



D1.11: Development of materials for trainings and inter-regional demonstrations of CCs

WP1 – Competence Centres and Technical Expertise Management

Authors: Many Afonso, Thijs Almekinders, Uldanay Bairam, Erik Pekkeriet, Kees Lokhorst



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Lead Author	Manya Afonso	Email	manya.afonso@wur.nl	
	WR	Phone	+31317489822	
Other authors	Thijs Almekinders (WR), Uldanay Bairam (WR), Erik Pekkeriet (WR), Kees Lokhorst (WR)			
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Executive summary

With regard to training and education three related deliverables will be produced. In the first step (D1.13) an overview has given of existing training that can be used. In the second step (D1.11) the agROBOfood network needs for training will be identified. Based on the needs and availability of training material in step 3 there will be set up some specific training activities that will be reported in D1.12).

The main purpose of this Deliverable (D1.11) is to present an assessment of the training requirements of the agROBOfood consortium partners. This was done by asking participating respondents what topics their organizations require training in, in which languages, and whether online or offline. Analytics were run on the merged dataset.

Analytics key points:

- 📌 The area with the most demand for training is robotics competencies;
- 📌 The language for trainings with the most demand is English;
- 📌 Online training is viable, if on-site learning is not required;
- 📌 Most common gaps are: 'finding trainings relevant for the agri-food sector', 'finding trainings at the right level', and 'obtaining information on the trainings'.

Recommendations:

- 📌 Develop joint trainings with other European projects, such as Smart Agri Hubs;
- 📌 Develop a strategy to validate trainings with regard to content, quality and usefulness;
- 📌 A form or tool to gather information on training requirements.

1 Introduction

The agROBOfood project's main objective is to create a network of various stakeholders, both Digital Innovation Hubs (DIH) and Competence Centres (CC) within Europe to support the use of robotics within the agriculture and agri-food sector. This includes the use of existing open software and/or hardware tools as well as identifying the needs and development for training within the project network. This training can be divided over the three service areas: Technology, Business and Ecosystem. Training is not just for end-users and companies only, but is also important for employees within DIHs and CCs. Training your employees is important to gain more expertise, to be able to conduct experiments, use their skills within R&D&I and to train end-users.

The content of this document lays focus on the need and development of additional training within the project focusing on our agROBOfood existing partners, newly associated partners and end-users within the regional clusters. This document tries to answer in which areas the consortium members require training and gives related information such as the languages or format required. In deliverable D1.13, a set of available training courses relevant for the project was compiled and categorized according to various criteria such as service, course type, language, country/cluster, and consortium membership. Thus, the present deliverable complements D1.13 in assessing which topics are covered by existing trainings, which topics require trainings to be set up and which procedure might be useful in developing and testing of specific training material. The information from this deliverable is also expected to be useful for some tasks in Work Package 6, related to the assessment of the maturity of the services.

2 Method

The data collection was done from three sources:

1. an audience poll at the agROBOfood digital week in October 2020
2. one-on-one video calls with CCs, in November and December 2020
3. an online questionnaire sent to all DIHs by email, in January 2021

In all three cases, questions were asked on the following:

- 🗨️ What are the topics in which you (your organization) is seeking training or anticipate to require training in future? These topics were broken down into the three services: technology, business, and ecosystem
- 🗨️ In which sectors related to the agri-food sector do you require training?
- 🗨️ Do you prefer online or in-person training?
- 🗨️ In which language(s) do you require training?
- 🗨️ What problems or gaps have you encountered as a training seeker?

In the agROBOfood digital week audience poll, a set of questions was asked through a slido quiz. This tool allows participants to answer questions which are either in closed form (select one or more responses) or in open form (to type an answer). Thus, it was possible to ask questions related to service, online/offline preference as a closed form question as well as specific topics, problems/gaps, language as open form questions. Slido's data export feature allows the answers to be exported as pdf or excel files.

