



# DIVINFOOD

Co-constructing interactive short and mid-tier food chains  
to value agrobiodiversity in healthy plant-based food

## Deliverable D1.1

*White paper for food chains actors for using  
agrobiodiversity, listing consumer expectations and  
aversions*

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## Summary

The Deliverable 1.1 “White paper for food chains actors for using agrobiodiversity, listing consumer expectations and aversions” is intended to guide innovation and research in the development of food chains valuing agrobiodiversity, with a special attention to neglected and underutilised crops (NUCs). It is addressed to the DIVINFOOD consortium, and to all value chain actors, development services, policy-makers, researchers and consumer-citizens concerned by the use of agrobiodiversity in food chains. It presents the methodology and the results of i) an online survey implemented in the 7 European countries of the DIVINFOOD project, in which citizen-consumers have been invited to judge different options to use cultivated biodiversity in food chains; ii) focus groups in specific regions in which a focus has been done on NUCs. Results are synthesised through recommendations for DIVINFOOD members, and for all concerned actors.

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## Introduction

Rising consumer demand for healthy plant-based food, with a local/regional identity<sup>1</sup>, is a key opportunity to preserve various plant varieties and species in food chains, and thus, reverse the agrobiodiversity (i.e. cultivated biodiversity) decline, which is also a growing concern for citizens<sup>2</sup>. Small-scale producers and processors have been using underutilised agrobiodiversity as a means to increase the nutritional value of classic products (e.g., use of ancient varieties of wheat to make bread) and have been proposing new nutritious products in short and mid-tier chains<sup>3</sup>. The DIVINFOOD European project<sup>4</sup> aims to develop these chains valuing agrobiodiversity, for and with consumers, by focusing on minor cereals and legumes whose use for human food in Europe is low. The EU Commission's Report on Agricultural Genetic Resources (European Commission 2013) highlighted the role of the consumer in safeguarding biodiversity. However, most studies reduce the consumer to a food buyer. In parallel, citizen consultations on biodiversity bring out many proposals to change our production and consumption systems, but citizens remain little involved in the elaboration and implementation of this change at the economic, scientific and policy level.

In DIVINFOOD, consumers are considered as citizens, and vice-versa, and are involved from the project's premise, in the co-construction of food supply chains valuing agrobiodiversity, jointly with economic actors, development services, policy-makers and researchers. This approach positions the consumer-citizen as a central actor who holds an active decision-making role. The first major step in this project was thus to invite citizen-consumers to express their expectations and aversions regarding the use of agrobiodiversity in food chains, in order to elaborate a "white paper". Citizens' opinions have been collected and used to formulate recommendations to guide research and innovation activities of DIVINFOOD partners<sup>5</sup> and, more largely, of all actors concerned by the use of agrobiodiversity in food chains. This white paper is a living document to be enriched by subsequent indications arising from the project, especially to operationalize the first recommendations elaborated from citizens' opinions.

This report presents the results of the citizen-consumer consultation organised in the first months of the DIVINFOOD project to elaborate the white paper. Specific options concerning the use of agrobiodiversity in food chains were favoured by the multi-actor consortium at the time of the

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<sup>1</sup> Lappo A., Bjørndal T., Fernández-Polanco J., 2015. Consumers' concerns and external drivers in food markets. FAO, Fisheries and Aquaculture Circular No. 1102. Rome, Italy.

Brandwatch, 2019. *2020: Consumer Trends for the Restaurant Industry*. [on line report].

<sup>2</sup> Seibold, S., Gossner, M.M., Simons, N.K. et al., 2019. Arthropod decline in grasslands and forests is associated with landscape-level drivers. *Nature*, 574, 671–674.

<sup>3</sup> Kneafsey M. (dir.), 2015. EIP-AGRI Focus Group Innovative Short Food Supply Chain management. Final report, Brussels, European Commission.

Galli F., Bartolini F., Brunori G., Colombo L., Gava O., S. Grando, Marescotti A., 2015. Sustainability assessment of food supply chains: an application to local and global bread in Italy. *Agricultural and Food Economics*, 3:21.

<sup>4</sup> This project is developed within the Horizon 2020 research and innovation programme, from which it received funding under grant agreement No. 101000383.

<sup>5</sup> The consortium is composed of research organisms, farmer organisations, small-scale food businesses, agricultural and rural development organisms, technical institutes, consumer associations, restaurant associations, local authorities, and open source developers.

construction of the project, after discussions with consumer-citizens. However, it was essential to submit these options to a wider set of consumer-citizens in the 7 countries of the project, in order to verify that the chosen options meet their expectations but also to identify those that raise questions or even aversion, and therefore need to be discussed, adapted or revised.

The first section of the report presents the methodology adopted to elaborate this white paper, which relies both on an online survey in the 7 countries of the project, and on focus groups in the specific regions within these 7 countries, where DIVINFOOD partners collaborate with local actors in living labs to develop agrobiodiversity-rich food chains (see DIVINFOOD living labs in **Appendix 1**). The second section exposes the results of the online survey. The third section brings additional inputs from the focus groups. The fourth and last section synthesises the results through first recommendations for the DIVINFOOD multi-actor consortium, and more largely, for all actors concerned by the development of agrobiodiversity-rich food chains.

Finding the best way to develop a white paper, in line with the work schedule and the budget of DIVINFOOD, required a lot of thinking and discussion. Moreover, implementing a survey in 7 countries and 7 national languages meant presenting notions which are easily understandable in all national languages – to be sure to ask the same questions in all countries –, which was an under-anticipated but highly formative challenge that will be useful all along the project. The co-production of this deliverable and the associated deliverable 1.2 therefore took 2 months longer than planned but results are numerous, rich, robust and useful.

# 1. Methodology

## 1.1 DIVINFOOD's general approach to develop a white paper

White papers are documents positioning institutions' or organisations' arguments and recommendations regarding a policy, business or technical issue. They are generally written by experts but could also involve informed citizens to help elaborate recommendations. In line with the participatory research approach adopted in DIVINFOOD, a participatory process has been implemented to propose a white paper from informed citizen-consumers' expectations and aversions regarding the use of agrobiodiversity in food chains. This white paper is intended to be a guide for developing scientific and innovation strategies in line with participants' expectations, not only in DIVINFOOD but also for all actors in value chains, agricultural and food development, civil society and public policies concerned by the use of agrobiodiversity in food chains.

Developing a white paper from informed citizen-consumers' expectations and aversions is not a common nor easy task. The deliverable 1.2 ('Methodology to elaborate a consumption white paper') presents the different participatory approaches that can be used to reach this objective, and shows how the DIVINFOOD project was inspired by them in order to design its own approach.

The DIVINFOOD approach relied on two complementary methods:

- i) **an online survey**, targeting the largest population possible in the 7 countries involved in the project, and inviting respondents to judge different options to use agrobiodiversity in food chains, from breeding/selecting varieties to marketing food products;
- ii) the implementation of **focus groups**, allowing to focus on specific underutilised crops, and to discuss about the reasons justifying their judgement regarding diverse options to use these crops.

In both methods, we gave some basic information for respondents to judge and discuss something they could more fully understand.

## 1.2. Method of the online survey

The online survey has been co-constructed in English with DIVINFOOD members (involved in the task 1.1), including two consumer associations used to involve citizen-consumers in their activities. A first version has been tested with a set of diverse citizen-consumers in France, and the final version has been translated in 7 national languages (Danish, French, Swedish, Portuguese, Italian, German, Hungarian) and for 7 countries (Denmark, France, Hungary, Italy, Portugal, Sweden, Switzerland). That supposed to use notions and phrases that make sense for the 7 countries, as well as to adapt the questions about socio-economic groups and education levels to each country, for instance, as their categories differ among European countries. Notably, we produced a list of socio-economic groups, with the list of all concerned concrete professions per group, from the European Socio-Economic Groups classification (ESEG), which is very general and not easy to use for respondents in self-declaration. This list has been validated by partners from the 7 countries involved in DIVINFOOD and can be used by other European projects using online self-declaration surveys. The final version of the questionnaire has been disseminated through DIVINFOOD members' personal and professional networks, national consumer associations, NGOs, local authorities, social media, etc. The online questionnaire has been opened the 7th of June, and was planned to be closed the 30th of June. To maximise the number of respondents, the deadline has been extended to the 20th of July.

To invite respondents to evaluate different options for using or enhancing agrobiodiversity in a food value chain, we used the 'majority judgment' approach recently developed by researchers to renew voting in political elections<sup>6</sup>. This method allows each voter to express an independent opinion on all options, not just one. Beforehand, respondents were given information on what a food value chain is, with 4 steps (breeding, production, processing, marketing). Moreover, for each option relative to a step, basic information has been given about its main impact presented in the academic literature for respondents to make a more informed judgement about an option. Two options per step were proposed, except for the marketing step divided in 3 sub-steps. In each case, one of the proposed option referred to the one on which the DIVINFOOD project planned to focus,

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<sup>6</sup> Balinski, Laraki, 2010. *Majority Judgment: Measuring, Ranking, and Electing*. The MIT Press.

and which could be considered more alternative than the second proposed option, commonly implemented in food chains. The two options (alternative, conventional/ traditional) were randomly proposed for each step or sub-step, to limit biases in answers.

Additional questions were asked to characterize the respondent, along 3 dimensions: i) her/his concern and representation regarding certain environmental topics; ii) her/his food habits; iii) her/his socio-demographic characteristics. The objective was to propose an easy-to-answer and pleasant questionnaire, taking 15-20 minutes to fill in, which was also another big challenge in addition to the translation issue.

The questionnaire is presented in the **Appendix 2**.

In addition to data processing through R, a specific software, CorText Manager<sup>7</sup>, has been used to process some qualitative data.

### 1.3. Method of the focus groups

The organisation of focus groups aimed to complement the European online survey data collection, through discussions with small groups of citizens about the use of specific NUCs. These groups were supposed to be organised in the regions where DIVINFOOD is developing a living lab to co-construct NUCs-based food chains, and focus on the NUC(s) that is/are addressed in the living lab. The main objective of these focus groups was to identify the different reasons/arguments for and against diverse options relative to the use of the NUC(s) throughout each step of the food supply chain. These arguments are important to take in account for our consortium who wants to develop options meeting citizens' expectations and taking in account their aversions, from breeding to marketing. More largely, they are important for all value chains actors and policy-makers who are interested to develop or support NUCs-based food chains.

