



D4.1 Report on relative importance of factors encouraging or discouraging farmers to use organic seed in organic supply chains

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Document version

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Summary

This report summarises the results of an online survey conducted between November 2018 and June 2019, with a convenience sample of 839 organic farmers (of which 763 farmers completed the whole survey) in 17 European countries. The main aim of the survey was to identify factors encouraging or discouraging farmers to use organic seed. The survey also explored other issues relating both to organic seed and breeding.

The main critical issue reported by the surveyed farmers is the availability of organic seed for the varieties they need. This is true regardless of the crop sector, but it is significantly less pronounced in Central and Northern European countries. Other differences between countries relate to the use of purchased organic seed *versus* farm-saved organic seed, with the highest share of farm-saved seed found in some Eastern and Mediterranean countries.

The quality of seed does not seem to be a major issue. In fact, most surveyed farmers are satisfied with the quality of the organic seed used, although about 15% of respondents stated they did have germination problems and about 10% pests and disease problems, but high number of “Don’t know” responses indicates that cannot be directly related to the seed being organic.

A number of factors were taken into account that appear to be affecting the use of organic seed. Farms in Central and Northern Europe, where most organic seed is produced, have a significantly higher rate of use of organic seed than in Eastern and Southern Europe. Also, farms selling through direct marketing to consumers and organic shops have significantly higher rate of organic seed use than those who do not. In contrast, farms selling their products to supermarkets show a significantly lower organic seed use rate. Organic seed use in fruit-oriented farms was reported to be significantly lower than in arable and forage farms.

Finally, the farmers claim a lack of locally adapted varieties and a need for breeding for organic farming conditions, also to encourage organic seed use. This is true for the arable, vegetable and fruit sectors in all the study countries, but is less pronounced for the forage sector.

Overall the study provides useful insights, yet it should be pointed out that results cannot be generalised to the population of organic farmers in Europe, as the survey is based on a convenience sample and the voluntary participants that provided feedback might be more dedicated to organic. Despite this limitation, however, to the best of our knowledge, this is the first study investigating organic seed use from the farmers’ point of view in several European countries and taking into account all crop sectors.



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1 Introduction

According to the principles of European Regulation (EC) 834/2007 (Art 4) organic farming should use organic inputs, wherever external inputs are necessary. The implementing rules laid down in Regulation EC 889/2008 state that seed and vegetative propagating material used in organic agriculture should also be organic (Art. 45). The Regulation also allows untreated conventional seed to be used where no organic alternative is available. In fact, there seems to be still relatively limited use of organic seed, although with differences between countries and crops (Döring et al. 2012).

According to the new European Organic Regulation 2018/848 that will enter into force in 2021, derogations should be phased out and only organic seed should be used by January 2036. Therefore, there is a need to identify the factors that are preventing a larger use of organic seed by farmers. This is especially true due to the glaring lack of recent studies and reliable data on production and use of organic (see also Solfanelli et al 2019).

This report presents the results of an online survey with the main aim to identify factors encouraging or discouraging farmer to use organic seed. The survey also explored related issues such as the need for breeding for organic farming, and the percentage of organic seed use based on the self-declaration of surveyed farmers.

The survey, conducted between November 2018 and June 2019, is based on a sample of 839 organic farmers (of which 763 farmers completed the whole survey). It was carried out in 17 European countries (Austria, Belgium, Bulgaria, Denmark, France, Greece, Germany, Hungary, Italy, Latvia, the Netherlands, Poland, Portugal, Romania, Spain, Switzerland, United Kingdom), and a few responses were also obtained by farmers in Finland, Ireland, Luxemburg and Sweden.

In this report we first provide a literature review relating to organic seed use (chapter 2), followed by a description of the methods used for the survey (chapter 3). Results of the online survey are presented in chapter 4 and conclusions in chapter 5.

2 Literature review

The literature review was based on a search of the internet database Scopus, using a combinations of key words related to organic seed and organic farming including: *organic, seed, breeding, variety, seed saving, farm-saved seed, cereals, arable, vegetables, forage, fruit, potato, organic regulation, derogation, seed quality, seed borne disease, seed vigour, seed germination, seed availability, seed price.*

The results of the search were screened and selected based on the relevance to the survey. Overall, only eight relevant studies were found.

As shown in [Table 1](#), six studies are focused on some European countries, two on the US, one study on Canada. Only four of them were based on surveys with organic farmers. The other studies considered were based on policy analysis and surveys with seed companies and certification bodies.



Main factors that have been analysed in these studies were quality, price, availability and regulatory issues. Although these studies provide some interesting insights, there is a lack of research covering several European countries and all crop sectors which take into account farmers' experience of and attitudes to organic seed.

Table 1. Key information on organic seed related literature

Authors	Country	Focus of the study	Method
Bocci et al (2012)	Italy	Relationship between formal and informal seed system. Analysis of limiting factors for organic seed use	Survey with 250 organic farmers (as part of SOLIBAM)
Döring et al 2012	Europe	Analysis of seed regulation in Europe	Analysis of the challenges for organic seed use based on policy documents/regulation
Hubbard (2016)	US	State of the art of organic seed use and analysis of limiting factors	Survey with 1,365 organic farmers, certifiers, seed companies.
Le Doaré (2017)	Bretagne (France)	Organic seed use on organic farms. Main focus: vegetables	Survey with 103 organic vegetable growers. 19 of them were also qualitatively interviewed.
Levert (2014)	Canada	State of the art of organic seed use and analysis of limiting factors	Survey with 33 organic field inspectors
Merfield (2012)	Europe	Analysis of seed regulation against IFOAM principles and objectives	Analysis of policy documents
Renaud et al (2016)	US, Europe	Analysis of seed regulation in Europe, and US	Survey with seed companies, organic farmers, regulators, NGOs, and analysis of policy documents
Rey et al (2013)	France	Analysis of limiting factors for organic seed use. Main focus: vegetables	Qualitative interviews and quantitative online survey with 720 organic vegetable growers (as part of SOLIBAM)

2.1 Price of organic seed

In the surveys with farmers conducted in France (Le Doaré 2017; Rey et 2013), Italy (Bocci et al 2012) and the US (Hubbard 2016) it was found that the higher price of organic seed compared to conventional does not represent a major reason for organic farmers to apply for derogation (Le Doaré 2017). For example, 59% of the organic farmers surveyed in the US responded that price was 'not a reason' for not purchasing organic seed (Hubbard 2016).

In Italy, less than 1% of the responding farmers in the survey stated that the price was a reason for using conventional seed (Bocci et al 2012). According to the survey in Canada, price resulted to be of intermediate importance as a reason for derogation request (Levert 2014).



2.2 Farmers' view on organic seed availability and quality

Availability of varieties seems to be the most common reason for not using organic seed, as reported by 56% of the farmers surveyed in the US (Hubbard 2016) and more than 70% in Italy (Bocci et al 2012). Specific variety availability also was the main reason cited by the inspectors in Canada for organic farmers applying for derogations.

Overall, there is consensus among the studies reviewed that seed quality is not a major issue. In France, Rey et al (2013) reported that vegetable growers were satisfied with organic seed, with some variation across species: the satisfaction rate was 80% for red beets and lettuce, while melon and broccoli (*var. italica*) had a lower satisfaction rate of 60%. Likewise, in Brittany, vegetable growers do not envisage quality differences between organic and conventional seed (Le Doaré 2017).

In the US, 'distrust of organic seed quality' was a reason for not purchasing organic seed for only 6% of the surveyed farmers (Hubbard 2016). However, the seven seed companies surveyed in Europe in the study by Renaud et al (2016) reported seed borne disease, together with seed vigour, to be a problem for the organic seed sector.

2.3 Crop types and farm characteristics

According to the survey conducted by the Organic Seed Alliance, vegetables lag behind other crops with only 18% of vegetable growers planting 100% organic seed, compared with 30% of field crops, forage crops, and cover crops (Hubbard 2016).

The survey in France analysed if and how the supply for organic seed has been improving over time according to the farmers' point of view. The increase in supply and the prospects are found to be generally encouraging for some species such as beans, onion, pepper, radish, lettuce and tomato. From the farmer survey in the US it emerged that the organic seed use decreases as farm size increases, across all crop types.

Rey et al (2013) and more recently Le Doaré (2017) found that organic vegetables growers in France and Brittany, respectively, tend to use more conventional seed if they operate in long food supply chains compared to growers in short supply chains. Farmers growing vegetables for processing and in greenhouses tend also to use conventional seed, as their needs are mainly related to high productivity and capability to meet long food supply chain requirements, i.e. appearance and shelf life (Le Doaré 2017, Levert 2014, Rey et al 2013).

In France, recently converted farms appear to apply more for derogations than established organic farmers, as they tend to remain faithful to the cultivars used prior to conversion (Rey et al 2013). Le Doaré 2017 also found organic seed use to be significantly higher by organic farmers who have been trained in organic farming than those not trained.



2.4 Regulation related issues

It has been claimed in some studies that an important reason for not using organic seed lies in the current regulatory framework. In the survey with organic vegetables growers in Brittany 72% of the surveyed farmers would see an end of the derogation system as a way to develop the organic seed sector and improve its offer in terms of choice of varieties (Le Doaré 2017).

Based on the survey with seed companies undertaken as part of the COBRA project, the growth of the organic seed sector is hampered by an easy granting derogation policy (Rey et al 2016). Döring et al (2012) contend that the lack of harmonisation of the ways derogations are handled and derogation data are reported in different European countries represent a potential bottleneck for the further development of the organic seed sector overall. Similarly, the application of the progressive implementation might create some strange outcomes, resulting for example in some seed companies not listing their organic seed on the database to prevent their customers seeking a more direct contact with them (Merfield 2013).