The questionnaire was prepared as an excel file with the questions listed above, and specimen answers were provided to explain how it had to be filled. It was sent out via basecamp, and then by email to the list of contacts from the DIH catalogue. The respondents sent their responses back by email.

Finally, video calls were planned as a way to get the information directly, as there is a possibility of potential respondents forgetting to reply to the questionnaire by email. The calls were planned to be of 15 minutes in duration, with the questions presented in a word document where the answers were also noted.

After receiving all the responses and information noted from the video calls, the data were merged into a single excel file, that contains one column per respondent, that can be used for further processing. Due to the fact that the slido poll responses cannot be traced back to the respondents, a single column for all the slido responses was added. A data-cleanup check was done to correct for spelling mistakes, formatting differences, etc. and to define categories to group similar or related topics. A python script was developed to read this excel file and prepare graphs for analytics related to the above points.

The questionnaire, video call question list, slido question list, and merged excel data file are included in the annexes.

3 Results and Discussion

The slido poll at the digital week webinar registered 18 active users, and the number of responses obtained was 7 for the one-on-one video calls, and 16 for the questionnaire. The responses after cleanup and merging in a standard format were analyzed with a Python script which produced the graphs and analytics presented in this section.

3.1 Training requirements by topic

The topics in which training is required is the most important detail to be determined from this work. This requires a data clean up to correct spelling and formatting errors, categorization to group similar terms (for example sales and marketing), and classifying them under the right service.

3.1.1 Technology Service

For the technology service, the bar graphs for the reported topics is shown in Figure 1 (top) and the categorized topics are shown in Figure 1 (bottom). Robotics competencies refer to those technical topics such as robotics hardware and software, artificial intelligence, computer vision, etc. required for robotic solutions. Expectedly, this was the most reported group of topics, followed by domain knowledge. This refers to basic knowledge of agriculture, agronomy, and the agri-food sector which are relevant from the point of view of the project.