ACC and INRAE provided a focus group methodology guideline (see **Appendix 3**) which was used or adapted for the discussions. The discussions had three main sections, tailored for a 2-hour meeting: 1) Introduction and understanding the concept of NUC, 2) Share of knowledge about the organisation of a supply chain and 3) Discussion about diverse options to use and spread NUCs in food chains, from breeding to marketing. The proposed options were the same as in on the online survey. In line with white paper principles, the two first sections aimed at sharing the needed information for citizens to understand the main notions that were discussed. The discussions

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<sup>7</sup> CorText Manager is an on-line tool, freely accessible (<https://www.cortext.net/projects/cortext-manager/>) that has been developed since 2009 by the CorText Platform team, within the LISIS research unit located on Université Gustave-Eiffel campus in France. CorText Manager is designed to facilitate the use of computational methods in social science researches. It provides users a set of tools, processing chains, procedures, methods and visualizations for processing, characterizing, analyzing, and quantifying digital data, specifically useful with textual data. CorText Manager allows classical analyses made in the field of scientometrics and bibliometrics (e.g. distributional and relational analyses), used for the treatment of textual content (e.g. extraction of important terms) and for geospatial exploration (e.g. geocoding of addresses).



were supposed to be moderated by the living lab coordinator or a partner of the task, with the support of a scribe.

Nine focus groups were organised in 8 living labs regions, representing 5 countries (Denmark, France, Italy, Hungary, and Portugal), between August-October 2022. The configurations varied (see **Appendix 4**):

- i) different types of citizens were represented in the discussions according to the focus group; some focus groups only gathered consumers while others were opened to professionals and/or academics;
- ii) the way of organisation varied; some focus groups were in person, others online or hybrid; most of the focus groups were organised on purpose but in one case, the discussions were developed during an event (bread festival in Hungary).

This diversity is explained by the fact that some living labs are advanced, while others are just emerging. Some living lab coordinators therefore focused on collecting data from key stakeholders to build their network. In addition, some living labs cover a large area, which rather required an online meeting able to reach the citizens of its different parts. However, this diversity of participants also translates, in some cases, the difficulty to recruit “ordinary” citizens who are not professionals of food systems nor from high socio-economic groups and already engaged in sustainable food, a difficulty already observed in the online survey. Recruitment was done through the personal and professional networks of DIVINFOOD's partners, and information on social media.

## 2. Results of the online survey

### 2.1 Number and diversity of respondents

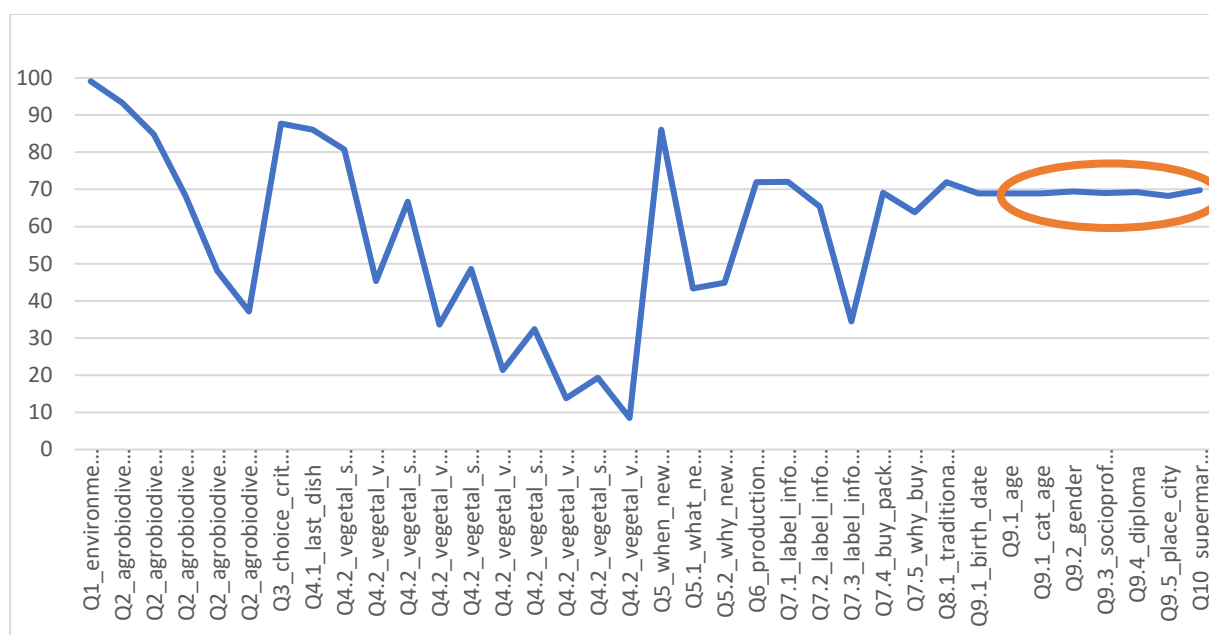
#### 2.1.1 Number per country and question

European region	Country	Number of respondents
Northern Europe	Denmark	229
	Sweden	60
Eastern Europe	Hungary	544
Western Europe	France	1 183
	Switzerland	71
Southern Europe	Italy	172
	Portugal	138

**Table 1.** Number of respondents to the online survey according to the country and the European region

The number of respondents differs among countries, reflecting both the existing relations between DIVINFOOD members and relay persons/structures to citizens, and the time allocated to the partners for this task, considering that the co-construction of the questionnaire took more time than expected. However, the total number, 2 397, is a good score, and the four regions of Europe are correctly represented.

The number of respondents also differs between questions.



**Figure 1.** Answer rate (%) per question of the questionnaire (n=2 397)

Only 70% of respondents completed the questions relative to their socio-demographic characteristics (Q9.1 to Q9.2). The representativeness of the sample of respondents thus cannot be totally assessed along these criteria.

## 2.2.2 Diversity of respondents

- Women represent 63% of the respondents who specified their gender (n=1 663). Women are typically more concerned by food, and food surveys are generally more completed by women.
- 43% of the respondents who specified their age (n=1 663) are 30-49 year-old but the other age classes are correctly represented ( $\leq 29$  year: 18%; 50-64 year: 26%;  $\geq 65$  year: 12%).
- The rate of intellectual and scientific professions is high in all countries (46% of the respondents who specified their profession, n= 1 653), except in Denmark and Sweden; that also reflects the stronger willingness of higher socio-economic groups – who also may have more time - to complete research surveys. Nevertheless, lower socio-economic groups are correctly represented (42%) in the European sample, which also includes students (7%) who

are one of the key targets of the project. Moreover, 30% of respondents did not specify their socio-economic group to which they belong and previous experience of DIVINFOOD researchers showed that respondents from lower socio-economic groups are more reluctant to declare their belonging than persons from higher socio-economic groups.

- 76% of the respondents live in ‘urban functional areas’<sup>8</sup>, which correspond to the combination of a city and of its commuting zone<sup>9</sup> (home-work journeys). To conclude, even if certain categories of gender, age, socio-economic groups and living areas are slightly over-represented, the European sample that we constituted, regarding the respondents who completed their socio-demographic characteristics (70%), reflects a large diversity of persons from 4 regions in Europe.

This consultation is not a poll, its completion is voluntary and needs a little of interest for the subject, and for research surveys. The risk, in this case, is to reach only specific socio-demographic categories. The diversity of our sample is one of the highlights of our consultation.

## 2.2 Respondents’ concerns and representations regarding agrobiodiversity

Of seven problems related to environmental degradation (climate change, air pollution, etc.), the disappearance of certain plant or animal species has been cited by 41% of the respondents (n= 2 375) as their first or second choice, after the climate change (cited by 71%) and the pollution of water, lakes and rivers (43%). The disappearance of certain plant or animal species, which is part of the decline of agrobiodiversity, is thus an important concern of the respondents<sup>10</sup>.

Supporting food production that contributes to the preservation of neglected and underutilised varieties has been cited by 31% of respondents (n= 1 724) as their first to third choice, among 10 impacts. This impact is thus ranked 4, after the contribution to consumer health, the positive impact on climate and the contribution to rural development.

Asked to propose 1 to 5 words when thinking to ‘agrobiodiversity’ (or ‘cultivated diversity’), the respondents who completed the question (n= 2 211) cited 7 877 words, corresponding to 2 010 different items. “Diversity” and “agriculture” are the most cited words, as shown in the figure 2 below which presents and numbers the words cited by the respondents, by relying the words frequently jointly cited.

<sup>8</sup> Brezzi M. et al., 2012. Redefining urban areas in OECD countries. In *Redefining "Urban": A New Way to Measure Metropolitan Areas*, Paris, Éditions OCDE.

<sup>9</sup> The definition of the residence location of respondents in a urban functional area vs. rural area has been done with the Cortext Manager® software.