3 Methods

The survey was conducted in 17 European countries: Austria (AT), Belgium (BE), Bulgaria (BG), Denmark (DK), France (FR), Germany (DE), Greece (GR), Hungary (HU), Italy (IT), Latvia (LV), the Netherlands (NL), Poland (PL), Portugal (PT), Romania (RO), Spain (ES), Switzerland (CH), the United Kingdom (UK). It was administered online using Qualtrics and translated in 14 languages.

The descriptive analysis of attitudinal statements refers to 839 respondents overall and the number of responses is indicated for each individual question. The response rates are as follows: 839 farmers responded to 14 out of 25 questions; 777 farmers responded to 21 questions including the question on current seed use rates; 763 completed the survey.

It should be pointed out that as in most online surveys, the study was based on self-reporting answers which can lead to problems related to social desirability bias (Krumpal et al 2013). This might be true in this case also because the use of organic seeds is legally mandatory (except when derogations are in place). In order to mitigate this, the survey was anonymous and respondents could optionally decide to enter their emailing addresses to get the final report and for a possible follow-up. However, there might also be a bias that those farmers, which are more dedicated to organic and follow the rules more closely, are more likely to participate in such surveys.

The LIVESEED partners were responsible for promoting and circulating the survey to organic farmers in their countries, making use of their contacts with organic associations and certification bodies. In some countries (Bulgaria and Greece) where farmers have low access to the internet, the project partners conducted the survey over the telephone and entered the answers online.

3.1 Survey questions and crops considered in the survey

The preparation of the survey questions was based on:



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- Literature review (see above)
- Preliminary interviews with organic farmers conducted at the end of 2017 in Germany, Italy, the Netherlands and the United Kingdom. Overall 11 organic farmers were interviewed growing arable, forage and vegetable crops. This explorative stage helped us identify the key issues related to organic seed from the farmer’s point of view.
- Expert knowledge within the project consortium.

The analysis of the online survey was performed with STATA 15.

The survey questions are reported in Appendix 1 at the end of this report. The questionnaire consists of four main parts. The first questions are concerned with the farm and the farmer characteristics (e.g. age, crop grown, farm size, training etc.). The second group of questions includes a number of attitudinal statements to assess on a five-point Likert scale; farmers were also asked to rank a number of priority actions that could facilitate the use of organic seed. The block of statements was designed building upon an adaptation of the technology acceptance model (TAM) (Davis 1989). The statements can be grouped in different acceptance measures or ‘latent constructs’, i.e. attitude, intention, perceived usefulness, facilitating conditions, subjective norms. Such an approach was used to ensure a solid theoretical background as well as to allow further analysis in future.

Current organic seed use on the farm, quality issues encountered with organic seed and need for breeding were asked in the third group of questions, structured in crop specific questions. Finally, the survey includes questions on the organic seed database, which were designed by UNIVPM.

The survey includes some crop-specific questions. The selection of 20 crops (see Table 2 below) to be included in the survey was carefully chosen with the project partners based on their relevance in terms of land area and economic value in the LIVESEED countries involved (see also Solfanelli et al 2019).

Table 2. List of crops considered in the survey

Arable	Barley (<i>Hordeum vulgare</i>); Grain maize (<i>Zea mays</i>); Oats (<i>Avena sativa</i>); Soft wheat (<i>Triticum aestivum</i>); Durum wheat (<i>Triticum durum</i>); Soybeans (<i>Glycine max</i>); Lupine (<i>Lupinus spp.</i>); Pea (<i>Pisum sativum</i>)
Forage	Alfalfa (<i>Medicago sativa</i>); Forage mixture*
Fruit	Apple (<i>Malus domestica</i>); Grape (<i>Vitis vinifera</i>); Olive (<i>Olea europea</i>), Strawberry (<i>Fragaria</i>)
Vegetables	Potato (<i>Solanum tuberosum</i>); Cauliflower (<i>Brassica oleracea var. botrytis</i>); Carrot (<i>Daucus carota</i>); Onion (<i>Allium cepa</i>); Tomato (<i>Solanum lycopersicum</i>)

* The crops here considered are: White clover (*Trifolium repens*); Red clover (*Trifolium pratense*); Perennial ryegrass (*Lolium perenne*); Italian ryegrass (*Lolium multiflorum*); Red fescue (*Festuca rubra commutata*); Tall fescue (*Festuca arundinacea*).

3.2 The sample

Convenience sampling was used as it was the only real option for data collection, mainly for two reasons. First, despite the existence of registers of organic farms in all European countries kept by certification bodies, they cannot be used by researchers for random selection due to the Data

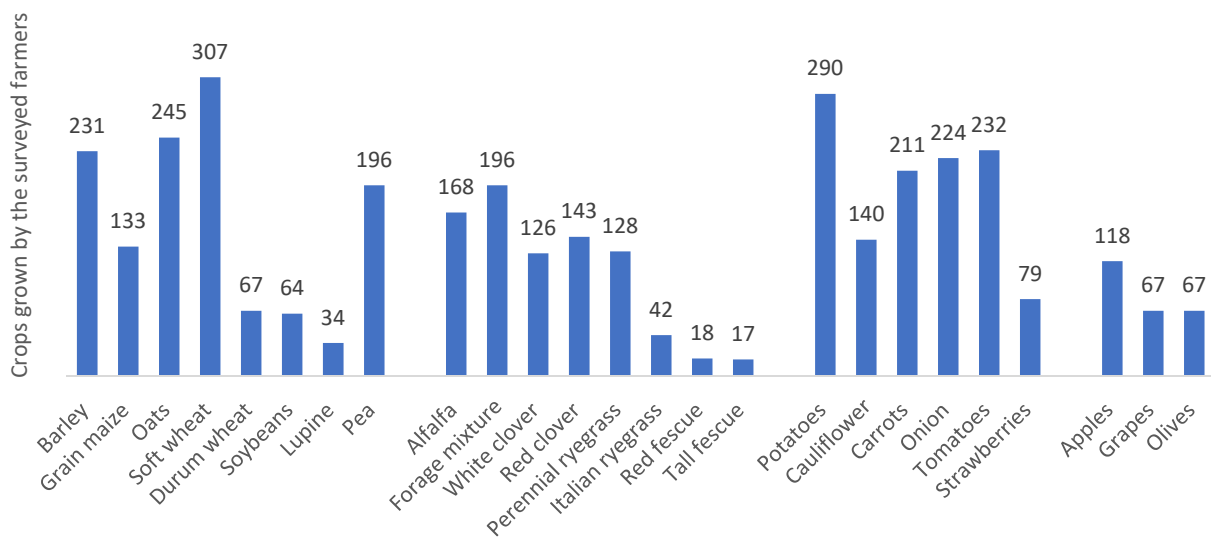


Protection Act in force. Besides, farmers are, in general, quite unwilling to participate in surveys and they agree to participate only if recommended by someone whom they trust (Despotović et al 2019). The option of quota sampling based on farm characteristics was initially also explored but was discarded as it requires to introduce filters at the beginning of the survey which would have reduced the number of responses.

The only requirement for farmers to participate was that the farm is certified organic.

Despite this limitation, the different crops are well covered by the survey completed, as illustrated in Figure 1 below reporting the number of responses by crop.

Figure 1. Crops grown by the surveyed farmers (N=839)



Other key characteristics of the sample relating to farmer demographics and the farm are reported in Tables 3 to 5 below.

Table 3 shows the number of responses per country and the average farm size. France is the country with the highest number of responses (119 responses), followed by Spain (94) and Germany (82). In the analysis presented in this report the countries are often grouped in Central, Eastern, Northern and Southern European countries¹

Overall both small and big farms are part of our sample and the average farm size is 81 hectares (ha), ranging from 0.2 ha to 2100 ha. It can be noted from Table 3 that in most countries the participating farms are larger than the average farm size of the population of organic farms at country level.

¹ Central European countries: Austria, Belgium, France, Germany, Luxemburg, the Netherlands, Switzerland; Eastern European countries: Bulgaria, Hungary, Latvia, Lithuania, Poland, Romania; Northern European countries: Denmark, Finland, Ireland, Sweden, the United Kingdom; Southern European countries: Greece, Italy, Portugal, Spain.



Table 3. Number of responses by country, average farm size (ha), standard error se(mean), min and max values (ha) (N=839)

European area	Country	No responses	Sample average farm size (ha)	Population average farm size (ha)*	se(mean)	Min (ha)	Max (ha)
Central Europe	Austria	32	61	25	10.1	5	300
	Belgium	26	106	40	22.1	0.8	350
	France	119	60	48	10.7	0.5	1110
	Germany	82	101	46	26.9	1	2100
	Luxembourg	2	37	53	33	4	70
	The Netherlands	31	41	33	7.2	0.25	140
	Switzerland	47	33	23	8.5	0.2	400
Eastern Europe	Bulgaria	23	37	21	7.7	4	150
	Hungary	47	35	55	6.7	1	250
	Latvia	45	152	64	31.1	2	1000
	Lithuania	1	400	94	.	400	400
	Poland	43	37	24	5	5	128
	Romania	28	167	33	53.3	0.5	1050
Northern Europe	Denmark	30	207	62	41.3	15	1000
	Finland	4	53	56	13.4	17	80
	Ireland	6	8	43	4.6	0.2	30
	Sweden	3	75	99	34.6	7.5	120
	United Kingdom	51	206	143	34.3	0.5	1250
Southern Europe	Greece	46	8	20	1.7	0.2	50
	Italy	48	95	29	37.6	3	1500
	Portugal	34	60	54	26.9	1	850
	Spain	94	48	55	11.6	0.2	800
	Total	839	80	51	5.7	0.2	2100

*Source: Organic Farming datasets (Eurostat)

Table 4. Demographic characteristics of the sample (N=839)

Variables	Min-Max/ Relative Frequency %	Mean
Age (year)	18-83	46.8
Sex	Male	71.2%
	Female	28.7%
Training in organic farming in the last 10 years	Yes	73.7%
	No	26.3%



As shown in Table 4 above, the average age of respondents is 47 years, with a strong prevalence of male farmers (71%), and 74% of the responding farmers attended training courses in organic farming in the last 10 years.