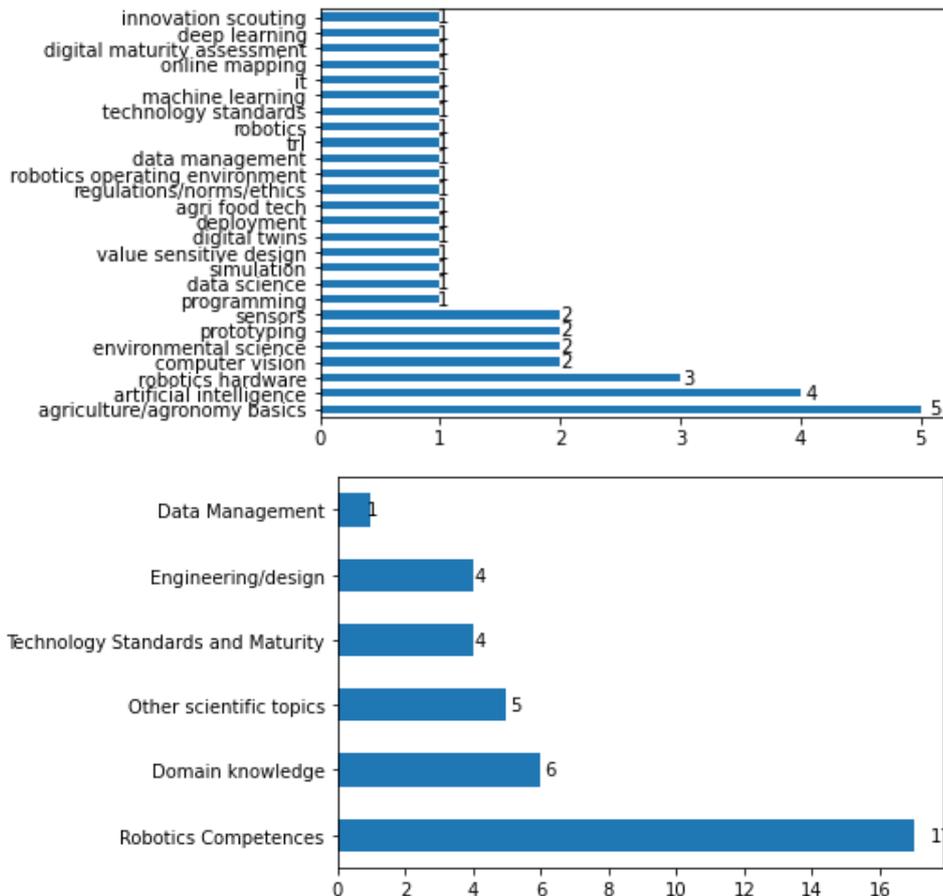


Figure 1: (top) technology topics in which respondents reported as requiring training, (bottom) categorized topics

3.1.2 Business Service

The bar graphs for the topics and categories under the business service are presented in Figure 2 (top) and Figure 2 (bottom), respectively. It can be seen that project management and business development (marketing and funding acquisition) have the most reported training needs.

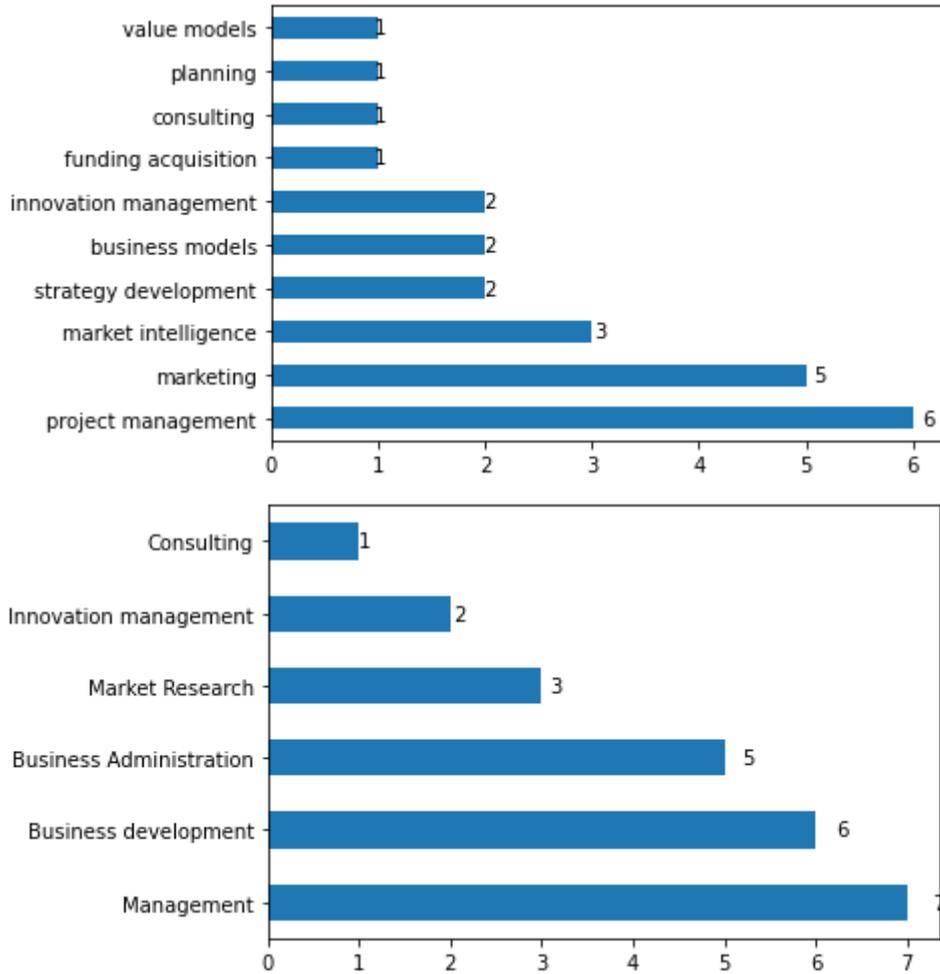


Figure 2: (top) business topics in which respondents reported as requiring training, (bottom) categorized topics.

