

# ROBS4CROPS

## D1.5 Collaboration plan with other relevant projects and initiatives

• [robs4crops.eu](https://robs4crops.eu)



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ROBS4CROPS Consortium			
Participant Number	Participant organisation name	Short name	Country
1	STICHTING WAGENINGEN RESEARCH	WR	NL
2	GIROPOMA COSTA BRAVA SL	GIR	ES
3	AGROTIKOS SYNETAIRISMOS POLISEOS XIRON KAI NOPON STAFYLION KIATOY KORINTHIAS PIGASOS	PEG	GR
4	SERRATER SL	SER	ES
5	SMART AGRI TECHNOLOGY BV	SAT	NL
6	TERRENA SOCIETE COOPERATIVE AGRICOLE	TER	FR
7	ABEMEC BV	ABE	NL
8	AGREENCULTURE	AGC	FR
9	AGRO INTELLIGENCE APS	AI	DK
10	FOODSCALE HUB ENTREPRENEURSHIP ANDINNOVATION ASSOCIATION	FSH	SR
11	TEYME TECHNOLOGIE AGRICOLA SL	TEY	ES
12	GOPONIKO PANEPISTIMION ATHINON	AUA	GR
13	FUNDACIO EURECAT	EUT	ES
14	KOBENHAVNS UNIVERSITET	UCHP	DK
15	UNIVERSITAET HOHENHEIM	UHOH	DE
16	PANEPISTIMIO PATRON	LMS	GR

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## D1.5 Collaboration plan with other relevant projects and initiatives

List of Abbreviations and Acronyms	
DIH	Digital innovation hub

# 1. Introduction

This document identifies the areas and activities where ROBS4CROPS will work together with various projects and initiatives. Examples of working together are joint meetings, innovation hubs, and facilities development. Robs4Crops partners are having an instrumental role in the European Digital Innovation Hubs ecosystem. This deliverable proposes the plan on how to work together with other EU projects in the Digital innovation hubs and new initiatives to stimulate the adoption of agricultural robotics in the practice of farming systems.

The collaboration efforts should be aligned with the objectives of Robs4Crops. The three main objectives of Robs4Crops are:

1) Build an ecosystem of users and other stakeholders to support all aspects of the practical application of agricultural robots. 2) Build a robotic farming system that uses knowledge from industrial manufacturing to achieve full autonomy, and that fits with existing agricultural machinery, practices, and standards. 3) Demonstrate the robotic system in diverse large-scale pilots across Europe.

**The topics for collaboration derived from the main Robs4Crops objectives are therefore:**

**1) Identify and link to initiatives and projects that consist of users and stakeholders that practically apply agricultural robots**

**2) Identify and link to ecosystems and hubs that are active in full autonomous robots in industry, and learn how to transfer lessons learned into Robs4Crops agricultural robot applications and pilots**

**3) Identify and link to large scale initiatives to spread the Robs4Crops pilots' activities**

Each of the objectives involves collaboration with other projects and partners, such that the adoption of robotics throughout agriculture is accelerated. In this deliverable we first identify who to collaborate with, and later how we propose to collaborate.

## 2. Who to collaborate with - to stimulate adoption of agricultural robots

### Overview of Pan European projects active in hubs

This section provides an overview of pan European projects active in hubs related to agro robotics. Only projects relevant for the scope of Robs4Crops are mentioned.

The information presented has been gathered in the EU project AgRoboFood. AgRoboFood is almost finalized as an EU project. AgRoboFood has good connections with the The International Forum for Agricultural Robotics (French acronym = FIRA) and Global Organisation For Agricultural Robotics (Gofar).

Within AgRoboFood several overviews have been created to identify hubs and partners active in agricultural robots. Figure 1 shows the identified partners for South West Europe. The partners identified are not active in Robs4Crops, and therefore interaction could provide mutual benefits.



Figure 1 Overview of hubs in agro robotics in South-Western Europe. From: Inextenso (2022).

In addition to this overview of the hubs, also the EU is keeping track of digital hubs. The list of hubs and contact points for agricultural robot initiatives is added in the Annex to this deliverable, and can be used by the partners of Robs4Crops in the identification of partners to collaborate.

### National networks and activities

Apart from European projects that coordinate and link activities, also national initiatives are working on stimulating the developments of agricultural robots and digitalisation.

France:

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In France a large national challenge has started in 2022. “Grand Défi Robotique Agricole” (= Great Challenge for Agricultural Robotics). The information from RobAgri and INRAe for this challenge is as follows:

- **Objective** : “improve the emergence and interaction of agricultural equipment with their complex environment and facilitate their appropriation by farmers and citizens”. With the ambition to “be able to provide robotic tools for the realisation of agro-ecological itineraries capable of feeding people while limiting the impact of this human activity on the planet”.
- **Start** : Beginning of 2023, **Duration** : 5 years, **Instigator** : French State, **Leader** : French association “RobAgri”, **Stakeholders** : Researchers, Manufacturers of agricultural machinery and robotics, equipment manufacturers, clusters, education and farmers groups.