Table 5 indicates that a 56% of respondents chose selling directly to consumers as one of the three options, and only 7.3% chose supermarkets. A large share of farmers sells also their organic products to intermediaries including processors, traders, cooperatives and producer groups. It has to be pointed out here that the sample does not reflect the main pattern in Europe in terms of sales of organic food, which mostly take place in supermarkets (Willer & Lernoud).

Table 5. Main sales channels used by the surveyed farms (N=839)*

Country	Frequency (%)
Directly to consumers	56.4%
Organic shops	23%
Cooperative/producer group	31.8%
Processor/trader	40.6%
Supermarket	8.7%

* In this question, the farmer was asked to indicate up to three most important sale channels used

Furthermore, the participating farms can be grouped based on their production orientation (PO) as in Table 6, by multiplying the crop area provided by the survey by the Standard Output (SO) coefficients for each crop in the considered countries, which is provided by Eurostat. This way we could test the difference in organic seed use among farms not just based on farm size or individual crop area but take into account the economic value of each crop as well.

Table 6. Production orientation of the surveyed farms (N=839)

Production orientation	Frequency (%)
Arable	39%
Vegetables	33%
Fruit	19%
Forage/livestock	9%

The average time since conversion to organic farming indicated by the participating farmers was 12.3 years.

3.3 Organic purchased and farm-saved seed use

Although the objective of the survey was to identify the factors affecting the use of organic seed and farmers' attitudes, some questions were also about the amount of organic seed used. In this section a rough estimate of use of organic seed on by the participating farmers is presented with the breakdown between purchased and farm-saved seed.



In this Deliverable the same approach used by Solfanelli et al (2019) was followed. The approach used to estimate the organic seed use is presented in [Box 1](#) below.

Box 1. Method used to estimate the organic seed use

In the survey farmers were asked to indicate the average percentage of organic seed used in the past year for each organic crop sown. This percentage was used to estimate the average percentage of organic seed use for each crop and European macro area. Farmers were also asked to state if the seeds were *predominantly* purchased from external suppliers or produced on the farm (farm-saved). This information was clearly fuzzy in nature, since *predominantly* could refer to any percentage within the range 51% to 100%. Therefore, in attributing the organic seed use to either the purchased or farm-saved bundle, the fuzziness of the concept *predominantly* was explicitly taken into account.

To have a crisp mapping of the fuzzy concept we used an approach that had already been used in Solfanelli et al (2019).

Three discrete thresholds were used: the minimum level for the concept to be true (51%), the median (75%) and the maximum (100%, corresponding to complete truth). In the 100% threshold scenario, if a farmer declared to predominantly use farm-saved seeds and at the same time indicated that the percentage of organic seeds used on-farm for a specific crop was 80%, the assumption modelled was that all 80% of the organic seeds used were indeed farm-saved. Equally, if a farmer declared to predominantly use purchased seed and at the same time indicated that the percentage of organic seed used on-farm for a specific crop was 80%, the assumption was that all 80% of the seeds were purchased and none farm-saved. However, in a 51% scenario, when the farmer declared a predominant use of farm-saved seeds at the same time revealing an 80% on-farm use of organic seeds for a specific crop, the model assumed that only 40.8% (51% of 80%) of the seeds used were organic farm-saved, while the remaining 39.2% (41% of 80%) were purchased. With this method, a minimum, median and maximum value of purchased organic seeds was estimated.

4 Results

4.1 Farm/farmer characteristics and use of organic seed

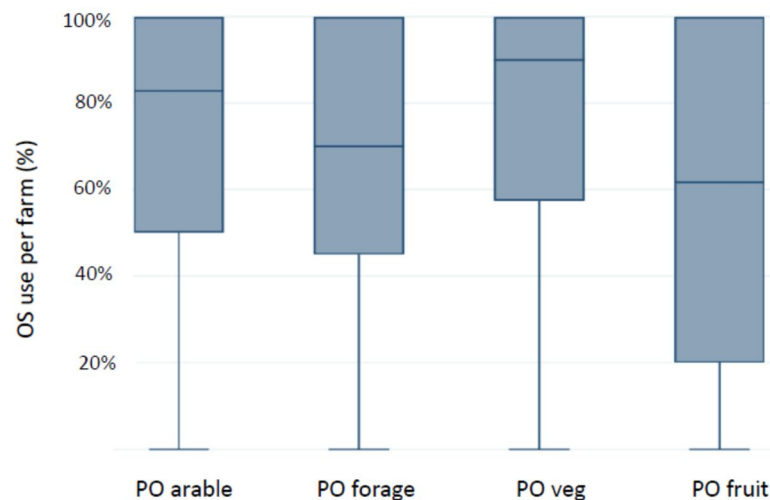
Statistical analysis was performed to test whether organic seed use by the surveyed farmers differs based on certain farm and farmer characteristics. Non-parametric tests were employed as the average organic seed use per farm shows no normal distribution. The tests are performed on 777 farms who responded to the question on current use of organic seed on the farm.

- **Farm size:** Spearman correlation test indicates a negative correlation between organic seed use and farm size. The correlation is significant ($p = 0$), although is very weak with a Spearman coefficient $r_s = -0.18$



- *Training in organic farming over the last ten years:* Wilcoxon-Mann Whitney test was used to test whether the difference in organic seed use between farmers who did or did not attend any training course in organic farming over the last ten years is significant. The result suggests that there is no statistically significant difference between the two groups ($p = 0.7230$).
- *Farmer age:* Spearman correlation test indicates a weak but significant positive correlation between the farmer’s age and use of organic seed. (Spearman coefficient $r_s = 0.10$; $p = 0.0034$).
- *Sex:* The result of the Wilcoxon-Mann Whitney test indicates that there is no statistically significant difference between females and males in terms of organic seed use ($p = 0.79$).
- *Time since conversion:* Spearman correlation test suggests that the correlation between time since conversion and organic seed use (Spearman coefficient $r_s = 0.0275$) is not significant ($p = 0.4469$).
- *Production orientation:* Figure 2 below shows that the highest share of organic seed use per farm is on farms with the vegetable -production orientation, whereas the lowest is with the forage production-oriented farms. Kruskal Wallis test with Bonferroni adjustment was performed to test whether the difference in organic seed use between farms with different production orientations (PO) is significantly different from a statistical point of view. Organic seed use in fruit-oriented farms resulted to be significantly lower than in arable and forage farms.

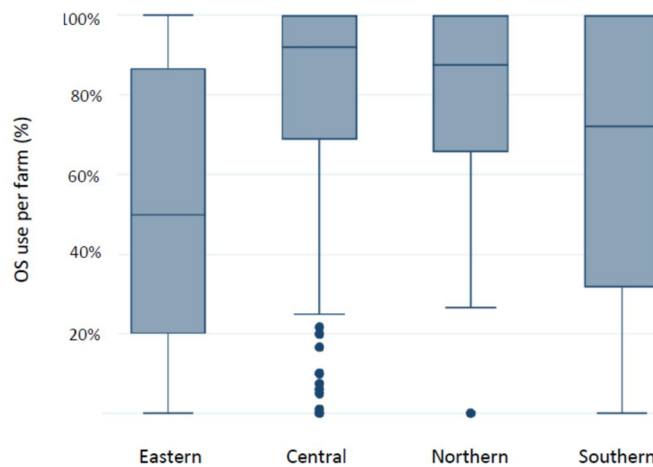
Figure 2. Distribution of organic seed (OS) use per farm (%) by Production Orientation (PO)



- *European region:* Figure 3 shows that the highest share of organic seed use is with farms in Central Europe, whereas the lowest shares are in the Eastern and Southern countries. Kruskal Wallis test with Bonferroni adjustment was used to test whether the difference in organic seed use between farms located in different geographical areas in Europe is significantly different. The test shows that farms in Northern and Central Europe have significantly higher use of organic seed than in Southern Europe, which in turn has significantly higher organic seed use than Eastern Europe.



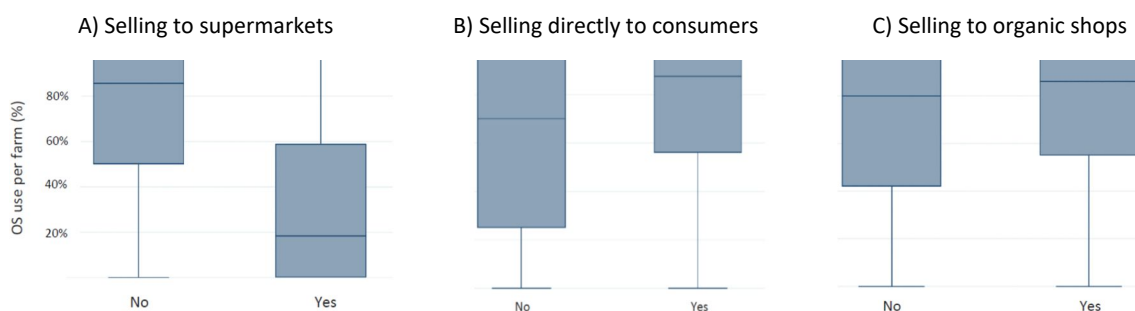
Figure 3. Distribution of organic seed (OS) use per farm (%) by European region



- **Marketing channel:** Wilcoxon-Mann Whitney tests were performed to see if the organic seed use significantly differs between farms according to the use of a specific marketing channel among the three most important channels selected by the respondents.