3.1.3 Ecosystem Service

Finally, for the ecosystem service, the bar graphs for the topics and categories are presented in Figure 3 (top) and Figure 3 (bottom), respectively. It can be seen that networking was the topic most required for training, followed by communication topics.

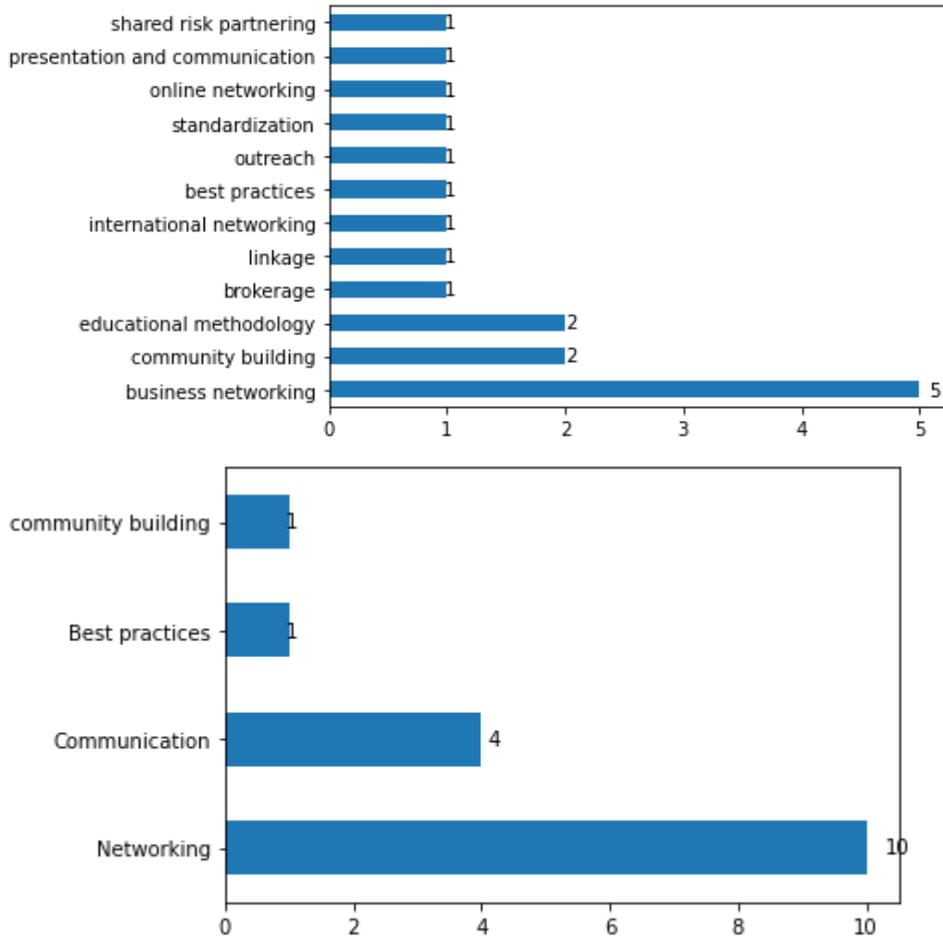


Figure 3: (top) ecosystem topics in which respondents reported as requiring training, (bottom) categorized topics.