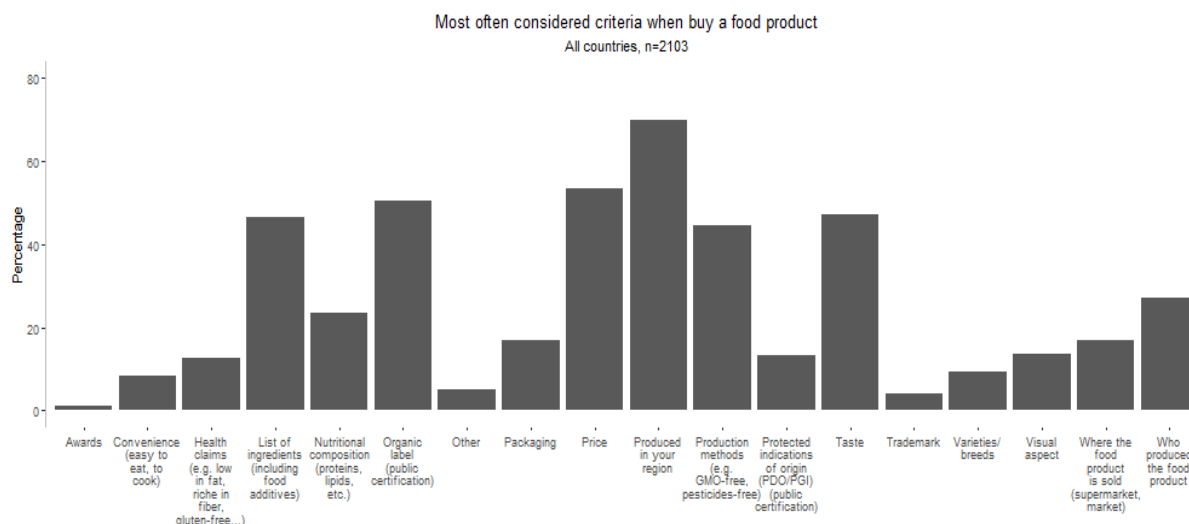
<sup>10</sup> The introduction to the questionnaire just mentioned that the DIVINFOOD project aims to support the development of plant-based food chains in relation to environmental challenges, without a focus on agrobiodiversity, in order to limit the bias in the answers (see Appendix 2).

Then, there is no common representation of this subject in our sample. Moreover, items referring to nature and agriculture are numerous – like in the French citizen consultation on biodiversity, for instance<sup>11</sup> -, while those relative to ‘food’ or ‘health’ have been very little cited, showing a weak connexion between agrobiodiversity and these dimensions by our respondents.

## 2.3 Respondents' food habits

11 Gouvernement Français, 2021. CONSULTATION CITOYENNE : Synthèse détaillée des contributions à la Stratégie nationale biodiversité 2030. Reporting final (23 juillet 2021). [https://biodiversite.gouv.fr/sites/default/files/2022-05/SNB%202030\\_Synth%C3%A8se%20consultation%20citoyenne\\_web.pdf](https://biodiversite.gouv.fr/sites/default/files/2022-05/SNB%202030_Synth%C3%A8se%20consultation%20citoyenne_web.pdf)

respondents but other criteria, important in DIVINFOOD, are also taken in account by a large part of the sample ('produced in your region', 'organic label', 'list of ingredients', 'production methods').



**Figure 3.** Most often criteria considered when buying a food product (n= 2 103)

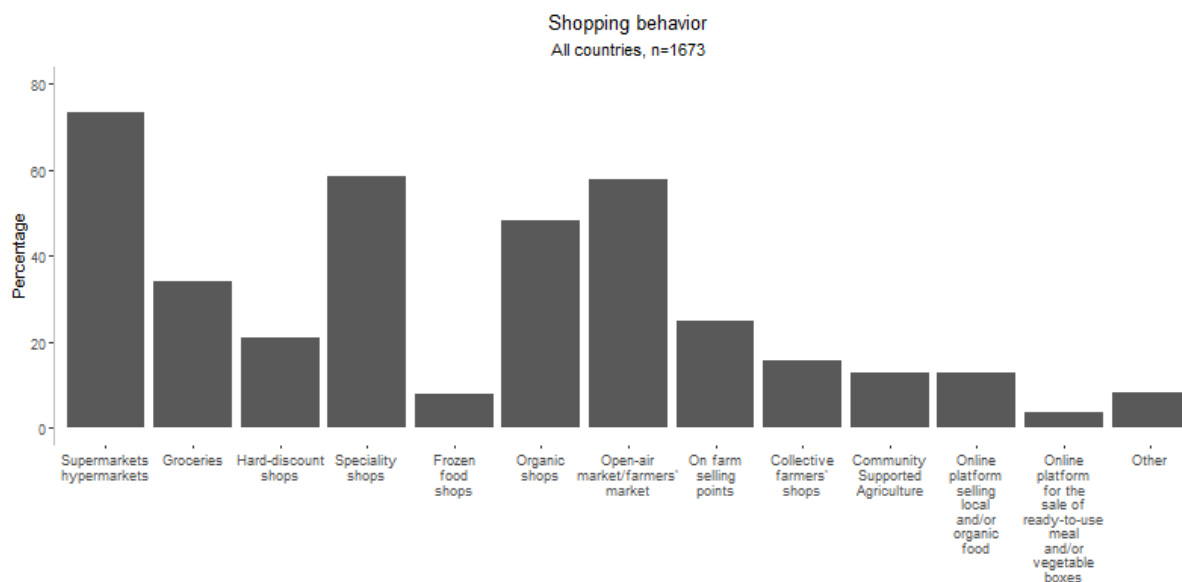
The presentation of a picture of a package of flour made from ancient varieties of wheat in France, featuring a lot of information, confirmed that respondents are not much interested by the varieties/ancient varieties/landraces from which the flour has been made. This makes emerge a challenge for DIVINFOOD, whose objective is to favour the consumption of food preserving agrobiodiversity. This question also highlights the contrasted position among respondents, with some stating that the package provides too much information about the food product and others not enough. The DIVINFOOD project has to work on the best way to provide relevant information on food products, relative to agrobiodiversity especially.

Asked about their last dish and its vegetal ingredients, respondents (n= 2064) declared a large diversity of meals and ingredients. Respectively 21% and 2% of the respondents had eaten legumes and minor cereals during their last dish, with a higher rate of legumes eaters in Denmark and a lower rate in Italy, compared to the average. Other socio-demographic criteria do not discriminate the eaters of legumes or minor cereals in the sample. In matters related to vegetal ingredients, respondents were asked to specify species and, if possible, varieties. A first general approach shows the difficulty of most respondents to detail their dish with information relative to agrobiodiversity on their plate.

Asked about the last new species or varieties they ate that they had not known before, very few respondents cited a legume or a minor cereal.

Two levers, studied and supported in DIVINFOOD, appeared as important in encouraging the consumption of a new species or variety: going to a farmer market and eating at a restaurant.

In matters of food products buying, the figure 4 shows the use of a large diversity of channels:



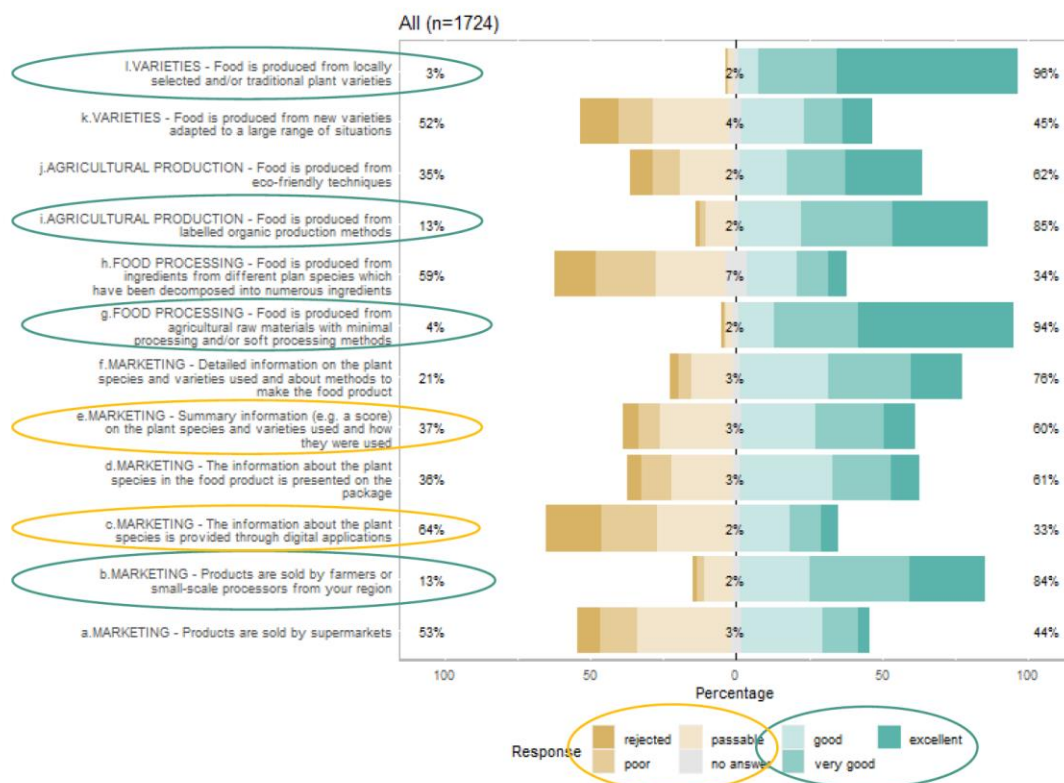
**Figure 4.** Channels regularly used by respondents to buy food products (% of respondents, n= 1 673)

To conclude, respondents are not much interested by the agrobiodiversity used in the food products or in their dishes whereas the biodiversity decline is a concern (see 2.2). Again, this highlights a weak connexion between these two dimensions. Short and mid-tier chains appear as important levers to introduce new species and varieties. The country does not discriminate respondents regarding this set of questions, except for legumes consumption, which has to be considered with caution as the survey has been made in Summer, while legumes are usually more consumed in Winter.

## 2.4 Respondents' judgements regarding agrobiodiversity use options

Diverse options to use agrobiodiversity, from varieties selection to final products marketing, were proposed to respondents. For each step or sub-step, two contrasted options were proposed, with a minimal information, including one which could be considered as more alternative/innovative than the other and on which DIVINFOOD planned to focus.

The figure 5 shows how respondents judged the different proposed options.