The results indicate that the difference in organic seed use is significant ($p < 0.05$) between the farms selling and those not selling directly to consumers, between the farms who sell and those who do not sell to organic shops, between the farms selling and those not selling to supermarkets. No significant difference was found in the other groups, i.e. farms selling/not selling to processors or traders, and farms selling/not selling their products to cooperatives or producer groups (Figure 4).

Figure 4. Distribution of OS use of farms selling and not selling to supermarkets (A), directly to consumers (B) and selling to organic shop (C)



4.2 Attitudinal aspects

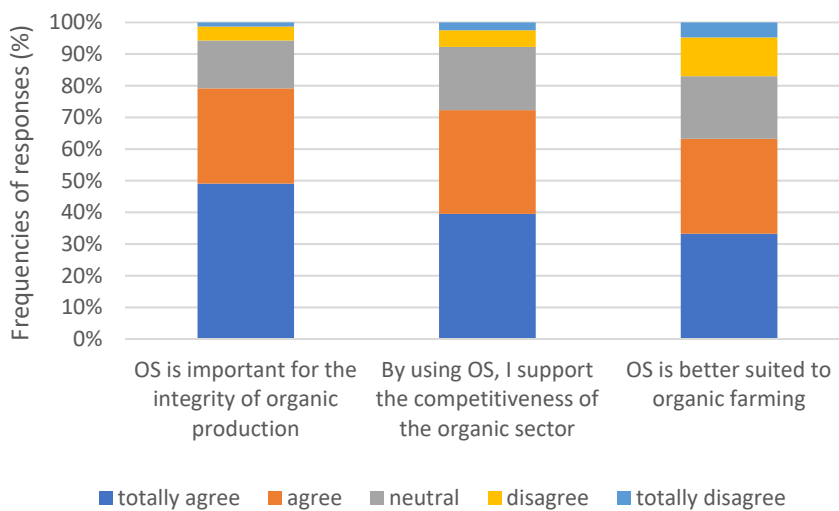
After asking some questions on the farm and farmer characteristics, the survey included a block of attitudinal statements using a five-points Likert scale.



The following figures (Figures 5 to 8) below illustrate the results of this assessment as frequencies in percentages of ‘strongly agree’, ‘agree’, ‘neutral’, ‘disagree’ and ‘strongly disagree’ responses per statement. The first three charts are presented in a way that each of them represents a grouping of statements in acceptance measures that we name respectively ‘perceived usefulness’ (PU), ‘facilitating conditions’ (FC) and ‘subjective norms’ (SN) ².

Figure 5 suggests that most respondents ‘strongly agree’ or ‘agree’ with the statements relating to the perceived usefulness of using organic seed, in particular with ‘Organic seed is important for the integrity of organic production’ and ‘By using organic seed I support the competitiveness of the organic sector’.

Figure 5. Assessment of ‘perceived usefulness’ of organic seed (OS) (N=839)



As shown in Figure 6, less pronounced is the agreement with the statements relating to the facilitating conditions for using organic seed: the percentage of ‘strongly agree’ with the four items is below 20%.

For this block of statements, Kruskal Wallis tests with Bonferroni adjustments were performed for different crops sectors and countries as the conditions might change based on these two factors.

Particularly negative is the assessment of the statement ‘Organic seed is easily available for the varieties that I want to use’, with 33% of ‘disagree’ and 15% ‘strongly disagree’. This is true regardless of the crop sector, whereas the Kruskal Wallis test shows that the disagreement is significantly less pronounced in some countries, in particular Denmark, France, Germany, the Netherlands and Switzerland. These are also the countries where most of organic seed production in Europe takes place (Orsini et al 2019).

As for price, the level of agreement with the statement ‘Price for organic seed is accessible’ is below 30% of total responses. The statistical test shows that the agreement with the statement is however

² The Cronbach alpha for the three latent constructs indicates acceptable levels of internal consistency as they are above the cut-off value 0.60 (Sekaran and Bougie 2013): α (PU) = 0.78; α (SN) = 0.62; α (FC) = 0.65

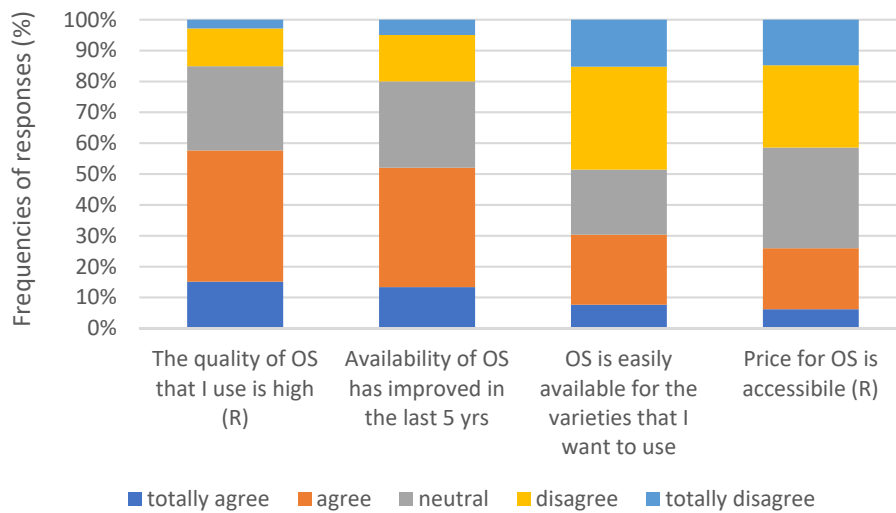


significantly higher for farmers in Central and Northern Europe than in Eastern and Southern Europe. Again, no statistically significant difference was found between the farms belonging to different production orientation groups.

Overall about 50% of the farmers either ‘agree’ or ‘strongly agree’ with the statement ‘Availability of organic seed has improved in the last five years’. The agreement with this statement is significantly higher in Central European countries than in other countries. No statistical difference is found between farm sectors.

The best rate among the four FC items is with the statement on seed quality, with more than 50% of respondents who either ‘strongly agree’ or ‘agree’ with the statement ‘The quality of organic seed that I use in my farm is high’. For this statement also some regional and crop-type specific differences were found. The rating is significantly higher in the Centre and North of Europe. The only significant difference between farming types was found between vegetable and fruit farms, with a lower agreement with the latter.

Figure 6. Assessment of ‘facilitating conditions’ of using organic seed (OS) (N=839)



As for the items relating to ‘subjective norms’, about 60% of respondents either ‘strongly agree’ or ‘disagree’ with the statement that their buyer would expect them to use organic seed, and that they are encouraged by their certifier to use organic seed. Lower and overall more neutral is the agreement with the statement that other farmers play a role in persuading them to use organic seed (Figure 7).



Figure 7. Assessment of 'subjective norms' relating to organic seed (OS) use (N=839)

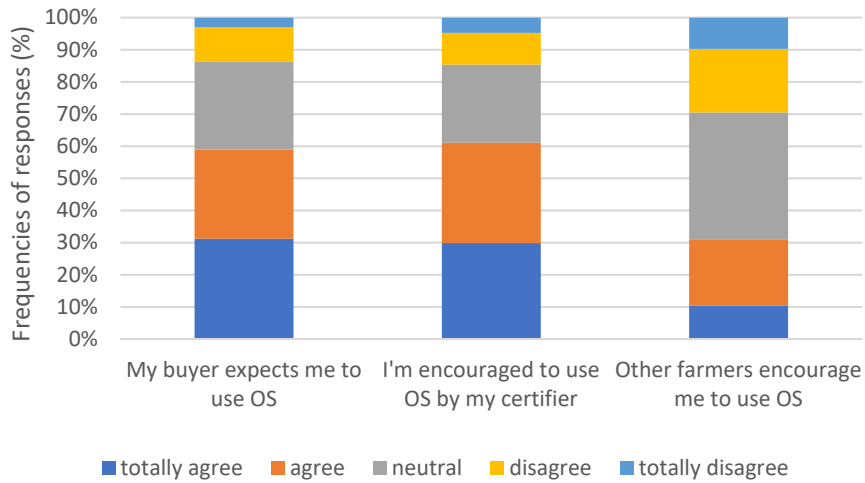
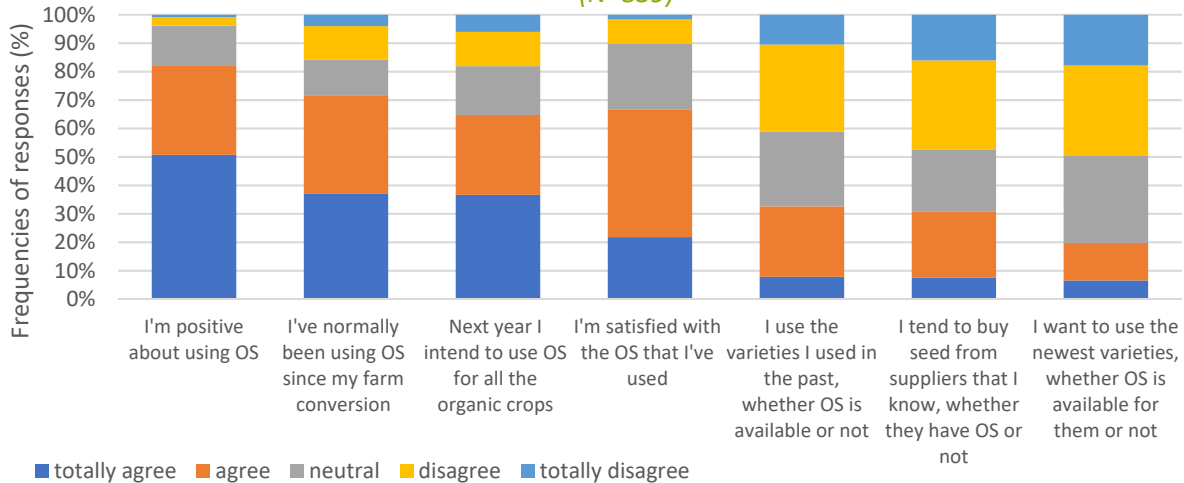