3.2 Training requirements by sector

To identify which sub-sectors from agriculture and agri-tech are relevant for the training to focus on, a question was included in the questionnaire. It can be seen that there is training requirement over all sectors, with the largest number of respondents selecting all of the below:

-  Arable Farming
-  Fruits
-  Livestock
-  Greenhouses
-  Aquaculture
-  Breeding
-  Dairy
-  Vegetables
-  Food Processing
-  Agri-Food Logistics
-  Agri-Food Retail

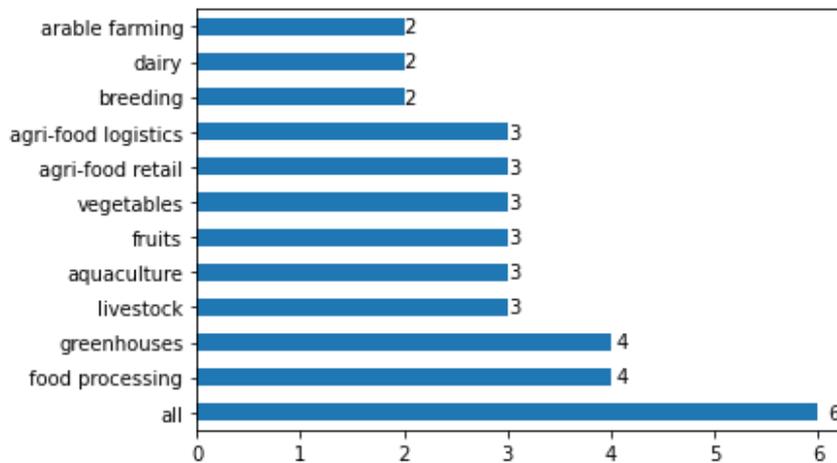


Figure 4: Sectors which respondents reported as relevant for training needs.

3.3 Language requirements

The bar graph of the languages in which training needs were reported is presented in Figure 5. English by far exceeds any of the other languages and even their sum, thus it is important and probably sufficient to prepare trainings in English.

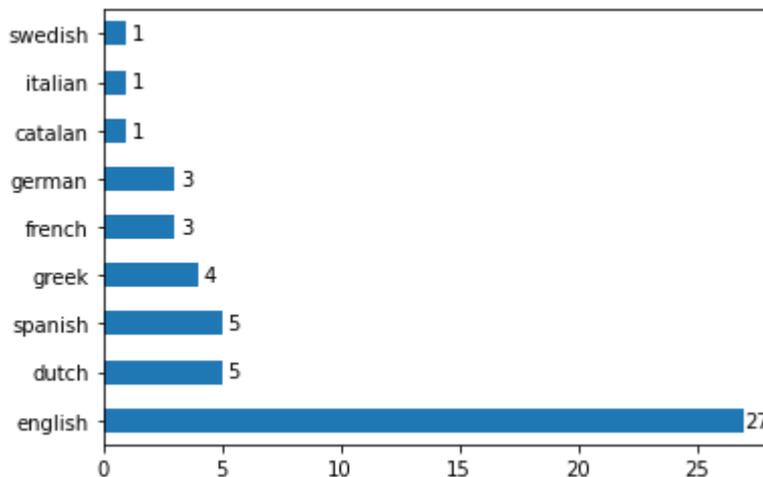


Figure 5: Bar plot of the languages in which training needs were reported.

3.4 Online or in-person

The results on preference for online or in-person training courses are presented in Figure 6. The majority indicated a preference for online courses or for both online and offline. While it is unclear whether this is an effect of the present Covid19 pandemic, it shows that online learning is emerging as a viable alternative to in-person training.

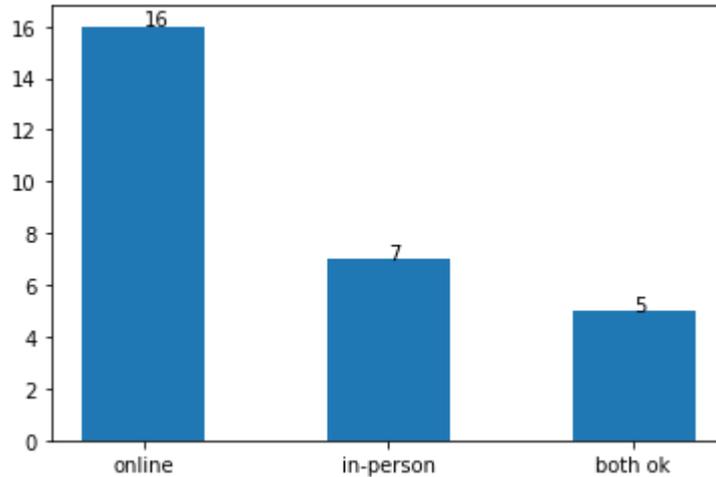


Figure 6: Bar plots of the number of training courses, by (top) online or in person; (bottom) online or in person, with breakdown by service.