**Figure 5.** Percentages of respondents by each category of judgement for each proposed option (n=1 724).

Four options, on which DIVINFOOD planned to focus, have been positively evaluated by most of the respondents (green circled):

- Producing food from locally selected and/or traditional plant varieties (Step varieties)
- Producing food from organic labelled production methods (Step production)
- Producing food from mild-processing techniques (Step processing)
- Selling food through by farmers or small-scale processors from their region (Step marketing)

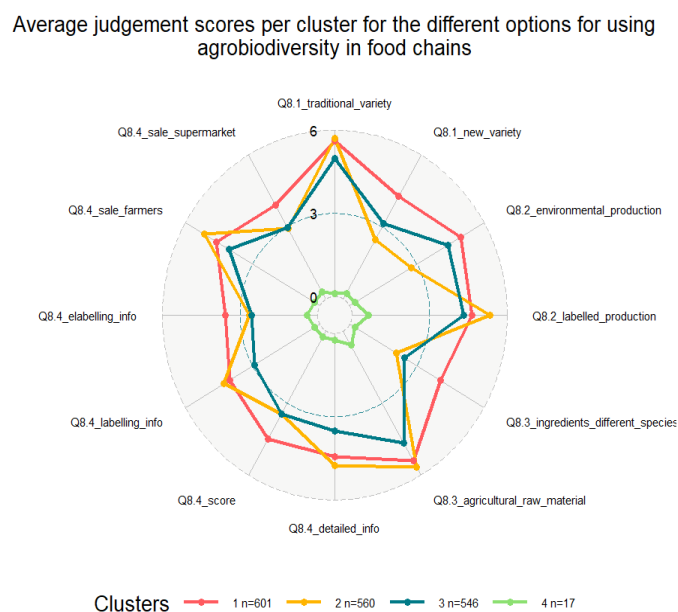
The second options proposed in these steps received a more contrasted judgement among respondents. For instance, selling products through supermarkets received 53% of negative judgements and 44% of positive judgements. These options should thus not be rejected in DIVINFOOD, even if they are not a priority.

The step marketing was divided in 3 sets of options: 2 options relative to information on food products, and 1 to channels. The options relative to channels has just been mentioned above. In matter of information on food products, the diverse options which we proposed did not resulted in a consensus. In particular, the options which will be experimented in DIVINFOOD (use of a score of information and of digital applications) received a lot of bad judgements, especially the use of



digital applications. Again, this highlights that the information on food products is a key issue, on which we have to discuss more with citizen-consumers in the living labs of the project.

Data have been processed to see how socio-demographic characteristics, as well as shopping profiles<sup>12</sup>, may influence the judgements. It consisted in describing the clusters which had the same types of judgements on the options, presented in the figure 6 below.



**Figure 6.** Clusters of respondents with similar judgements regarding the options of agrobiodiversity use, and average score of judgement per option for each cluster (n= 1 724)

We could characterize 3 clusters, which we named in relation to their judgements:

- **Cluster 1 (601) “Open citizens”:** were mostly more positive than the others about both options proposed for each step or sub-step

What: direct sales and sales in supermarket...

Who: younger, more students

Where: more represented in Portugal compared to the average

- **Cluster 2 (560) “Alternative citizens”:** were mostly more positive than the others about more options that could be considered as more alternative

What: local varieties, direct sales...

Who: more alternative diversified (shopping profile) compared to the average

Where: more represented in France, less in Denmark, Hungary and Portugal

<sup>12</sup> Shopping profiles have been detailed in 4 categories, based on the number of channels used to buy food (< 3= non-diversified; ≥ 3 = diversified), and the use of at least one short or organic channel (<1 = conventional; ≥ 1 = alternative).



- **Cluster 3 (546) “Traditional citizens”:** were mostly more positive than the others about the more options that could be considered as more conventional/traditional

What: local varieties, environment-friendly agriculture, less need of information

Who: older

Where: more represented in Denmark and Hungary, less in France

The 4<sup>th</sup> cluster was too small to be characterised (n=17).

Socio-professional groups, levels of diploma and location of residence (urban/rural) do not discriminate the clusters. The slight over-representation of higher socio-professional groups in our sample thus does not affect the robustness of our results.

To conclude, most of the options on which DIVINFOOD planned to focus are judged positively by our sample of respondents, and this result is not dependent of the socio-professional group to which respondents belong. Information on food products, both in terms of content and tool, raise more contrasted judgements, and calls for more discussion in living labs. However, it is difficult to interpret the judgements of respondents, which is why we implemented focus groups to provide additional inputs.

## 3. Additional inputs from focus groups

### 3.1 Understanding the concept of NUC

The implementation of focus groups aimed to focus on the use of specific neglected and underutilised crops (NUCs) in food chains, and to discuss about the reasons justifying their judgement regarding diverse options to use these crops.

At the beginning of the discussions, moderators explained which minor cereals or legumes, as NUCs, are/will be developed by the living lab, and mentioned the activities that will be carried out, very briefly to not influence the participants. Participants' knowledge appeared diverse about the specific NUCs: NUCs which are part of a traditional or regional dish were rather known (like Grass pea in Portugal or Lingot bean in France where it is used to make 'Cassoulet') than NUCs that are more connected to healthy diets (e.g. Blue lupine in Denmark or Einkorn in Hungary). The table 1 lists the main keywords cited by participants when thinking to the NUC(s), which will be developed through DIVINFOOD in their region.

<b>Bean</b>	(focus group in France) Good for the health; rather heavy food; winter food; basis of shared dishes (e.g. chilli con carne). (focus group in Hungary) Plant-based protein, the saver of mankind: healthy, easy to cultivate; ingredient of ancient porridge, reach in calories and healthy.
<b>Grass pea</b>	(focus group in Portugal) Bruchus weevil, Alvaiázere, festival, breastfeeding, lupins and soup.
<b>Lentils</b> <b>Faba beans</b> <b>Grey peas</b> <b>Blue lupine</b>	(focus groups in Denmark) Healthy food, boring food, no-taste food, fibres, protein, animal feed, food that require a lot of preparation, non-explored products that could have great potential.
<b>Lupine</b>	(focus group in Italy) Healthy and traditional products; high-protein content and gluten-free.
<b>Einkorn</b>	(focus group in Hungary) grain wheat, mysterious, wholegrain, nutritious, ancient, wheat, expensive and resistant. (interviews during the bread festival in Hungary) Healthy and less allergenic properties compared to bread wheat.

**Table 2.** Keywords about NUCs mentioned during the discussions

## 3.2 Sharing minimal knowledge about supply chains

To harmonize basic knowledge about the organisation of supply chains among participants, and to be sure that everyone understood what are the main steps of a supply chain, moderators asked them to describe in detail how the bread people usually eat gets onto the table. They were thus invited to draw collectively the supply chain, and then they presented it to the moderators.

In three focus groups the first steps of the chains were not identified which shows that selection of varieties/ breeding and cultivation are not so well known by the (potential) end users of NUC products.

## 3.3 Discussion about how to use and spread NUCs in food supply chains

The most part of the meetings was dedicated to discussing the different options to use NUCs in each step of the supply chain. In line with the ‘majority judgement’ approach used in the online survey, participants discussed if they consider options for each step good or bad for the use, and, more largely, a wider spread of the specific NUC of the LL, and why. We were especially interested in the WHY question, revealing their habits, values or emotions.

### 3.3.1 Step “varieties/seeds”

The options were the following, like in the online survey:

- o Food is produced from locally selected and/or traditional plant varieties<sup>13</sup> that often present interesting characteristics (taste, resistance to pests, high nutritional value...)
- o Food is produced from new varieties adapted to a large range of situations, selected from recent breeding techniques, and presenting desired characteristics (taste, resistance to pests, high nutritional value...)

The focus groups’ participants better judged the option in which food is produced from locally selected and or traditional varieties; locality appeared as important for them. The reasons behind that were that this option would support the local food systems, and, in some cases, they were sceptical about more advanced breeding techniques. However (as it was already recognised at the session on bread supply chains), some citizens also mentioned that they do not have the appropriate knowledge about breeding techniques or the selection of varieties.

In some other cases, participants were not against other breeding techniques and varieties if it supports the wider spread of NUC, assuring food security or adaptation to new circumstances (for example less water supply). Some specific reasons were also listed by the more knowledgeable citizens as a reason for the second option, for example in the case of Lingot bean in France where the fungi pressure makes it no longer possible to self-produce seeds and current selection has a weak potential. Introduced in the discussion in one focus group in France, the use of New Breeding Techniques received contrasted judgements, but all participants agreed to say that this use, if generalised, has to be clearly communicated to consumers.

### 3.3.2 Step “agricultural production”

The options were the following:

- o Food is produced from eco-friendly techniques that limit the use of synthetic input without a legally binding standard.
- o Food is produced from labelled organic production methods that guarantee that no synthetic input has been used but may induce more expensive food products.

Both options were good judged by the citizens. In the case of short supply chains, they were more in favour of eco-friendly techniques because the relationship between consumers and farmers (for example on the local level) helps to build trust, no certification is necessary. In some discussions, it was also mentioned that the benefit could be that this could decrease the price of NUC products because organic products and certification are expensive, and fewer consumers can

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<sup>13</sup> Moderators mentioned the specific NUC(s) of the living lab where the discussion was organised.

afford to buy them. However, it seemed to be important that information about production methods should be available, even if it is not certified.

Those citizens who considered long supply chains as the possibility of a wider spread of NUC emphasized the importance of organic certification and legally binding standards. Some participants justified this by their fear of manufacturers who are cheating with the production methods (highlighted in the two focus groups on legumes in Denmark) or because this could be an option to reach premium consumers and convince them about the quality of the products (highlighted in the focus group on einkorn in Hungary).

### 3.3.3 Step “food processing” (in case of a processed food product)

The options were the following:

- o Food is produced from ingredients originating from different plant species which have been decomposed into numerous ingredients, allowing a wide diversity of food products with desired characteristics.
- o Food is produced from agricultural raw materials that have undergone minimal processing and/or ‘soft’ processing methods (e.g., fermentation, lighter heating) to preserve their intrinsic nutritional value.

Citizens better judged the second option because either they considered processed food unhealthy or they thought the unprocessed food is closer to the traditional diet (e.g. bread made from einkorn or Cassoulet from bean). However, students and urban citizens, especially, judged good to use legumes in plant-based processed food – for example in vegetarian burger – because these “trendy products” are often consumed to avoid meat because of ethical or climate awareness, so with adding NUCs to these, the wider spread could be possible for a specific group of consumers. In focus groups opened to chefs, the discussion about processing took another perspective, and helped to acknowledge chefs as innovative actors in matters of processing methods respecting the intrinsic quality of raw material.