Figure 8 below shows the responses to other statements, each representing a different construct or item. The attitude, the intention and the level of satisfaction with organic seed appear to be overall positive. On the other hand, there appears not to be a strong level of agreement with the statements relating to the choice of the varieties and seed supplier, as the chart below suggests.

Figure 8. Assessments of other statements relating to organic seed (OS) (N=839)



4.3 Priority action to boost organic seed use as assessed by the surveyed farmers

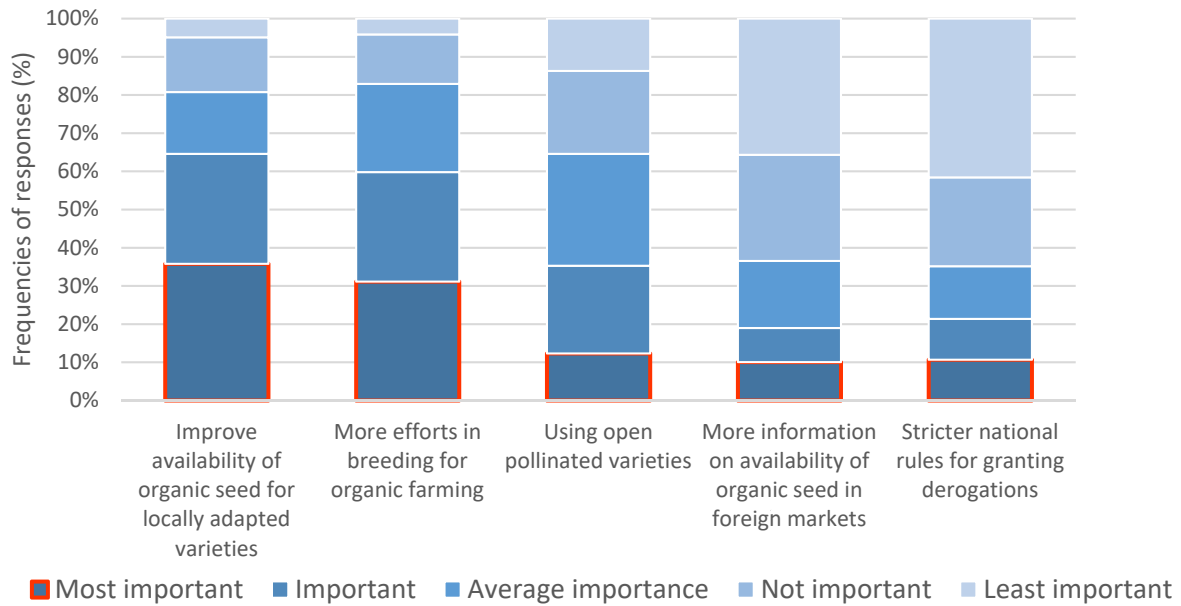
One survey question was about ranking some actions that are supposed to boost organic seed use. The actions that farmers were asked to rank from the 'most important' to the 'least important' are indicated in Figure 9 below together with the overall results.



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Figure 9. Ranked actions to boost organic seed use (N=804)



The farmers ranked as the two most important actions ‘*Improve availability of organic seed for locally adapted varieties*’ and ‘*More effort to breeding programmes for organic farming*’. ‘*More information on availability of organic seed in foreign markets*’ and ‘*Stricter national rules for granting derogations*’ are the least preferred actions.

Similar patterns were found for farms belonging to different economic-production orientation groups and geographical areas.

4.4 Issues encountered with organic seed (germination, pests and disease)

A relatively small share of farmers indicated that they have come across more germination (Figure 10) and pests and disease (Figure 11) problems with organic than untreated conventional seed. This is consistent with the rated attitudinal statements on satisfaction and seed quality reported above. It is worth noting that a relatively large share of farmers chose ‘*It’s difficult to judge*’, meaning that it is often impossible to directly relate germination and pest and disease problems with the seed being organic.

Farmers who replied ‘Yes’ to the questions above, were also asked to indicate for which crops they had experienced issues with organic seed quality. Some respondents identified more germination problems with organic than untreated conventional seed for carrot (15% of the responses gathered for 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 pest and disease issues – the highest shares were 9% with soft wheat, 6% with maize and olive.



Figure 10. Higher germination problems encountered with organic than untreated conventional seed

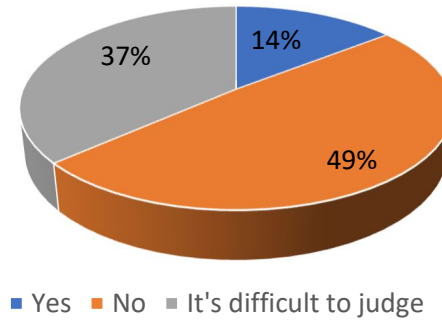
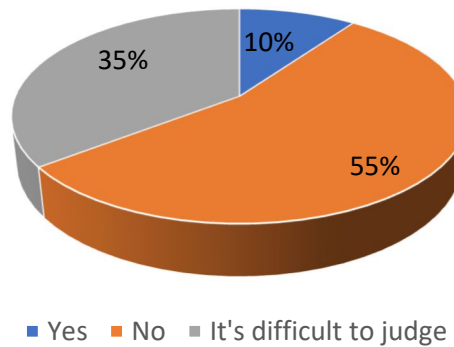


Figure 11. Higher pest and disease problems encountered with organic than untreated conventional seed



4.5 Seed source and information source

Differences between the study countries emerge in terms of seed supply source (Figure 12). Among the surveyed farms, there is a large use of farm-saved seed as main organic seed source in Eastern and Southern countries, especially in Poland (57% of respondents), Greece (more than 55%), Portugal (37%), Spain (36%), Hungary (33%), Latvia (27%), France (27%) and Italy (23%). The situation is very different in Northern and Central European countries, where the use of farm-saved seed in the participating farms is very low and seed are mostly bought from seed companies.



Figure 12. Main seed supplier by country (N=790)

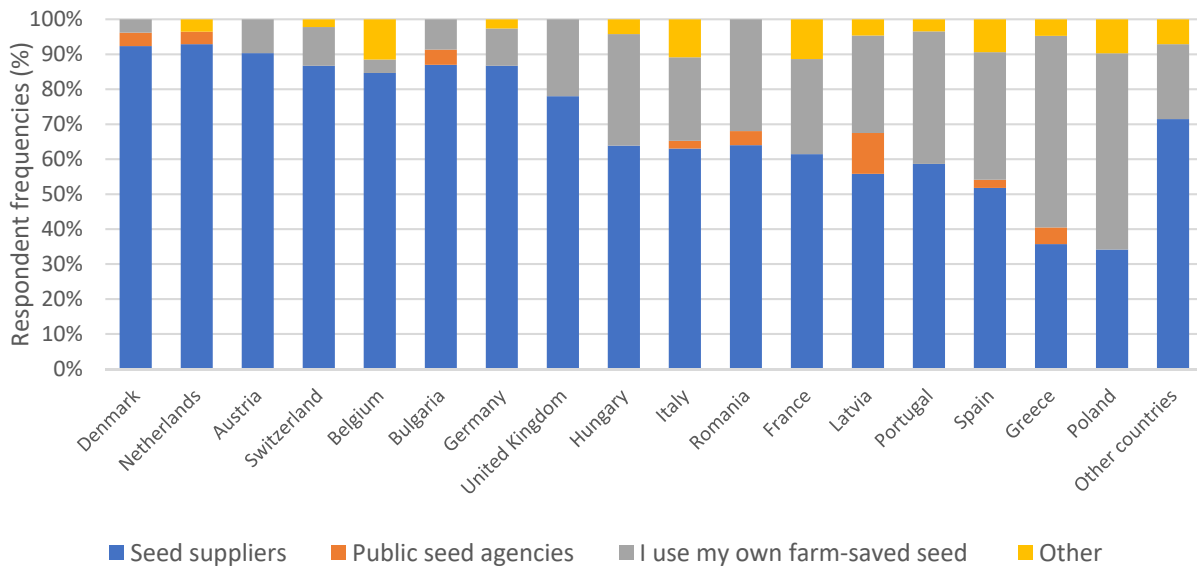


Table 7 below indicates that seed companies represent the main useful information source for farmers about seed, followed by other farmers, farmers’ knowledge and past experience.