3.5 Course on setting up a DIH

A question was included in the questionnaire, addressed to DIHs, on whether they were interested in attending a course on setting up a DIH. A clear majority indicated interest, while the remainder answered not sure.

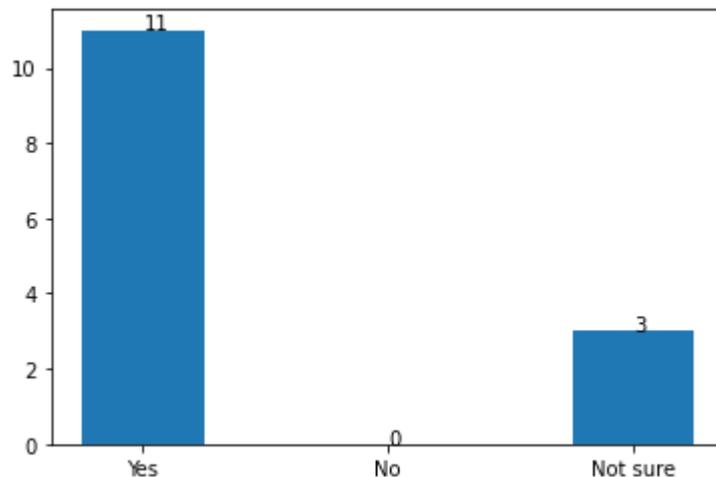


Figure 7: Bar plot of responses to the question on interest in taking part in a course on setting up a DIH.

3.6 Reported Problems and Gaps

This was an open ended question to which respondents answered with the points which they feel are problems or gaps that they encountered concerning trainings. The answers are presented as a bar graph in Figure 8. The largest number reported that finding training topics related to the agri-food sector was a problem. Others reported the level of trainings available, and finding information on trainings as an issue.

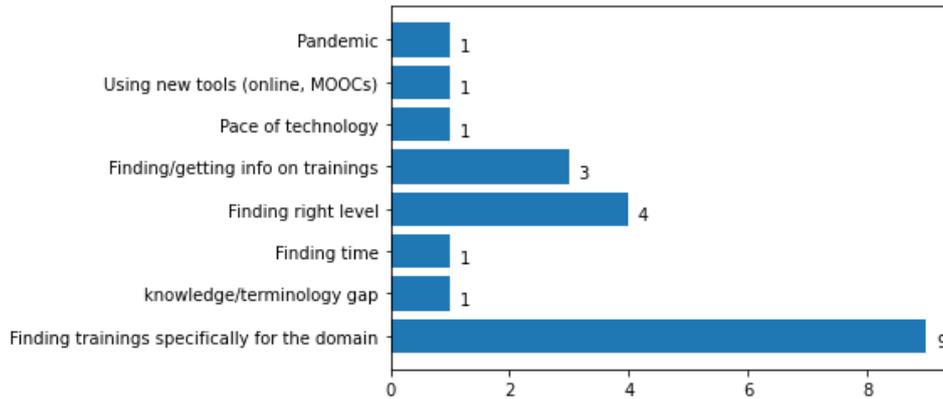


Figure 8: Bar plots of the number of the number of training courses, by (top) consortium membership; (bottom) consortium membership with further breakdown by service.

