating the potential of the organic seed market in Europe

By looking at the organic seed sector from different perspectives (regulatory authorities, farmers, seed companies) LIVESEED elucidated the different constraints that have hampered the growth of organic seed market in Europe. Combining data on the organic land area (obtained by the FiBL-CH database¹³) with the estimated average crop seeding rate (obtained through a literature review and validated by an experts' survey), the project estimated the total demand of organic seed for selected crops (tons of seed, number of plants) in the different countries. Combining this information with the results of the farmer survey, it was possible to gain a unique insight in the European organic seed market and estimate for each of the strategic crops, which fraction of the overall seed used by organic farmers derives from organic certified seed, non-organic untreated seed and farm-saved seed. The overall picture of the present use of organic seed presented in Table 5.1 is the sum of different geographical areas, each unique and different from the others in terms of average farm size, amount of organic seed available on the market, the number of derogations

granted and derogation reporting system (see Figure 5.1, 5.2, 5.3). It is important to note that the majority of farmers who participated in the survey use direct sale channels and short-chain marketing schemes; thus, the estimated percentage of seed sources (organic/farm-saved seed/non-organic) is likely biased towards higher organic seed rates compared to what occurs among average European organic farmers, many of who sell through large retailers or supermarket chains, where organic seed use rates are lower (Chapter 3). Therefore, further expert interviews have been compiled to validate this data in order to refine the estimation of the amount of organic seed currently used in European Member States and Switzerland.

This data provides a useful indication of the European situation and provides industry and policy makers with a first quantitative estimate of the potential demand for organic seed. This data may support the R&D and marketing strategies of the private organic seed sector, as well as public policies governing the use of derogations in view of their phasing out by 2035.



¹³ Willer, Helga and Julia Lernoud (Eds.) (2019): *The World of Organic Agriculture. Statistics and Emerging Trends 2019*. Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM – Organics International, Bonn.

TABLE 5.1 The estimated total potential demand of organic seed & plant reproductive material (sum of organic purchased seed, organic farm-saved seed, derogation for non-organic seed) in terms of volume of seed (in tonnes) required by organic farmers in the EU Member States and Switzerland in 2016. Crops marked with * are quantified in terms of number of transplants; crops marked with ** are quantified in mio of seeds

	Organic seed purchased (Amount & percentage)	Organic farm saved seed (Amount & percentage)	Non-organic seed purchased (Amount & percentage)	Total organic seed demand (Amount)
GRAINS				
Wheat (t)	60,727 (42%)	37,201 (26%)	46,637 (32%)	144,564
Grain maize (t)	1,521 (51%)	168 (6%)	1,309 (44%)	2,998
Barley (t)	21,348 (47%)	12,466 (28%)	11,285 (25%)	45,098
Oats (t)	23,247 (43%)	18,765 (34%)	12,503 (23%)	54,516
LEGUMES				
Lupine (t)	1,599 (43%)	952 (25%)	1,189 (32%)	3,741
Soybeans (t)	4,549 (46%)	2,037 (20%)	3,374 (34%)	9,961
Peas (t)	5,638 (42%)	2,564 (19%)	5,149 (39%)	13,351
Lucerne (t)	1,115 (43%)	249 (10%)	1,217 (47%)	2,582
VEGETABLES				
Tomatoes*	52,586,746 (22%)	22,952,357 (10%)	162,971,075 (68%)	238,510,179
Onions**	2,277 (55%)	235 (6%)	1,648 (40%)	4,161
Carrots**	3,018 (24%)	106 (1%)	9,331 (75%)	12,455
FRUIT				
Apples*	1,629,674 (36%)	585,247 (13%)	2,280,694 (51%)	4,495,615