### 3.3.4 Step “marketing”

Like in the online survey, the marketing step has been divided in three sub-steps, relative to i) information level/type on products, ii) information tools, and iii) selling channels.

#### i) Information level/type on products

The two options were the following:

- o Detailed information is given on the plant species and varieties that have been used to make the food product, as well as the production methods, etc., which is very informative but can be difficult/long to read.
- o Summary information (e.g. a score) is given on the plant species and varieties that were used and how they were used, which is less informative but easier to read.

Participants of the discussions good judged detailed information, but they think consumers would not have time to read it or “average consumers” would not be interested in these kinds of details at all. So, a common consensus was that the basic information should be given and that a score or label could further support consumers’ decisions. It was also mentioned that if someone would be interested, more information should be available (in the shop or online for example).

## ii) Information tools

The two options were the following:

- The information about the plant species in the food product is presented on the package that may be not very visible or easy to read.
- The information about the plant species is provided through digital applications that require the use of a smartphone

Some citizens were absolutely against smartphone applications, they would like to see the information available in the shop, on a card or online. Young participants better judged this kind of information tool and some suggested reaching information with a QR code from the package.

## iii) Selling channels

The two options were the following:

- o Products are sold by farmers or small-scale processors from your region, which favours dialogue with consumers about the use of plant species but is not necessarily very convenient and may induce more expensive food.
- o Products are sold by supermarkets, which is more convenient but generally does not favour dialogue with consumers about the products.

The answers were diverse. For the wider spread of NUC, citizens mentioned in five discussions that they would prefer to make these products both available not only in farms but also in supermarkets, where consumers can easily reach them, as most consumers in general buy food through this channel. Especially important could it be in cities (highlighted in the focus groups in Denmark) where consumers would not drive to a farm for example. On the other hand, in many cases they also explained that shorter channels are important to make the NUC better known, and develop its reputation (highlighted in the focus group on bean in France) or to reach more conscious consumers, for example, farmers' markets, zero waste shops, food coops or community-supported farms (highlighted in one of the focus groups on einkorn in Hungary). Moreover, the local dimension of selling appeared as important in the discussions (highlighted in the focus group in Italy, for instance). Online channels were also suggested as additional options.

To conclude, in addition to give concrete data and useful contacts to living lab coordinators to develop their living labs, the focus groups, as expected, complemented the online survey: on one hand, participants mainly judged positively the options that are privileged in DIVINFOOD to develop NUCs use. On the other hand, they explained that the other proposed options are still interesting, for specific target groups (students, “average” urban consumers) or to up-scale the

use of NUCs in food chains. Discussions highlighted more largely the risk to develop elitist and time-consuming chains for consumers, also calling for taking these constraints in short chains. In all cases, participants want to be informed about what is done in food chains, with different expectations or aversions regarding information type and tools. The discussion about marketing channels finally confirmed the interest to develop not only short but also mid-tier chains (proposing larger volumes of well identified products in conventional channels), as planned in DIVINFOOD. However, especially in the cases in which the NUCs are little known and consumed, participants want first to better know the added values of these crops, in particular in the health/nutrition perspective.

## 4. From results to White paper: recommendations for DIVINFOOD members and concerned actors

In line with a white paper's ambition, this section is a first operational translation of the results obtained through the online survey and focus groups into recommendations for research and innovation activities, in DIVINFOOD and for other actors concerned by the use of agrobiodiversity in food chains. This list of recommendations will be integrated by DIVINFOOD work packages' leaders and living lab coordinators, in order to consolidate and adjust their programmes, identify priorities, develop new arguments and examine certain issues in greater depth. This process will be discussed in the follow-up of living labs and at the next DIVINFOOD General Assembly (May 2023). Moreover, this list of recommendations will be enriched and detailed through the participatory activities of the project.

To go beyond the consultation, and include citizen-consumers in DIVINFOOD's decisions, all survey respondents<sup>14</sup> and focus group participants interested to receive news from the project will be informed about the adjustments that DIVINFOOD partners will make in order to take their opinions into account. They will also be invited to become 'third-party watchers' of the project's different phases and evolutions, as well as to take part in its activities (participatory breeding, tastings, co-design of information tools, etc.).

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<sup>14</sup> Regulation on the Protection of Personal Data (RGPD) has been fully respected. Respondents to the online survey who were interested to receive news from the project had to complete a second questionnaire, without the possibility for us of cross-referencing their identity information with their responses to the online survey.

## Recommendations

- The decline of agrobiodiversity seemed to be an important concern for the citizens who took part in the consultation.

**→ The information campaigns on this subject are efficient and should be maintained to reach the largest population as possible.**

- Supporting food production that contributes to “the preservation of neglected and underutilised varieties” is ranked 4 in the online survey, following “the contribution to consumer health”, “the positive impact on climate” and “the contribution to rural development”.

**→ There is an opportunity to highlight that supporting NUCs-based production can also contribute to consumer health, climate change mitigation, and rural development, from robust data produced with stakeholders.**

- Asked to propose words when thinking of ‘agrobiodiversity’ (or ‘cultivated diversity’), the citizens who took part in the consultation cited ‘food’ or ‘health’ very rarely.

**→ There is an opportunity to strengthen the connexion between underutilised agrobiodiversity, food and health, from robust data produced with stakeholders.**

- Less than 20% of the online survey respondents chose a food product in relation with the varieties or breeds it comes from. Most respondents had difficulty describing their last dish with information relative to agrobiodiversity on their plate. Presented with an image of a package of flour, they did not seem very interested in the varieties/ancient varieties/landraces from which the flour was made. However, they highlighted the information indicated on products as a key issue.

**→ The DIVINFOOD project, as well as concerned actors, have to work on the best way to provide information about food products valuing agrobiodiversity, as mentioning the species/varieties on the package appeared inefficient. The discussions in focus groups highlighted the importance to value the impacts of using agrobiodiversity in food, and not only the use of agrobiodiversity.**

- When asked what led them to consume a new variety or species, respondents highlighted two vectors: going to the farmers' market and eating at a restaurant.

**→ Collaboration with farmers' markets and restaurant chefs around NUCs, as planned in DIVINFOOD, should really be the subject of special efforts, as these chains appear to be the most favourable to the consumption of new products by consumers.**

- Most of the options of agrobiodiversity use on which DIVINFOOD will focus are judged positively by our sample of respondents, both in the online survey and in focus groups: Producing food from locally selected and/or traditional plant varieties (Step varieties); Producing food from organic labelled production methods (Step production); Producing food from mild-processing techniques (Step processing); Selling food through by farmers or small-scale processors from their region (Step marketing). This result is independent of the socio-professional group to which respondents belong, except for students. However, the other proposed options also interest some specific groups (students, average urban consumers in big cities, older people), especially in some countries (Denmark, Portugal, Hungary). Information on food products, both in terms of content and tool, raised more contrasted judgements, even aversions.

**→ Even if some options are a priority in DIVINFOOD, above all because there is a lack of scientific and practical knowledge on them, the project, as well as concerned actors, have to highlight, or strengthen their contribution to the development of mid-tier chains. Planned to be studied and supported in DIVINFOOD, these chains propose large volumes of regional, well-identified food products, and with a better quality compared to mass products, typically found in conventional marketing channels. However, impacts of using agrobiodiversity in both short and mid-tier chains need large evaluations, to be sure to meet consumers' various concerns. Information on food products remains a key issue which calls for more discussions and co-design with citizens.**

## Conclusion

The DIVINFOOD European project aims to co-construct interactive short and mid-tiers chains valuing underutilised agrobiodiversity, to both contribute to reverse the agrobiodiversity decline, and foster sustainable diets and food systems meeting consumers' expectations. Usually little involved in the decisions regarding the processes within food chains, consumers, here considered as citizens, were invited to express their expectations and aversions regarding agrobiodiversity use in food chains. Two methods were used: an online survey and focus groups, in which, in some cases, they also had the opportunity to discuss these matters with value chain actors. This large consultation, gathering about 2 500 responses from the 7 partner countries, and representing a diverse sample, was implemented in the first step of the project, to elaborate a white paper which will guide the innovation and research activities. It is also a useful resource for all concerned actors by the use of agrobiodiversity in food chains, including value chain actors, policy-makers, researchers, development services, citizens, from Europe to local areas. The main results have been presented to DIVINFOOD partners during a webinar organised the 20<sup>th</sup> of October, 2022. Detailed results will be published in an academic journal and key results will be disseminated to targeted stakeholders through various communication channels. The integration of the results



into DIVINFOOD's activities will be discussed with partners, and the list of recommendations will be enriched and detailed through participatory research and innovation.

Of course, this citizen consultation presents some methodological limits. The elaboration of the online survey questionnaire was more time-consuming than expected, thus reducing the time to disseminate it. Moreover, some respondents found it too long, or too complex, even if an effort has been made to propose a short and easy-to-answer questionnaire. In addition, even if the slight over-representation of higher socio-economic groups and alternative shoppers has no impact on the results (no correlation between these variables and the judgements, except for students), this highlighted DIVINFOOD partners' difficulty to reach "average" consumers from lower socio-economic groups more oriented towards conventional, mainstream food purchasing channels. Working in living labs is an opportunity to strengthen the relationship with this population, by being attentive to the most vulnerable people, in order to develop inclusive food chains.