3.7 Availability of Reported Required Trainings

The final part of this analysis is to check which of the topics reported as training requirements in this deliverable are already available in the catalog of training materials compiled for deliverable D1.13. Once again, a python script was developed to parse the topics listed under each of the three services, and looked up in the list of topics from the courses from the catalog from D1.13. A manual correction was applied to match similarly worded topics such as sales and marketing, or similar topics such as deep learning and artificial intelligence.

The findings are presented in Table 1. There are quite a lot of offerings in technological topics such as robotics and artificial intelligence, whereas more specific topics are difficult to find. On the other hand, there were no trainings found for ecosystem topics. It should also be noted that the available trainings include general courses on economics and finance, which probably cover specific required topics such as funding acquisition.

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Table 1: Training topics reported as required which are available and not available in the catalogue of available trainings (D1.13).

Service	Available	Not yet available
Technology	(8) artificial intelligence, computer vision, robotics, data science, ICT, innovation management, agri food tech, agriculture/agronomy basics	(14) sensors, innovation scouting, environmental science, regulations/norms/ethics, prototyping, digital maturity assessment, simulation, programming, data management, value sensitive design, technology standards, online mapping, TRL, digital twins
Business	(3) marketing, planning, project management	(6) strategy development, business models, consulting, market intelligence, value models, funding acquisition
Ecosystem	(0)	(12) outreach, shared risk partnering, online networking, standardization, educational methodology, international networking, business networking, linkage, brokerage, presentation and communication, best practices, community building



4 Conclusions and Recommendations

The conclusions from the data analytics are summarized below:

- Across all services, the area with the most demand for training is robotics competencies, which includes topics related to developing and applying robotic solutions, such as robotics hardware, AI, computer vision, machine and deep learning;
- Sector wise, there is demand for trainings related to all sectors of the agri-food domain;
- English was by far the training language required indicated by the largest number of respondents. Thus, for the purpose of training DIHs, it is important to develop trainings in English;
- 75% of the respondents indicated that they prefer 'online training' or 'both online and in-person are ok'. This indicates that the online option is viable for at least those topics which do not require working on-location and/or with lab equipment;
- There is broad interest in attending a course on setting up a DIH, as most respondents replied with 'yes' and a few, 'not sure';
- The most common gaps/problems from the point of view of training seekers reported were 'finding trainings relevant for the agri-food sector', 'finding trainings at the right level', and 'obtaining information on the trainings';
- Based on the comparison between reported required topics and the available trainings, it can be concluded that there are sufficient trainings available in technological topics such as robotics competences and domain knowledge, but specialized trainings will have to be set up in other technical/scientific topics specifically in agri-food tech. In the business sector, trainings are available for marketing/sales, project management, and broader topics such as finance, economics, and planning, therefore trainings for business models/strategy and other topics tailored to agri-food tech will have to be created. This is also true for the ecosystem topics such as networking and community building.

Based on these findings, the following recommendations are made:

- 📌 Based on the analytics related to the training topics and sectors, it is recommended to develop joint trainings with other European projects, such as Smart Agri Hubs, may be a way to optimize resources and effort;
- 📌 A strategy needs to be developed on how to develop and validate trainings, with regards to the content, quality and usefulness. For example, define a time frame to decide if the knowledge learnt is being applied. This will require inputs from consortium members. This exercise can be synchronized with similar work planned in WP6, on obtaining specific sub-topics for training/expertise;
- 📌 A form or tool on the project website to ask consortium members for their training requirements;
- 📌 Finally, getting information or responses for this deliverable was a challenge as members may not reply promptly to emails or may miss the related messages sent through basecamp. Therefore a different strategy may have to be defined by the project steering group for future exercises requiring such data polling.