NON-ORGANIC SEED PURCHASED

ORGANIC FARM SAVED SEED

ORGANIC SEED PURCHASED

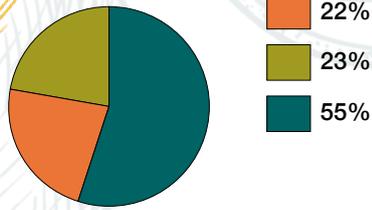


WHEAT

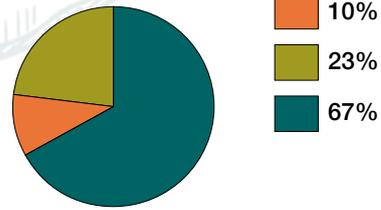
LUCERNE

TOMATO

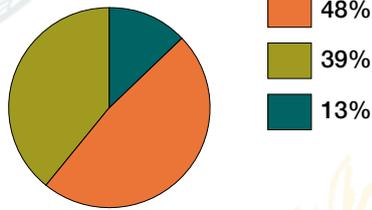
Northern Europe



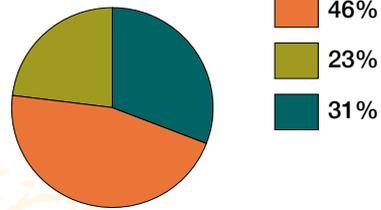
Central Europe



Eastern Europe



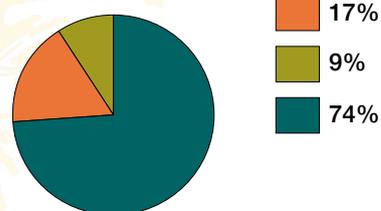
Southern Europe



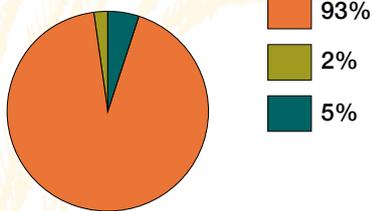
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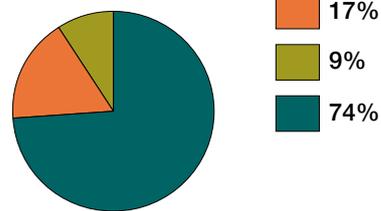
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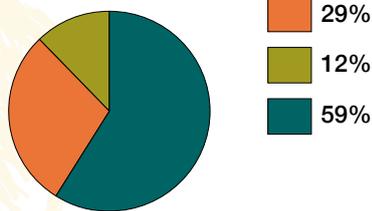
Eastern Europe



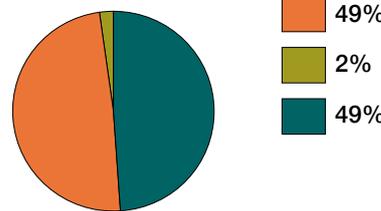
Southern Europe



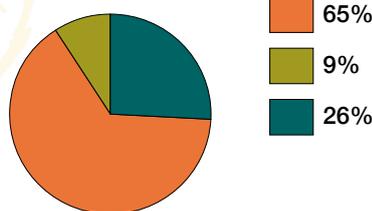
Northern Europe



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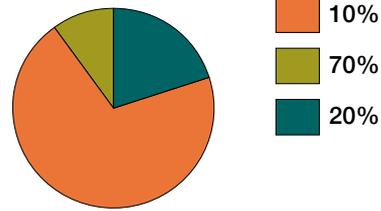


FIGURE 5.1 Average total potential demand for wheat, lucerne and tomato in different European regions in 2016..

Conclusions and recommendations

The research on the **state of organic seed in Europe** carried out by LIVESEED produced the first comprehensive report analysing the potential demand, present use, bottlenecks, and market development perspectives of organic seed production from different angles. It highlighted the **major role played by derogations in shaping the current organic seed market**. Of particular importance in this context is the coming into force of the **new European Organic Regulation 2018/848, according to which the derogations should be phased out and 100% organic seed should be used in organic farming by January 2036**. A good understanding of the current situation and trends is key to inform and guide policy makers and national authorities, as well as to stimulate investments in the organic seed sector. Organic seed production is on average more risky than conventional seed production, implying higher production costs and seed prices. Therefore, it is important that the derogation rules currently in place are not misused just to allow the purchase of cheaper non-organic seed. Only through a **joint effort of seed companies, farmers, certification bodies and competent authorities** is it possible to develop a roadmap for reaching 100% organic seed in the near future and securing the integrity of the European organic sector.

The new organic EU regulation (2018/848) coming into force in 2022 provides an enhanced legal framework...

for providing more transparent data on the availability of organic seed as well as stricter implementation, monitoring and final phasing out of derogations for non-organic seed. This will not only create a level playing field among EU Member States but also boost the organic seed and breeding sector. In-conversion seed can be used if no organic seed is available and organic farm-saved seed will be recognised besides certified seed. In order to increase the range of organic seed, facilitated market access of Organic Heterogeneous Material (OHM) with the potential to evolve and adapt to local conditions will be granted. A new temporary experiment shall be kick-started in 2021 to foster research and development of organic varieties suitable for organic production taking into account the specific needs and objectives of organic agriculture such as enhanced genetic diversity, disease resistance or tolerance and adaptation to diverse local soil and climate conditions.