Table 7. The main useful information source about seed used by farmers* (N=790)

Main seed information sources used by farmers	Responses (%)
Seed companies	57%
Other farmers	44%
I rely on my past experience and knowledge	41%
National organic seed database	36%
Research centres	22%
Private advisory services	21%
Public advisory services	19%
Social media	11%
Other	5%

* In this question, the farmer was asked to indicate up to three main information source

There appears to be also differences between countries in relation to the use of the organic seed database as shown in Figure 13. In Austria almost 90% of respondents declared they have used the database more than once during the last years, against the 12% in Greece. No specific pattern in relation to the countries or European regions was found.



Figure 13. Use of organic seed database by country (N=763)

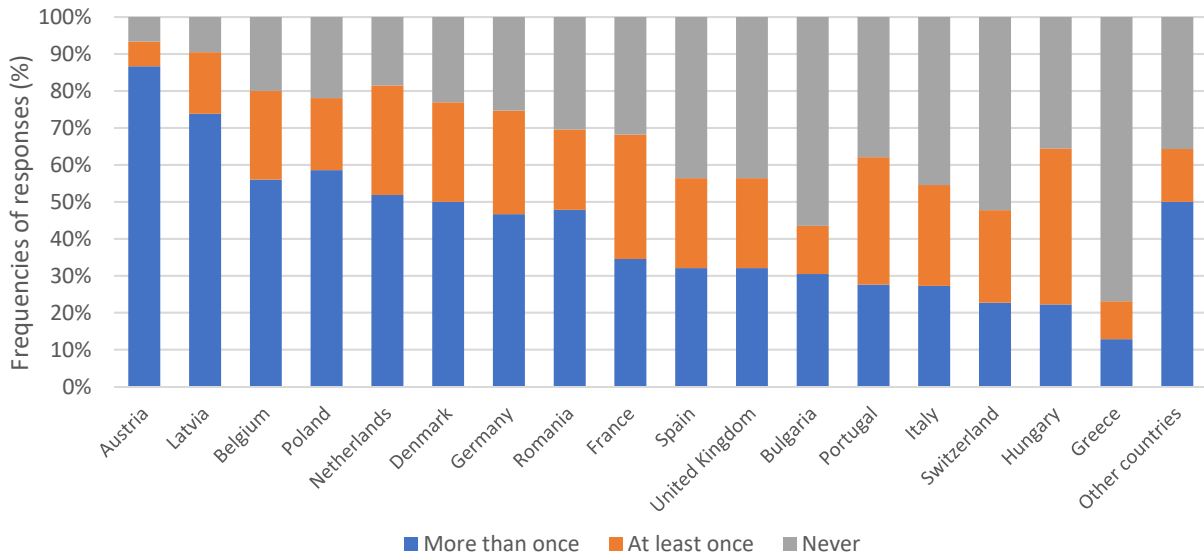
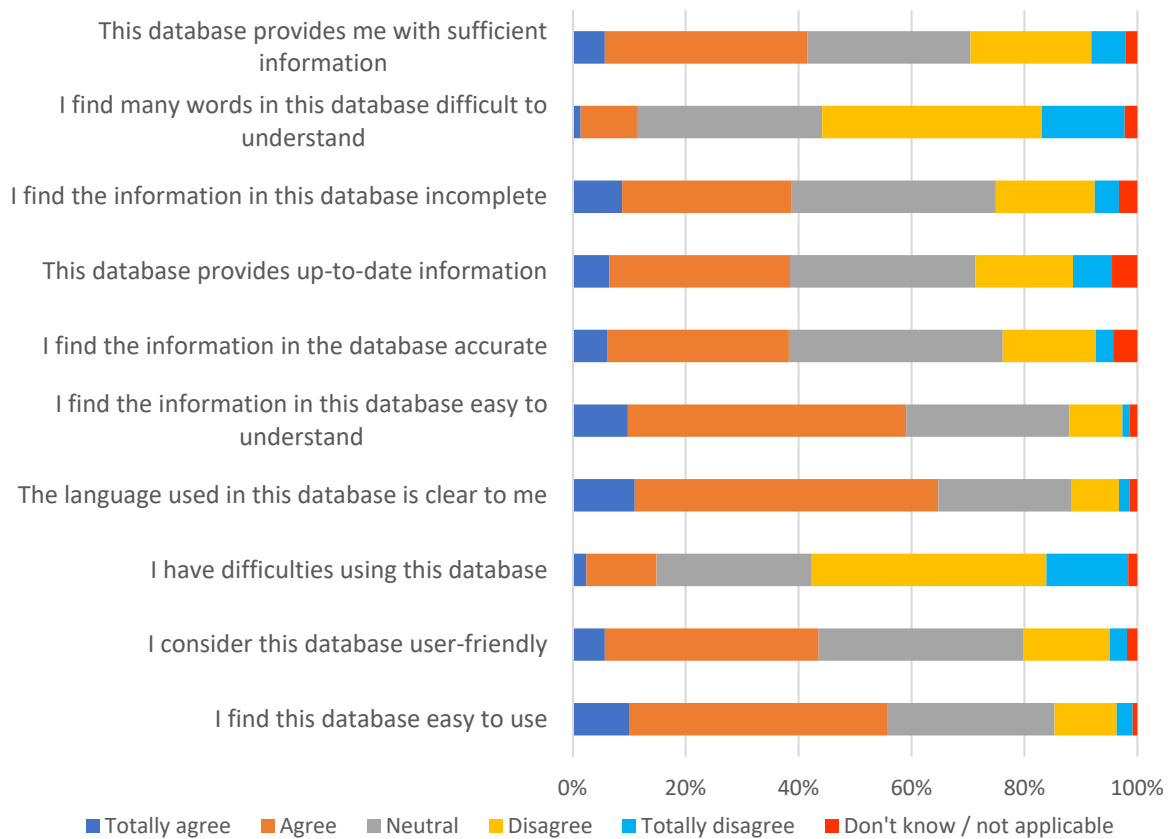


Figure 14. Distribution of database usability scored by item (N=491)*
 *(question asked only to those who used the database in the last year)



The outcomes of the specific questions relating to the database are presented in Figure 14.



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The statements relating to ease of use of the database and clarity of information provided received large share of ‘agree’ and ‘strongly agree’. Lower rate were given to the statements about accuracy, completeness and the database proving up-to-date information.

4.6 Breeding for organic farming conditions

According to most respondents, the need for breeding for organic farming condition is ‘very high’ or ‘high’ for all the arable and vegetable crops considered. The situation is slightly different for forage crops, for which ‘average’ is the most frequent response, although still many farmers believe there is a need for breeding for organic. It is worth noting that in the case of forage crops and fruits, we have the highest rates of respondents who selected the option ‘I don’t know’ (up to 32% and 41% for Italian ryegrass and red fescue, respectively). For the forage case, a possible explanation can be that farmers might not be fully aware of the variety characteristics in the forage mixture. Results are detailed in Table 8 below.

Table 8. Need for breeding for organic farming conditions per crop, frequencies (%) of responses by crop (N= 795)

	Crop	Very high	High	Average	Low	Very low	I don't know
Arable	Barley	27%	38%	26%	2%	0%	7%
	Grain maize	33%	43%	15%	4%	2%	3%
	Oats	22%	40%	26%	5%	1%	6%
	Soft wheat	34%	43%	16%	2%	1%	4%
	Durum wheat	34%	39%	15%	3%	0%	10%
	Soybeans	29%	50%	15%	2%	0%	5%
	Lupine	34%	38%	16%	9%	0%	3%
	Pea	30%	34%	23%	6%	2%	5%
Forage	Alfalfa	14%	23%	34%	17%	4%	8%
	White clover	11%	25%	33%	16%	3%	11%
	Red clover	14%	27%	28%	15%	4%	12%
	Perennial ryegrass	18%	23%	30%	11%	6%	13%
	Italian ryegrass	10%	20%	24%	12%	2%	32%
	Red fescue	12%	12%	24%	12%	0%	41%
	Tall fescue	17%	22%	28%	6%	6%	22%
Vegetables	Potato	41%	36%	17%	2%	1%	3%
	Cauliflower	38%	33%	22%	5%	0%	2%
	Carrot	26%	39%	28%	3%	1%	4%
	Onion	27%	37%	27%	3%	1%	4%
	Tomato	32%	38%	20%	6%	0%	4%
Fruit	Apple	31%	38%	19%	6%	4%	2%
	Grape	45%	26%	12%	5%	0%	12%
	Olive	28%	35%	13%	7%	3%	13%
	Strawberry	25%	42%	22%	3%	1%	7%



4.7 Organic purchased and farm-saved seed use

Although the objective of the survey was to identify the factors affecting the use of organic seed and farmers' attitudes, some questions were also about the amount of organic seed used. In this section a rough estimate of use of organic seed on by the participating farmers is presented with the breakdown between purchased and farm-saved seed.

From [Table 9](#) below we can see that the highest share organic seed use (especially purchased) is in Central and Northern Europe. The highest share of organic seed use is for vegetable and arable crops, followed by forage and fruit. Organic farm-saved seed is especially used in Southern and Eastern countries. Also, the largest share of farm-saved seed is for arable crops.