# Appendices

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Appendix 1: Map of DIVINFOOD living labs

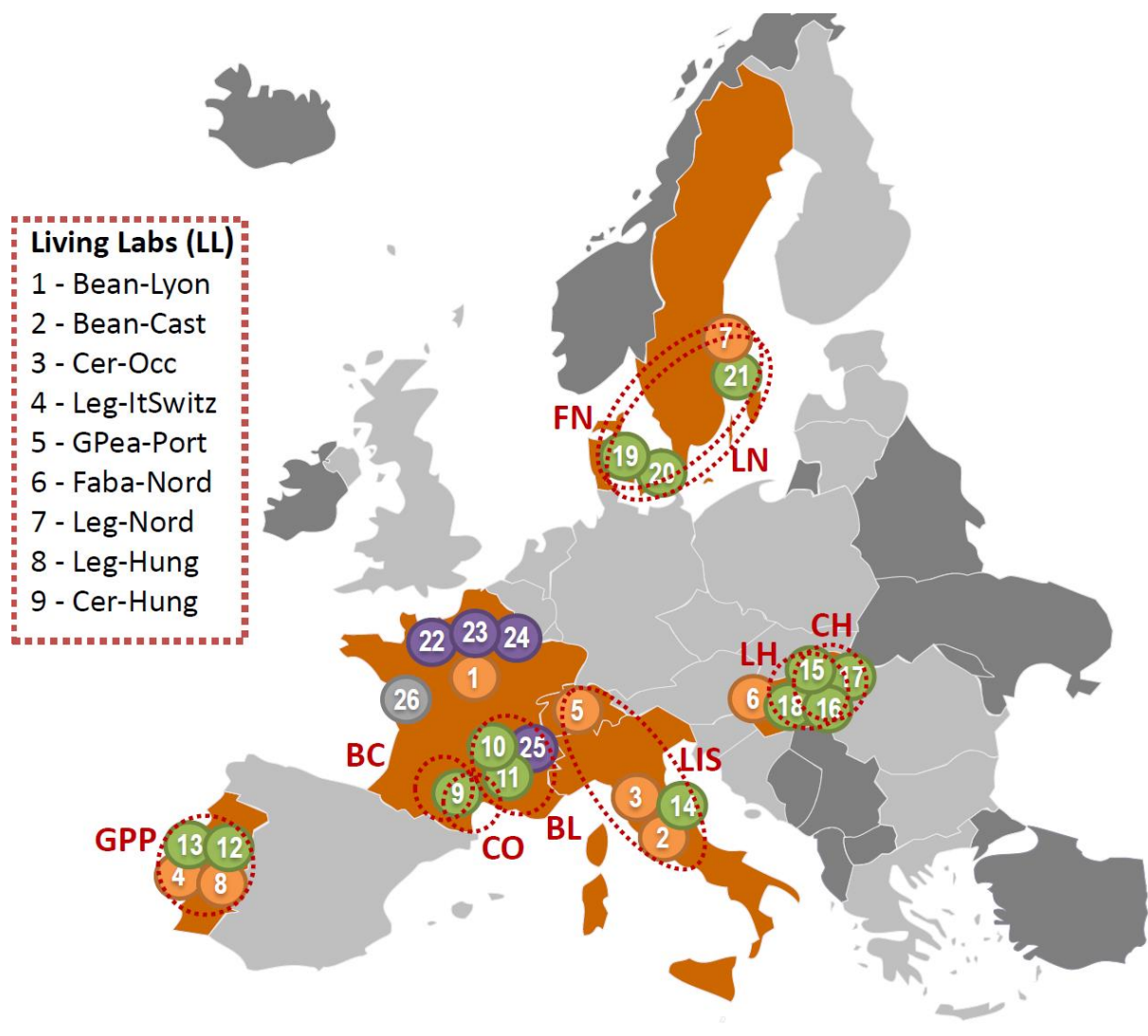
Appendix 2: Questionnaire of the online survey

Appendix 3: Guidelines for the implementation of focus groups

Appendix 4: Formats of the 8 focus groups

## Appendix 1: Map of DIVINFOOD living labs

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## Appendix 2: Questionnaire of the online survey

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# DIVINFOOD-France

## What future for the plant-based food chains in relation to environmental issues?

### Help decide this through this citizen consultation!

This questionnaire is part of the European project DIVINFOOD involving researchers and partners\* from 7 countries (Denmark, France, Hungary, Italy, Portugal, Sweden, Switzerland) to support the development of plant-based food chains in relation with environmental challenges. It aims to build a roadmap with citizens for the future of these chains, from production to marketing. It is composed of 4 parts and will take only 15-20 minutes to answer. The roadmap will be widely shared with agriculture and food professionals, as well as public decision makers. Before deciding to participate in this consultation, please read the privacy policy below carefully. Thank you in advance for your contribution (the questionnaire will close on 17 July 2022).

\* farmer organisations, small-scale food businesses, agricultural and rural development organisms, technical institutes, consumer associations, restaurant associations, local authorities, open source developers

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There are 33 questions in this survey.

## I. ENVIRONMENTAL TOPICS

**QUESTION n°1: Of the following problems related to environmental degradation, which two do you find most worrying? (1,2 by order of importance, 1 being the most important)**

❗ All your answers must be different and you must rank in order.

❗ Please select at most 2 answers

Please number each box in order of preference from 1 to 7

Please choose no more than 2 items.

Climate change

Air pollution

Pollution of water, rivers and lakes

Disappearance of certain plant or animal species

Natural disasters (floods, storms...)

Increase in household waste

Noise pollution

**QUESTION n°2: When you think of "agro-biodiversity" or "cultivated biodiversity", what words come to mind? (between 1 and 5 words)**

## II. FOOD CONSUMPTION

**QUESTION n°3: When you buy a food product, which criteria do you most often consider?**

❗ All your answers must be different and you must rank in order.

❗ Please select at most 5 answers

Please number each box in order of preference from 1 to 18

Please choose no more than 5 items.

<input type="text"/>	Taste
<input type="text"/>	Visual aspect
<input type="text"/>	Price
<input type="text"/>	Produced in your region
<input type="text"/>	Nutritional composition (proteins, lipids, etc.)
<input type="text"/>	List of ingredients (including food additives)
<input type="text"/>	Protected indications of origin (PDO/PGI) (public certifications)
<input type="text"/>	Organic label (public certification)
<input type="text"/>	Health claims (e.g. low in fat, riche in fiber, gluten-free...)
<input type="text"/>	Awards
<input type="text"/>	Trademark
<input type="text"/>	Varieties/breeds
<input type="text"/>	Production methods (e.g. GMO-free, pesticides-free...)
<input type="text"/>	Packaging
<input type="text"/>	Who produced the food product
<input type="text"/>	Where the food product is sold (supermarket, market...)
<input type="text"/>	Convenience (easy to eat, to cook)
<input type="text"/>	Other: specify

Choose 1 to 5 criteria from the list below, by order of frequency (1 being the most frequent, 5 being the least frequent)

You choose "other", please specify :

Only answer this question if the following conditions are met:  
((Q3\_1.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/3/qid/12) == "A18")) or ((Q3\_2.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/3/qid/12) == "A18")) or ((Q3\_3.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/3/qid/12) == "A18")) or ((Q3\_3.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/3/qid/12) == "A18")) or ((Q3\_3.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/3/qid/12) == "A18")) or ((Q3\_3.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/3/qid/12) == "A18"))

Please write your answer here:


QUESTION n°4a: Can you describe the last main course you ate? (excluding breakfast)

Please write your answer here:

QUESTION n°4b: Can you name the most important plant species composing this main course, specifying if possible the variety\* for each species?

	plant species	varieties
1	<div></div>	<div></div>
2	<div></div>	<div></div>
3	<div></div>	<div></div>
4	<div></div>	<div></div>
5	<div></div>	<div></div>

\*INFO: A variety is a distinctive type within a plant species.



Example: see here 1 plant species (tomato) and 2 varieties within this plant species ('premio F1' classic variety and 'pineapple' traditional variety).

**QUESTION n°5: When was the last time that you ate a plant species or variety that you had not known before?**

❗ Choose one of the following answers

Please choose **only one** of the following:

- ☐ In the last month
- ☐ In the last year
- ☐ Over a year ago
- ☐ I don't know

**QUESTION n° 5.1: What was it?**

Only answer this question if the following conditions are met:

((Q5a.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/3/qid/15) == 'AO01')) or ((Q5a.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/3/qid/15) == 'AO02')) or ((Q5a.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/3/qid/15) == 'AO03'))

Please write your answer here:

**QUESTION n° 5.2: What led you eat this new plant species or variety?**

Only answer this question if the following conditions are met:

((Q5a.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/3/qid/15) == "AO01")) or ((Q5a.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/3/qid/15) == "AO02")) or ((Q5a.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/3/qid/15) == "AO03"))

❗ Choose one of the following answers

Please choose **only one** of the following:

- ☐ Meal at a restaurant
- ☐ Meal at a friends' house
- ☐ Cooking a new recipe
- ☐ Information from online social networks
- ☐ Merchandise showcase/discount at the supermarket
- ☐ Discovery at a farmers' market
- ☐ Purchase by a family member
- ☐ Gift
- ☐ I do not remember

☐ Other

**III. DESIGN YOUR PLANT-BASED FOOD CHAIN**

## QUESTION n° 6: In your view, it is important to support food production that...

❶ All your answers must be different and you must rank in order.

❷ Please select at most 3 answers

Please number each box in order of preference from 1 to 10

Please choose no more than 3 items.

contributes to consumer health

has a positive impact on the climate

contributes to the preservation of neglected and underutilized plant and animal species

contributes to rural development by supporting local companies and farmers

contributes to the competitiveness of the national economy

contributes to the preservation of diversified landscapes

creates a natural environment that is safe to live in

provides food security in uncertain times

contributes to the cohesion of the local community

contributes to the preservation of local gastronomical culture

Please select 3 options from the list below by order of importance (the most important at the top of the list, the least important at the bottom)

Look at this package of flour:



1. "Landraces"
2. Trademark
3. "Organic flour from stone mills"
4. Region of production (here: Occitanie, South of France)
5. "Common wheat"
6. Name of common wheat in Latin
7. "Mix of ancient varieties"
8. European organic certification logo
9. National organic certification logo (here: French)
10. Weight of the package
11. Type of flour (T80 corresponds to a semi-wholemeal wheat flour)
12. Name of the producer
13. Country of production (here: France)
14. "Best Before Date"

15. Address of the producer



**QUESTION n° 7a: Which information written on the package and/or which features of the package are important to you?**

❗ All your answers must be different and you must rank in order.

❗ Please select at most 5 answers

Please number each box in order of preference from 1 to 17

Please choose no more than 5 items.