Organic seed databases

Organic seed databases are an important tool to improve the use of organic seeds within the EU Member States and Switzerland.

- An **effective database** is the first step to limit the number of derogations, as it can strengthen market transparency and the
- successful connection between organic seed supply and demand.
- Fully **computerised databases**, including interactive functions and direct “real time updates” by seed suppliers, are to be preferred as they allow more frequent updates and easier handling of derogations, while offering many additional functions and features which can influence the end

users' willingness to use them.

- **Training of users** (especially farmers) could **facilitate direct access and usability** of feature-rich, fully computerised, interactive databases.
- **Harmonisation of organic databases across countries** (software programming & architecture, common ontology) could **help harmonise the implementation of EU regulation across EU countries** and promote the overall use of organic seed. This could be achieved by deploying platforms linking different national organic seed databases, such as the organicXseeds and the EU-wide router database developed within LIVESEED.

Annual reports on the use of non-organic seed and vegetative planting materials

The annual reports of national authorities on the use of non-organic seed and vegetative planting materials provide important information on crop species, sub-species and varieties used in organic farming as non-organic plant propagating material.

- The **accessibility and quality** of national reports are **inconsistent** among countries, and many times **incomplete** (e.g. no data for "general derogation" species). This is problematic, as without good quality, accurate and timely information it is difficult for stakeholders, especially for seed companies, to make decisions on the risks and benefits of investing in the organic seed sector.
- A **harmonised** comprehensive and solid **overview of derogation reports at EU level** is needed. Our research highlighted the importance of consistency in data collection, to obtain

meaningful information and take sound decisions. This concerns not only the way data on number and volume of derogations are reported, but also the way that derogation reports are released, analysed and disseminated.

Strategies to increase organic seed production and use based on geographical distribution, value chain and product orientation.

Farms in Central and Northern Europe, where most organic seed companies are located, use a significantly higher percentage of organic seed than in Eastern and Southern Europe. In addition, farms marketing their products directly to consumers and organic shops have significantly higher organic seed rates than those selling through longer value chains (e.g. supermarkets, large retailers etc.). In general, there is a much higher number of derogation requests for non-organic seed in vegetables than in cereals.

- **Special incentives** should be provided to promote **production and use of organic seed** in Eastern and Southern European countries, targeting crops with more derogation requests or under a general derogation category, and to create awareness on the use of organic seed among farmers participating in longer value chains.
- **Farm-saved seed** is an important organic seed source especially in Eastern and Southern European countries. Therefore, **investments** should be made in **training and capacity building** to promote **local seed production of high-quality seed** free of seed borne diseases. Given the potential market demand for organic

seed, and the commitment of the industry in investing in organic seed production, these farmers could become important seed producers.

Perspectives for organic seed production and organic plant breeding from the seed producers' point of view.

Seed companies recognize the **growing market potential of organic seed** as organic farming has been constantly growing over the last 20 years. The majority is willing to **invest more in organic seed** (e.g., in special infrastructure to produce both organic and conventional seed), providing that accurate and validated data on the actual demand of organic seed in Europe become available to make informed decisions.

- **Cultivars adapted to organic conditions** are key for successful production. However, only a small range of cultivars are

available as organic seed and of those, not all are suitable for organic production. Concrete actions are needed to **increase the offer of locally adapted cultivars** (both in terms of range and quantity) and **specific breeding for organic farming is required** for arable, vegetable and fruit crops.

- **Joint action and close cooperation among different stakeholders** across the whole organic sector, as well as **long term public and private investments**, are needed to out-scale existing successful organic breeding initiatives which generate **new organic cultivars**. The scope of organic breeding needs to be extended to **a large portfolio of crops** at both local and European level.
- **Cultivar testing under local organic conditions** should be intensified to provide **lists of recommended cultivars for organic farmers**, which are currently missing or very limited in many countries¹⁴.



¹⁴ Please see https://www.liveseed.eu/wp-content/uploads/2019/07/LIVESEED_D2.1_Overview-of-the-organisational-models-of-cultivar-trials-for-organic-agriculture.pdf

Duration: 4 years (2017 – 2021)
Project coordinator: IFOAM EU
Scientific coordinator: FiBL-CH



Budget: 7.5m EUR
from the European Union &
1.5m EUR from Switzerland



BOOSTING ORGANIC SEED AND PLANT BREEDING ACROSS EUROPE



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