However, caution needs to be taken when looking at the percentages in [Table 9](#) as they are all based on self-declaration of farmers. They represent the rates of organic seed being used by the 777 farmers who participated in the survey, and therefore they cannot be considered representative of the entire population of farmers in Europe. This is especially true given the sampling approach used (convenience sample), the potential effect of socially desirable answers given and that it is possible that the most committed farmers completed the survey. Also the percentage of farmers delivering to supermarkets was only 9%, whilst supermarkets hold much higher organic market share (Willer and Lernoud 2019). In contrast, farmers involved in direct sales (56%) are overrepresented in our survey. Overestimation of the percentage of organic farm saved seed especially for vegetable species have been confirmed by expert interviews (Messmer pers. Comm.). Validation of the indicated percentages of organic seed use by certification bodies, advisors and seed companies is still ongoing as part of the status quo analysis of organic seed production and use of WP1.



Table 9. Organic purchased and farm-saved seed use by crop and European geographical area (N=777)

Crop species	Eastern Europe			Central Europe			Northern Europe			Southern Europe		
	% organic farm saved seed	% organic seed purchased	% untreated seed	% organic farm saved seed	% organic seed purchased	% untreated seed	% organic farm saved seed	% organic seed purchased	% untreated seed	% organic farm saved seed	% organic seed purchased	% untreated seed
Barley (<i>Hordeum vulgare</i>)	16.56	45.56	37.88	11.80	76.47	11.73	16.16	66.11	17.73	25.81	38.16	36.03
Wheat (<i>Triticum</i> spp.)	32.22	35.64	32.14	15.52	73.71	10.78	12.27	65.23	22.50	20.32	49.55	30.13
Grain maize (<i>Zea mays</i>)	26.85	31.35	41.80	15.48	70.37	14.16	-	33.33	66.67	25.42	40.69	33.89
Oats (<i>Avena</i> spp.)	29.12	36.18	34.71	11.93	77.87	10.19	21.75	63.74	14.51	32.39	41.25	26.36
Soybeans (<i>Glycine max</i>)	14.42	21.35	64.23	9.64	75.64	14.71	-	50.00	50.00	25.00	58.33	16.67
Lupine (<i>Lupinus</i> spp.)	17.39	42.16	40.45	37.50	40.28	22.22	-	55.00	45.00	15.00	41.00	44.00
Peas (<i>Pisum sativum</i>)	26.64	52.04	21.32	10.46	64.33	25.21	7.08	52.92	40.00	29.44	47.31	23.25
Alfalfa (<i>Medicago sativa</i>)	10.10	32.34	57.56	15.11	67.29	17.61	27.50	17.50	55.00	17.98	51.35	30.68
Forages mix	-	38.75	61.25	8.06	72.31	19.63	9.11	57.55	33.33	3.00	41.00	56.00
Ryegrass (<i>Lolium</i> spp.)	24.00	18.00	58.00	2.88	67.50	29.62	3.21	80.36	16.43	15.00	9.00	76.00
Clover (<i>Trifolium</i> spp.)	22.50	28.65	48.85	8.50	64.83	26.67	7.69	63.44	28.88	-	66.67	33.33
Fescue (<i>Festuca</i> spp.)	-	50.00	50.00	-	50.00	50.00	-	55.00	45.00	-	10.00	90.00
Potatoes (<i>Solanum tuberosum</i>)	29.14	37.71	33.14	10.17	76.26	13.57	18.47	59.26	22.27	25.23	60.23	14.55
Carrots (<i>Daucus carota</i>)	19.13	41.38	39.50	4.86	74.31	20.83	9.17	61.11	29.72	25.92	53.64	20.44
Cauliflower (<i>Brassica oleracea</i>)	-	68.75	31.25	6.19	79.54	14.27	-	55.00	45.00	16.92	64.87	18.21
Tomatoes (<i>Solanum lyc.</i>)	20.45	58.64	20.91	9.75	80.15	10.10	16.41	62.34	21.25	30.07	56.54	13.39
Onions (<i>Allium cepa</i>)	18.00	23.00	59.00	6.52	83.68	9.81	3.95	52.63	43.42	25.71	52.61	21.68
Strawberries (<i>Fragaria</i>)	7.50	35.50	57.00	7.03	82.81	10.16	18.75	60.42	20.83	12.56	31.69	55.75
Apples (<i>Malus domestica</i>)	20.25	33.98	45.77	7.69	59.23	33.08	13.64	46.36	40.00	21.43	19.05	59.52
Grapes (<i>Vitis vinifera</i>)	10.71	15.00	74.29	-	29.00	71.00	-	-	-	11.14	27.65	61.21
Olives (<i>Olea europaea</i>)	-	-	100.00	75.00	25.00	-	-	-	-	7.97	39.39	52.63

5 Conclusions

This report summarises the results of the survey conducted with a sample of 839 organic farmers (of which 763 farmers completed the whole survey) in 17 European countries. The results give interesting insights into a number of issues related to organic seed use, and the following conclusions can be drawn:

- The main critical issue reported by the surveyed farmers is the availability of organic seed for the varieties they need. This is true regardless of the crop sector, whereas it is significantly less pronounced in some countries, namely Denmark, France, Germany, the Netherlands and Switzerland. These are also the countries where most organic seed production in Europe takes place as reported in Orsini et al (2019).

On the other hand and in line with other studies (Le Doaré 2017; Hubbard 2016; Rey et al 2013), the quality of seed does not seem to be a major issue. In fact, most surveyed farmers are satisfied with the quality of the organic seed used. Nevertheless, some report germination, pests and disease problems but many respondents stated that they were unable to relate them to the seed being organic.

- The point above is partly complemented by the outcomes of the ranking exercise where farmers ranked *'Improve availability of organic seed for locally adapted varieties'* as the most important action to boost use of organic seed. In the same question, the proposed action *'Provide more information on the availability of organic seed in foreign markets (in and out Europe)'* was ranked low. This has to be considered for the future development of the organic seed sector, as the possibility to use organic seed with success seems to depend, from a farmers' point of view, on the availability of the varieties that suitable to the local conditions and they wish to grow.
- The farmers claim a need for breeding for organic farming conditions, which would also encourage the use of organic seed. This is especially true for the arable, vegetable and fruit sectors in all the study countries, whereas it seems to be less pronounced for the forage sector.
- Organic seed use was significantly affected by two main farm features: (1) the geographical European region where the farm is situated, and (2) the type of marketing channel(s) used. As for geographical region, the farms in Central and Northern Europe have a significantly higher rate of use of organic seed than in Eastern and Southern Europe. As for the marketing channel, in line with the studies conducted in France by Le Doaré (2017) and Rey et (2013), farms using direct marketing and organic shops as marketing channels have a significantly higher rate of organic seed use than those who do not use these two channels, whereas, on the contrary, farms selling their products to supermarkets show a significantly lower organic seed use rate.
- It is worth pointing out that there are also differences between countries in terms of source of organic seed. The highest share of farm-saved seed is found in some Eastern and Mediterranean countries, in particular Poland, Greece, Portugal, Latvia, France, Spain and Italy. This is quite consistent with the limited literature on the subject, i.e. Rey et al (2013) and Bocci et al (2010) who found that in France and Italy the percentage of farm saved seed can reach over 40% of the organic seed used.

- Demographic characteristics such as age, sex, attendance at training courses in organic agriculture and time since conversion do not have a significant role in determining the use of organic seed.

These results cannot be generalised to the population of organic farmers in Europe as the survey is based on a convenience sample. Despite this limitation, however, to the best of our knowledge, this is the first study investigating organic seed use from the farmers' point of view in several European countries and take into account all crop sectors.

The main current challenge seems to be the mismatch between organic seed availability and the requirement of suitable varieties. The harmonisation of the implementing rules and the organic seed market in Europe certainly remains the ultimate goal, but the first condition is to ensure availability and adequacy at local/national scale.



LIVESEED is funded by the European Union's Horizon 2020 under grant agreement No 727230 and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 17.00090.



References

- Bocci, R., Ortolani, L., & Micheloni, C. (2012). The seed sources of organic farmers in Italy. Preconference "Seed". Preconference paper 'Seed', Florence.
- Despotović, J., Rodić, V., & Caracciolo, F. (2019). Factors affecting farmers' adoption of integrated pest management in Serbia: An application of the theory of planned behavior. *Journal of Cleaner Production*, 228, 1196-1205.
- Döring, T. F., Bocci, R., Hitchings, R., Howlett, S., van Bueren, E. T. L., Pautasso, M., & Wilbois, K. P. (2012). The organic seed regulations framework in Europe—current status and recommendations for future development. *Organic agriculture*, 2(3-4), 173-183.
- Eurostat, "Organic farming", available at <https://ec.europa.eu/eurostat/data/database> (Accessed 24/08/2019)
- Eurostat, "Standard output coefficient", available at https://ec.europa.eu/eurostat/c/portal/layout?p_l_id=6764354&p_v_l_s_g_id=0 (Accessed 24/08/2019)
- Hubbard, K. & Zystro, J. (2016). State of Organic Seed, 2016. Organic Seed Alliance, US.
- Krumpal, I. (2013). Determinants of social desirability bias in sensitive surveys: a literature review. *Quality & Quantity*, 47(4), 2025-2047.
- Le Doaré, N. (2017). Les producteurs de légumes bio bretons face à leurs semences et variétés: Quelles pratiques, quels déterminants? Master thesis, AgroParisTech, Université Paris Saclay.
- Levert, M. (2014). The market for organic and ecological seed in Canada. Canada Organic Trade Association, Canada.
- Merfield, C. N. (2012). Problems and progress for organic seed production. *Agronomy New Zealand*, 42, 89-102.
- Miller, R. G. Jr. (1991). Simultaneous Statistical Inference. New York: Springer-Verlag.
- Orsini, S., Padel, S., Solfanelli, F., Ozturk, E., Winter, E., & Costanzo, A. (2019). Report on additional data collection for case studies. LIVESEED report (unpublished)
- Renaud, E. N., Bueren, E. T. L. V., & Jiggins, J. (2016). The meta-governance of organic seed regulation in the USA, European Union and Mexico. *International Journal of Agricultural Resources, Governance and Ecology*, 12(3), 262-291.
- Rey, F., Sinoir, N., Mazollier, C., & Chable, V. (2013). Organic seeds and plant breeding: stakeholders' uses and expectations – French inputs on vegetables. *International Symposium on Organic Greenhouse Horticulture 1041* (pp. 133-139).
- Sekaran, U. & Bougie, R. (2013). Research Methods for Business: A Skill-Building Approach. 6th Edition, Wiley, New York.
- Solfanelli, F., Ozturk, E., Zanolli, R., & Schäfer, F. (2019). Report on current production and use of organic seed and synopsis of database. LIVESEED report (unpublished).
- Van Bueren, E. L., Struik, P. C., & Jacobsen, E. (2003). Organic propagation of seed and planting material: an overview of problems and challenges for research. *NJAS-Wageningen Journal of Life Sciences*, 51(3), 263-277.
- Willer, H., & Lernoud, J. (2019). The world of organic agriculture 2019: statistics and emerging trends. Research Institute of Organic Agriculture (FiBL), Frick and IFOAM – Organics International, Bonn.