<input type="text"/>	"Landraces"
<input type="text"/>	Trademark
<input type="text"/>	"Organic flour from stone mills"
<input type="text"/>	Region of production (here: Occitanie, South of France) "
<input type="text"/>	"Common wheat
<input type="text"/>	Name of common wheat in Latin
<input type="text"/>	"Mix of ancient varieties"
<input type="text"/>	European organic certification logo
<input type="text"/>	National organic certification logo (here: French)
<input type="text"/>	Weight of the package
<input type="text"/>	Type of flour (T80 corresponds to a semi-wholemeal wheat flour)
<input type="text"/>	Name of the producer
<input type="text"/>	Country of production (here: France)
<input type="text"/>	"Best Before Date"
<input type="text"/>	Address of the producer
<input type="text"/>	Other 1
<input type="text"/>	Other 2

indicate 1-5 items, in order of importance (the most important at the top of the list, the least important at the bottom)

**QUESTION 7a.1: you choose "other 1", please specify:**

Only answer this question if the following conditions are met:

((Q7a\_1.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/20) == "AO16")) or ((Q7a\_2.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/20) == "AO16")) or ((Q7a\_3.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/20) == "AO16")) or ((Q7a\_4.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/20) == "AO16")) or ((Q7a\_5.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/20) == "AO16")) or ((Q7a\_6.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/20) == "AO16"))

Please write your answer here:

## QUESTION 7a.2: you choose "other 2", please specify:

Only answer this question if the following conditions are met:

((Q7a\_1.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/20) == "AO17")) or ((Q7a\_2.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/20) == "AO17")) or ((Q7a\_3.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/20) == "AO17")) or ((Q7a\_4.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/20) == "AO17")) or ((Q7a\_5.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/20) == "AO17"))

Please write your answer here:

## QUESTION n°7b: Which items on the package do you find unnecessary?

❶ All your answers must be different and you must rank in order.

❷ Please select at most 5 answers

Please number each box in order of preference from 1 to 17

Please choose no more than 5 items.

"Landraces"

Trademark

"Organic flour from stone mills"

Region of production (here: Occitanie, South of France)

"Common wheat"

Name of common wheat in Latin

"Mix of ancient varieties"

European organic certification logo

National organic certification logo (here: French)

Weight of the package

Type of flour (T80 corresponds to a semi-wholemeal wheat flour)

Name of the producer

Country of production (here: France)

"Best Before Date"

Address of the producer

Other 1

Other 2

**You choose "Other 1": please specify:**

Only answer this question if the following conditions are met:

((Q7b\_1.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/21) == "AO16")) or ((Q7b\_2.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/21) == "AO16")) or ((Q7b\_3.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/21) == "AO16")) or ((Q7b\_4.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/21) == "AO16")) or ((Q7b\_5.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/21) == "AO16"))

Please write your answer here:

**QUESTION n°7b.2: you choose "Other 2": please specify**

Only answer this question if the following conditions are met:

((Q7b\_1.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/21) == "AO17")) or ((Q7b\_2.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/21) == "AO17")) or ((Q7b\_3.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/21) == "AO17")) or ((Q7b\_4.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/21) == "AO17")) or ((Q7b\_5.NAOK (/index.php/questionAdministration/view/surveyid/467987/gid/4/qid/21) == "AO17"))

Please write your answer here:

**QUESTION n°7c: According to you, which information is missing?****QUESTION n°7d: Would you buy a similar package of flour in your country?**

Please choose **only one** of the following:

- ☐ Yes
- ☐ No

**QUESTION n°7e: For which reasons?**

Please write your answer here:

**QUESTION n°8:** As citizens, imagine that you are involved in the decision-making process to define plant-based food chains that meet your preferences. For each step of the chain, tell us what you think of the different options proposed.

Select an answer for each option you wish to evaluate. Options that you do not wish to evaluate will be considered as "to be rejected".

INFO: organisation of a plant-based food chain (4 steps)

Varieties (seeds) → agricultural production → food processing → marketing

#### STEP "varieties" (seeds)

\*

Please choose the appropriate response for each item:

	Excellent	Very good	Good	Passable	Poor	Rejected	No answer
Food is produced from locally selected and/or traditional plant varieties that often present interesting characteristics (taste, resistance to pests, high nutritional value...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Food is produced from new varieties adapted to a large range of situations, selected from recent breeding techniques and presenting desired characteristics (taste, resistance to pests, high nutritional value...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### STEP "agricultural production"

\*

Please choose the appropriate response for each item:

	Excellent	Very good	Good	Passable	Poor	Rejected	No answer
Food is produced from eco-friendly techniques that limit the use of synthetic input without a legally-binding standard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Food is produced from labelled organic production methods that guarantees that no synthetic input has been used but may induce more expensive food products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**STEP “food processing” (in case of a processed food product)**

\*

Please choose the appropriate response for each item:

	Excellent	Very good	Good	Passable	Poor	Rejected	No answer
Food is produced from ingredients originating from different plant species which have been decomposed into numerous ingredients, allowing a wide diversity of food products with desired characteristics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Food is produced from agricultural raw materials that have undergone minimal processing and/or ‘soft’ processing methods (e.g. fermentation, lighter heating) to preserve their intrinsic nutritional value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**STEP “marketing” (1)**

\*

Please choose the appropriate response for each item:

	Excellent	Very good	Good	Passable	Poor	Rejected	No answer
Detailed information is given on the plant species and varieties that have been used to make the food product, as well as the production methods, etc., which is very informative but can be difficult/long to read	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Summary information (e.g. a score) is given on the plant species and varieties that were used and how they were used, which is less informative but easier to read	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**STEP "marketing" (2) \***

Please choose the appropriate response for each item:

	Excellent	Very good	Good	Passable	Poor	Rejected	No answer
The information about the plant species in the food product is presented on the package that may be not very visible or easy to read	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information about the plant species is provided through digital applications that require the use of a smartphone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**STEP "marketing" (3) \***

Please choose the appropriate response for each item:

	Excellent	Very good	Good	Passable	Poor	Rejected	No answer
Products are sold by farmers or small-scale processors from your region, which favours dialogue with consumers about the use of plant species but is not necessarily very convenient and may induce more expensive food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Products are sold by supermarkets, which is more convenient but generally does not favour dialogue with consumers about the products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**QUESTION n°9a: what is your year of birth?**

❗ Choose one of the following answers

Please choose **only one** of the following:

- ☐ 1920
- ☐ 1921
- ☐ 1922
- ☐ 1923
- ☐ 1924
- ☐ 1925
- ☐ 1926
- ☐ 1927
- ☐ 1928
- ☐ 1929
- ☐ 1930
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- ☐ 1999
- ☐ 2000
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- ☐ 2002
- ☐ 2003
- ☐ 2004
- ☐ 2005
- ☐ 2006



**QUESTION n°9b: Gender**

❗ Choose one of the following answers  
Please choose **only one** of the following:

- ☐ Man
- ☐ Woman
- ☐ Other

**QUESTION n°9c: In which socio-professional category do you fall?**

❗ Choose one of the following answers

Please choose **only one** of the following:

☐

☐ 1.1 Heads of enterprises, self-employed ( > 49 employees)

☐ 1.2 Senior managers of enterprises, salaried ( > 49 employees)

☐

☐ 2.1 Engineers, researchers

☐ 2.2 Doctors and health executives

☐ 2.3 Administrative, financial and commercial managers (sales manager, etc.)

☐ 2.4 Legal, social and cultural professionals (lawyers, journalists, etc.)

☐ 2.5 Teachers and education professionals (lecturer, school teacher, etc.)

☐

☐ 3.1 Intermediate occupations in science, technology, information technology and communication (technicians, project managers, etc.)

☐ 3.2 Intermediate health occupations (nurses, etc.)

☐ 3.3 Finance, sales and administration associate professionals (accountants, etc.)

☐ 3.4 Legal, social and related service associate professionals (court clerks, social workers, etc.)

☐ 3.5 Non-commissioned officers in the armed forces

☐

☐ 4.1 Farmers, self-employed (farm < 50 employees)

☐ 4.2 Traders and similar professionals, self-employed (enterprise < 50 employees)

☐ 4.3 Artisans, self-employed (enterprise < 50 employees)

☐ 4.4 Other entrepreneurs, self-employed (enterprise < 50 employees)

☐

☐ 5.1 Clerical and similar staff

☐ 5.2 Receptionists, counter clerks and similar professionals

☐ 5.3 Assistant nurse, childminders, teacher assistants

☐ 5.4 Skilled employees in sales and services (postmen, hairdressers...)

☐ 5.5 Protective and security services and military personnel

☐

☐ 6.1 Skilled construction workers, except electricians

☐ 6.2 Skilled food, wood and clothing workers

☐ 6.3 Skilled metal, mechanical, printing, electrical and electronic workers

☐ 6.4 Machine and plant operators, skilled assembly workers

☐ 6.5 Drivers of vehicles and mobile equipment

☐

☐ 7.1 Service and shop employees (home assistants, shop assistants, etc.)