5 Annexes

Annex I: Questions asked in Slido poll at digital week webinar

- Do you provide trainings, workshops, or courses relevant to the agROBOfood project?
- On what specific topics/areas (for example, drones, deep learning) do you CURRENTLY PROVIDE trainings/courses?
- On what specific topics/areas do you IN FUTURE PLAN TO OFFER trainings/courses?
- Are the training courses in your organization accessible to:
 - In what languages do you offer these training courses?
- As a training provider, what problems and/or gaps have you encountered with the training programs ?
- As a training provider, which of the following best describes possible solutions to the aforementioned problems/gaps
- As an organization seeking training, in what topics do you currently require training, or in future anticipate training?
- As a training seeker, which do you prefer?
- As a training seeker, in which language do you require training?

Annex 2: Questions asked in one-on-one meetings

1. Do you **provide trainings**, workshops, or courses to students or clients, relevant to the agROBOfood project? If No, go to Q7
2. On what specific topics/areas (for example, drones, deep learning) do you **CURRENTLY PROVIDE** trainings/courses?

Technology:

Business:

Ecosystem:

3. Do you have any training course that focuses on any of the following sectors of agri food tech? If so, which ones?

Arable Farming, Fruits, Livestock, Greenhouses, Aquaculture, Breeding, Dairy, Vegetables, Food Processing, Agri-Food
Logistics, Agri-Food Retail

4. Are the training courses in your organization accessible to:

(a) employees/students only

(b) clients/ external collaborators

(c) interested, qualified, and paying members of the public

5. In what languages do you offer these training courses?
6. As a training provider, what problems and/or gaps have you encountered with the training programs ?
7. As an **organization seeking training**, in what topics do you currently require training, or in future anticipate training?
8. As a training seeker, which do you prefer? Online or in-person
9. As a training seeker, in which language do you require/prefer training?
10. As a training seeker, what problems and/or gaps have you encountered with available training programs ? Any specific to the sectors listed in Q3?



Annex 3: Questionnaire sent by email

	Question			Example Answers (this is to show how to fill the form)
Q1	Organization name			Wageningen UR
Q2	As an organization seeking training, in what topics do you currently require training, or in future anticipate training?			
		Technology		robotics hardware
		Business		project management
		Ecosystem		business networking, marketing
Q3	As an organization seeking training, do you require training or in future anticipate requiring training in any			Yes



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	of the following sectors? If yes, which ones?			
		Arable Farming, Fruits, Livestock, Greenhouses, Aquaculture, Breeding, Dairy, Vegetables, Food Processing, Agri-Food Logistics, Agri-Food Retail		all
Q4	As a training seeker, which do you prefer? Online or in-person			
		Online		
		In-person		x
Q5	As a training seeker, in which language do you require/prefer training?			Dutch, English
Q6	As a training seeker, what problems and/or gaps have you encountered with available training programs ?			difficult to find technical/IT trainings specifically focusing on agriculture
Q7	Would your organization be interested in attending a course on the setting up			Yes



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	of a Digital Innovation Hub?			
Q8	Other relevant information/comment on trainings?			



Annex 4: Combined and anonymized responses

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45	Q46	Q47	Q48	Q49	Q50	Q51	Q52	Q53	Q54	Q55	Q56	Q57	Q58	Q59	Q60	Q61	Q62	Q63	Q64	Q65	Q66	Q67	Q68	Q69	Q70	Q71	Q72	Q73	Q74	Q75	Q76	Q77	Q78	Q79	Q80	Q81	Q82	Q83	Q84	Q85	Q86	Q87	Q88	Q89	Q90	Q91	Q92	Q93	Q94	Q95	Q96	Q97	Q98	Q99	Q100
Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44	Q45	Q46	Q47	Q48	Q49	Q50	Q51	Q52	Q53	Q54	Q55	Q56	Q57	Q58	Q59	Q60	Q61	Q62	Q63	Q64	Q65	Q66	Q67	Q68	Q69	Q70	Q71	Q72	Q73	Q74	Q75	Q76	Q77	Q78	Q79	Q80	Q81	Q82	Q83	Q84	Q85	Q86	Q87	Q88	Q89	Q90	Q91	Q92	Q93	Q94	Q95	Q96	Q97	Q98	Q99	Q100



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