Appendix 1 – Survey questions

1. Please scroll down the list below and select the main crops that are grown at your farm and are certified organic (select no more than 5 crops maximum)

- | | | |
|--|---|---|
| <input type="checkbox"/> Barley (<i>Hordeum vulgare</i>) | <input type="checkbox"/> Alfalfa (<i>Medicago sativa</i>) | <input type="checkbox"/> Potatoes (<i>Solanum tuberosum</i>) |
| <input type="checkbox"/> Grain maize (<i>Zea mays</i>) | <input type="checkbox"/> Forage mixture | <input type="checkbox"/> Cauliflower (<i>Brassica oleracea var. botrytis</i>) |
| <input type="checkbox"/> Oats (<i>Avena sativa</i>) | | <input type="checkbox"/> Carrots (<i>Daucus carota</i>) |
| <input type="checkbox"/> Soft wheat (<i>Triticum aestivum</i>) | | <input type="checkbox"/> Onion (<i>Allium cepa</i>) |
| <input type="checkbox"/> Durum wheat (<i>Triticum durum</i>) | | <input type="checkbox"/> Tomatoes (<i>Solanum lycopersicum</i>) |
| <input type="checkbox"/> Soybeans (<i>Glycine max</i>) | | <input type="checkbox"/> Strawberries (<i>Fragaria x ananassa</i>) |
| <input type="checkbox"/> Lupine (<i>Lupinus spp.</i>) | | <input type="checkbox"/> Apples (<i>Malus domestica</i>) |
| <input type="checkbox"/> Pea (<i>Pisum sativum</i>) | | <input type="checkbox"/> Grapes (<i>Vitis vinifera</i>) |
| | | <input type="checkbox"/> Olives (<i>Olea europea</i>) |
| | | <input type="checkbox"/> None of the above crop |

2. Please indicate the three most important crops in the organic forage mixture grown at your farm

- White clover (*Trifolium repens*)
- Red clover (*Trifolium pratense*)
- Perennial ryegrass (*Lolium perenne*)
- Italian ryegrass (*Lolium multiflorum*)
- Red fescue (*Festuca rubra commutata*)
- Tall fescue (*Festuca arundinacea*)
- Chicory (*Chicorium intybus*)
- Alfalfa (*Medicago sativa*)
- Other. Please specify _____



3. Please select the country where your farm is based

<input type="checkbox"/> Austria	<input type="checkbox"/> Latvia
<input type="checkbox"/> Belgium	<input type="checkbox"/> Lithuania
<input type="checkbox"/> Bulgaria	<input type="checkbox"/> Luxembourg
<input type="checkbox"/> Croatia	<input type="checkbox"/> Malta
<input type="checkbox"/> Republic of Cyprus	<input type="checkbox"/> Netherland
<input type="checkbox"/> Czech Republic	<input type="checkbox"/> Poland
<input type="checkbox"/> Denmark	<input type="checkbox"/> Portugal
<input type="checkbox"/> Estonia	<input type="checkbox"/> Romania
<input type="checkbox"/> Finland	<input type="checkbox"/> Slovakia
<input type="checkbox"/> France	<input type="checkbox"/> Slovenia
<input type="checkbox"/> Germany	<input type="checkbox"/> Spain
<input type="checkbox"/> Greece	<input type="checkbox"/> Sweden
<input type="checkbox"/> Hungary	<input type="checkbox"/> Switzerland
<input type="checkbox"/> Ireland	<input type="checkbox"/> United Kingdom
<input type="checkbox"/> Italy	

4. Please indicate your gender

- Female
- Male

5. Please indicate the year you were born

6. What is your role in the farm? (you can select more than one option)

- Farm owner
- Farm tenant
- Far manager
- Farm worker



7. Please indicate the approximate size of your farm size in hectares

8. How much of your farmland is certified organic in percentage?

9. In which year has your farm started being certified organic?

10. Have you attended any training course in organic agriculture in the last 10 years?

Yes

No

11. What is your education in farming?

Degree from Agricultural College or University

Agricultural apprenticeship

None

12. Is your farm currently certified by a private organic label, such as Demeter, Bioland, Naturland, etc.?

Yes

No

13. Where do you sell your organic farm products? (You can select up to the three most important selling channels)

Directly to consumers (such as purchase groups, box schemes, community supported agriculture, farm shops)

Cooperative/producer group

Processor/trader

Specialised organic retailers

Supermarkets

Other. Please specify_____



14. To what extent do you agree with the following statements?

Totally agree / agree / neutral / disagree / totally disagree:

	Totally agree	Agree	Neutral	Disagree	Totally disagree
Organic seed is better suited to organic farming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organic seed is an important part of maintaining the integrity of organic food production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am positive about using organic seed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I tend to use the varieties that I used in the past, whether organic seed is available for them or not	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Availability of organic seed has improved in the last five years	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Price for organic seed is prohibitive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organic seed is easily available for the varieties that I want to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am satisfied with the organic seed I have been using on my farm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am encouraged to use organic seed by my certifier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other organic farmers have encouraged me to use organic seed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I've normally been using organic seed since my farm was certified organic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My buyer would expect me to use organic seed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
By using organic seed, I support the competitiveness of the organic sector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The quality of organic seed that I've used on my farm is low	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I tend to buy seed from suppliers that I know, whether they have organic seed or not	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I want to use the newest varieties, whether organic seed is available for them or not	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Next year I intend to use organic seed for all the organic crops on my farm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



15. In your view, what are the most and least important actions to encourage the use of organic seed? Please rank the following actions using 1 for the most important and 5 for the least important

	More information on the availability of organic seed in foreign markets (in and out Europe)
	Using open pollinated varieties as alternative to F1 hybrid seed
	More effort in breeding programmes for organic farming
	Improve availability of organic seed for locally adapted varieties
	Stricter national rules for granting derogations

16. Where do you get useful information on organic seed? (You can select up to the three most important information source)

- Private advisory services
- Public advisory services
- Other farmers
- Social media
- Research centres
- Seed companies
- I largely rely on my past experience and knowledge
- National organic seed database
- Other

17. Where do you buy organic or untreated conventional seed? (please select only the main supplier)

- Seed companies/seed retailers
- Public seed agencies
- I use my own seed
- Other. Please specify _____

18. Have you experienced on your farm germination problems with organic seed?

- No
- It's difficult to judge
- Yes → If so, for which of the following crops?
 - Barley (*Hordeum vulgare*)
 - etc.



19. Have you experienced on your farm more pests and diseases problems with organic than untreated conventional seed?

- No
- It's difficult to judge
- Yes → If so, for which of the following crops?
 - Barley (*Hordeum vulgare*)
 - etc.

20. For the use of untreated conventional seed in forage mixtures, is there a requirement in your country to apply for individual derogations for each crop in the mixture?

- No, you don't need to ask for individual derogations as far as a certain amount of seed within the mixture is organic
- Yes
- I don't know

21. Please indicate the approximate percentage (0 and 100) of organic seed (or propagation material) that you used the last time that you sowed/planted your organic crops.

	Certified organic seed (0-100%)
Barley (<i>Hordeum vulgare</i>)	<input type="text"/>
etc..	<input type="text"/>

22. Please indicate the approximate land area in hectares of the following organic crops at your farm last year

	Hectares
Barley (<i>Hordeum vulgare</i>)	<input type="text"/>
...	<input type="text"/>



23. In your view, to what extent there is a need for breeding for organic farming conditions for the following crops?

	Very high	High	Average	Low	Very low	I don't know
Barley (<i>Hordeum vulgare</i>)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. In the last year, how often have you used the online organic seed database*?

*Each European country maintains an online database where varieties are listed for which organic seed are available (art. 48 Commission Regulation 889/2008)

- Never
- At least once
- More than once

25. The following statements relate to different aspects of the organic seed database. For each of the statements, please indicate to what extent you agree or disagree!



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	Totally agree	Agree	Neutral	Disagree	Totally disagree	Don't know / not applicable
I find this database easy to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I consider this database user-friendly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have difficulties using this database	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The language used in this database is clear to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I find the information in this database easy to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I find the information in this database accurate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This website provides up-to-date information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I find the information in this database incomplete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I find many words in this database difficult to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This database provides me with sufficient information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The survey has been completed. Thank you very much for your time!