☐ 7.2 Low-skilled workers and labourers

☐ 7.3 Maintenance workers

☐ 7.4 Agricultural workers

☐

☐ 8.1 Retired managers

☐ 8.2 Retired professionals and scientists

☐ 8.3 Retired intermediate occupations

- ☐ 8.4 Retired small entrepreneurs
- ☐ 8.5 Retired skilled employees
- ☐ 8.6 Retired skilled workers
- ☐ 8.7 Other retired employees
- ☐ 8.8 Other persons aged 65 and over, not in the labour force
- ☐
- ☐ 9.1 Students
- ☐ 9.2 Disabled unfit persons under 65
- ☐ 9.3 Unemployed persons not classified in another category
- ☐ 9.4 Other persons outside the labour market and under 65

*These categories are used by the European Commission to compare countries.*

#### QUESTION n°9d: Education completed

❗ Choose one of the following answers

Please choose **only one** of the following:

- ☐ No diploma or CEP
- ☐ Brevet des collèges
- ☐ BEP, CAP
- ☐ High school diploma
- ☐ Associate's degree (2-year)
- ☐ Bachelor's degree (3-year)
- ☐ Master degree (5-year)
- ☐ PhD

#### QUESTION n°9c: Where do you live?

Indicate the name of your municipality or the postal code of your main residence

**QUESITON n°10: Which chains do you usually use to purchase your food?****!** Check all that applyPlease choose **all** that apply:

- ☐ Supermarkets/hypermarkets (incl. drive pick-up services)
- ☐ Groceries
- ☐ Hard-discount shops
- ☐ Specialty shops (e.g. bakery, butchery, fruit and vegetable shop, etc.)
- ☐ Frozen food shops
- ☐ Organic shops
- ☐ Open-air market/farmers' market
- ☐ On-farm selling points
- ☐ Collective farmers' shops (incl. drive pick-up services)
- ☐ Community-Supported Agriculture
- ☐ Online platform selling local and/or organic food
- ☐ Online platform for the sale of ready-to-use meal and/or vegetable boxes
- ☐ Other:

Check all the supply chains that you regularly use**Thank you for your participation!****If you wish to receive news from the DIVINFOOD project, please subscribe to the project newsletter (no more than two emails per year):**

Submit your survey.

Thank you for completing this survey.

## Appendix 3: Guidelines for the implementation of focus groups

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Pre focus group activity: participants complete the online survey (optional).

### Progress of the focus group and content of each phase

1. **Introduction – 10 minutes**
2. **Understanding the concept of agrobiodiversity and NUCs- 20 minutes**
3. **Understanding the main steps of a food supply chain – 20 minutes**
4. **Discussion about how various options along the food supply chain may be of interest for the use of NUC(s) considered in the living lab – MAIN PART – 70 minutes**

#### 1. Introduction, warm-up - 10 minutes

The moderator introduces himself/herself and explains the purpose and framework of the discussion (“there are no right and wrong answers”, timeframe, recording, data security and data management).

Participants introduce themselves - name, family, profession, last new species or variety they have eaten (reference to the online survey).

#### 2. Understanding the concept of agrobiodiversity and NUCs - 20 minutes (maximum)

The moderator explains which minor cereals or legumes are/will be developed by the Living Lab and very briefly, just mention the activities which will be carried out in the LL (depending on if the LL is emerging or advanced). DIVINFOOD should be briefly mentioned as well, explaining how important consumer and citizens’ feedback is in the whole research process. This introduction should lead to a common understanding of NUCs and agrobiodiversity.

To begin the discussion, the moderator shows a picture of the NUC or one of the NUCs (the most representative of the types of NUCs which will be considered, i.e. bean to represent a diversity of legumes) in the LL.

Moderator asks the citizens:

- are you familiar with this crop? (If yes, what do you know about it?)
- which processed products or recipes can we make from this crop?
- what words come to mind when you think of this crop?

Then, based on the answers to the previous questions, the moderator introduces the notions of NUC and agrobiodiversity

- Note that NUC could be at a larger level than the country of the LL (eg. Bean is common in some countries while little used at the international level)
- Moderators present simple quantitative data about the use of the NUC and/or its consumption (e.g., less than 2 kilos/person/year of legumes consumption in France), and data about the non-use or decline of agrobiodiversity in relation with the NUC (e.g., we wrote in the project that there are plenty of legumes in Hungary but only very few are used)

At the end of the introduction, the focus group participants should :

- know what a NUC is;
- understand the importance to produce/develop NUCs for preserving agrobiodiversity; and
- know which NUC will be considered in the living lab of their region, and become familiar with a non-exhaustive list of examples of processed products/recipes that can be made from this NUC

### 3. Knowledge about food supply chains – group exercise in small groups (approx. 3 citizens), 20 minutes (maximum) (if online, use different “rooms”)

The moderator asks citizens to describe how the bread people usually eat gets onto their table. They are invited to draw collectively the main steps of a bread supply chain, then they present it to the moderator.

#### ***Drawing exercise/discussion – 10 minutes***

Presentation of group results and discussion: 1 group starts to present its chain, and the others react; the moderator asks if anything is missing, and if everyone understands what each step is about (i.e. processing = processing of agricultural raw materials to produce a finished product) – **10 minutes**

The particularity, for bread, is that there are two steps of processing: from grain to flour, and from flour to bread.

At the end of this phase, the focus group participants agree on what a food supply chain is and understand its 4 main steps (selection of varieties, cultivation, processing, marketing).

### 4. Discussion about how various options can be of interest for the NUC considered in the living lab – 70 minutes

The moderator invites the group to discuss each step of the supply chain for the NUC considered in the living lab in question. It may be einkorn (France, Hungary), grass pea (Portugal), white lupine (Italy/Switzerland), Lingot or meat bean (France), fava bean (Denmark-Sweden), and one legume in Denmark-Sweden and Hungary.

Participants should say if solutions for each step are good, bad, to be rejected, etc. and why i) for the use of the NUC; ii) for the wide spreading of the NUC in their region or country.

*We are especially interested in WHY question, so please take care of listing these answers in the report. Note that answers can be different between the two questions (use / wide spreading): the second question is a way to introduce a discussion about up-scaling, people may argue that the most demanding option, i.e. local varieties, organic labelled farming, is good in itself, but less favourable to wide spreading). The moderator is not supposed to comment on opinions.*

Approx. 10 minutes are granted to discuss each step.

The food supply chain model is projected/shown again:

Organisation of a plant-based food chain (4 main steps)

Varieties (seeds) → agricultural production → food processing → marketing

Discussion for each step:

*NB. Each moderator replaces “NUC” by the specific crop considered in his/her LL*

- **Step “Varieties”**

- Food is produced from locally selected and/or traditional NUC varieties that often present interesting characteristics (taste, resistance to pests, high nutritional value...)
- Food is produced from new NUC varieties adapted to a large range of situations, selected from recent breeding techniques and presenting desired characteristics (taste, resistance to pests, high nutritional value...)

Questions to the group:

- which one is better for the use of the LL NUC and why?
- which one is better for a wide spread of the LL NUC and why?

NB. For this step, it is interesting to note the 'recent breeding techniques' that may be indicated by the participants (if any) as this is both a complex and controversial subject (i.e. do they speak of GMOs, for instance). This input will feed the WP4.

- **Step "agricultural production"**

- a. Food is produced from eco-friendly techniques that limit the use of synthetic input without a legally binding standard
- b. Food is produced from labelled organic production methods that guarantees that no synthetic input has been used but may induce more expensive food products

Questions to the group:

- which one is better for the use of the LL NUC and why?
- which one is better for a wide spread of the LL NUC and why?

- **Step "food processing"**

- 1) **In case of einkorn**

- a. Einkorn is used to prepare veggie burgers made with different ingredients extracted from a diversity of plants, allowing a wide diversity of veggie burgers with desired characteristics
- b. Einkorn is used to make bread with stone-ground flour, slow fermentation and sourdough, to preserve its intrinsic nutritional value

- 2) **In case of legumes**

- c. The legume is used to prepare veggie burgers made with different ingredients extracted from a diversity of plants, allowing a wide diversity of veggie burgers with desired characteristics
- a. The legume is used to make fermented products / traditional recipes (*choose the best 'mild' option for your legume*), to preserve its intrinsic nutritional value

Questions to the group:

- which one is better for the use of the LL NUC and why?
- which one is better for a wide spread of the LL NUC and why?

- **Step "marketing" (1)**

- a. Detailed information is given on the NUC and the NUC variety that have been used to make the food product, as well as the production methods, etc., which is very informative but can be difficult/long to read
- b. Summary information (e.g. a nutritional score) is given on the NUC and NUC variety as well as information on how they were used, which is less informative but easier to read.

Questions to the group:

- which one is better for the use of the LL NUC and why?
- which one is better for a wide spread of the LL NUC and why?

- **Step “marketing” (2)**

- a. The information about the NUC in the food product is presented on the package that may be not very visible or easy to read
- b. The information about the NUC is provided through digital applications that require the use of a smartphone

Questions to the group:

- which one is better for the use of the LL NUC and why?
- which one is better for a wide spread of the LL NUC and why?

- **Step “marketing” (3)**

- a. Products are sold by farmers or small-scale processors from your region, which favours dialogue with consumers about the use of NUC but is not necessarily very convenient and may induce more expensive food
- b. Products are sold by supermarkets, which is more convenient but generally does not favour dialogue with consumers about the products

Questions to the group:

- which one is better for the use of the LL NUC and why?
- which one is better for a wide spread of the LL NUC and why?

At the end participants should receive the present as well as information about the follow up of this focus group:

"We will take into account all your arguments concerning the use of this NUC to develop food supply chains valuing this NUC in your region. You will receive information about the project and the LL if you wish and you will be invited to participate in other activities, such as food tastings, etc."



## Appendix 4: Configurations of the focus groups

Name of Living Lab	Focused NUC(s)	Number of participants	Format	Categories of participants	Socio-demographic characteristics of participants
Bean Lyon	Bean	8	face-to-face meeting	citizens	female/male, age between 20s-70s
Bean Cast	Lingot bean / Cassoulet	9	face-to-face meeting	citizens farmers chefs	female/male, age between 20s-70s
Leg-ItSwitz	White lupine	12	online meeting	citizens chefs food bloggers food shop holders university students	female/male 20s-60s
GPea-Port	Grass pea	11	hybrid: face-to-face & online meeting	citizens PhD students researchers	female/male 20s-70s
Leg Nord&Faba Nord	Faba bean Grey pea Lentils Blue lupine	7	face-to-face meeting	citizens	female/male 30s-70s
Leg Nord&Faba Nord	Faba bean Grey pea Lentils Blue lupine	8	face-to-face meeting	citizens academicians	female/male 30s-40s
Cer Hung	Einkorn	10	face-to-face meeting	citizens (conscious consumers)	female only 20s-60s
Cer Hung	Einkorn	16	interviews on a festival + additional questionnaires on an Eco-Expo	citizens farmers	female/male 10s-50s
Leg-Hung	Legumes	6	moderated roundtable discussion	farmers retailer gastro writer and blogger chef	female/male 30s-50s