## Facilities development - Agrifood TEF

The European Commission introduced artificial intelligence Testing and Experimentation Facilities (TEFs) in the Digital Europe programme. This is done to achieve the strategy of EU to optimise the development and deployment of artificial intelligence, including robotics. Topics in the testing and experimentation facilities are manufacturing, healthcare, agri-food, smart cities and communities. Especially for Agri-Food these testing facilities are important, and there are good chances for Robs4Crops partners and pilots to cooperate with other projects and partners at these testing facilities.

These TEFs will be specialised large-scale reference sites open to all technology providers across Europe to test and experiment state-of-the art AI-based soft-and hardware solutions and products, including robots, in real-world environments, and at scale. This effort is an important step to bring technology to market and improve a higher uptake of AI in Europe.

## Sister projects and new ag robot EU initiatives

In the ICT46-2020 call (in which Robs4Crops is funded), several other projects have also been funded. In the call text the specific challenge identified was: “While robots originated in large-scale mass manufacturing, they are now spreading to more and more application areas. In these new settings, robots are often faced with new technical and non-technical challenges. The purpose of this topic is to address such issues in a modular and open way and reduce the barriers that prevent a more widespread adoption of robots. Four Priority Areas (PAs) are targeted: healthcare, inspection and maintenance of infrastructure, agri-food, and agile production.

Robs4Crops is active mainly in the agri-food sector. However, to learn from other projects for the technical and non-technical challenges, it is useful to step out for specific topics into the other priority areas mentioned. Therefore, here we list the projects funded in the call in Table 1, including the related topics of healthcare, inspection and maintenance of infrastructure and the agile production.

*Table 1 Overview of projects granted under the ICT46-2020 EU call.*

No	Title	Acronym	Id
1	AI-Driven Cognitive Robotic Platform for Agile Production environments	ACROBA	101017284
2	Robots for protecting crops	ROBS4CROPS	101016807



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3	Secure and Safe Multi-Robot Systems	SESAME	101017258
4	Robotics with and for Society – Boosting Widespread Adoption of Robotics in Europe	Robotics4EU	101017283
5	FLEXible assembly manufacturing with human-robot Collaboration and digital twin models	FELICE	101017151
6	Open-Digital-Industrial and Networking pilot lines using modular components for scalable production	ODIN	101017141
7	Flexible robots for intelligent automation of precision agriculture operations	FLEXIGROBOTS	101017111
8	Cognitive Robotic System for Digitalized and Networked (Automated) Insect Farms	CoRoSect	101016953
9	Collaborative draping of carbon fiber parts	DrapeBot	101006732
10	Dynamic Agile Production Robots That Learn and Optimise Knowledge and Operations	DARKO	101017274
11	A Collaborative Paradigm for Human Workers and Multi-Robot Teams in Precision Agriculture Systems	CANOPIES	101016906
12	Enhancing Healthcare with Assistive Robotic Mobile Manipulation	HARMONY	101017008
13	TRACEABLE ROBOTIC HANDLING OF STERILE MEDICAL PRODUCTS	TraceBot	101017089

Some of the projects in the same call and active in agrifood are already in touch with Robs4Crops. Partners active in Robs4Crops are also active in FlexigRobots and Corosect. However, joint activities or interaction will have to take place to learn lessons.

Within Europe, apart from the EU project funding, initiatives such as [EIP-Agri](#) and [euRobotics](#) are active to guide policy and funding towards topics that need most attention to solve the challenges for robotics in agricultural applications. Especially for the non-technical challenges and to prepare society for robotic workers, these organisations are important to include in discussions and activities.

## Topics for collaboration

This paragraph provides a description of the topics that are relevant for collaboration activities between Robs4Crops partners and other projects. Robs4Crops can feed other projects with best practices learned in the pilots (output). Robs4Crops partners can learn the other way around most from the topics listed here (input). Table 2 provides this overview of topics that can be covered during the activities.

*Table 2 Collaboration topic overview and input / output indication for Robs4Crops*

Topic	Input / output
Ethics and value sensitive design	Output
Co - design	Output
ROI tools	Input/Output

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Isobus / machine control	Output
Robot safety	Input
Standardisation	Input
Autonomous drones	Input
Land vehicles	Output
Crop protection	Output
Cost benefit	Output
Scaling production	Input
Business models	Input/Output
Robots as a service	Input/Output
Adoption	Output
Safety regulations	Output
Financing ag robots	Input
Insuring ag robots	Output
Manufacturing ag robots	Input
Smart implements	Output
Digital twins	Output
Farming controller	Output

## 3. How to collaborate - to improve Robs4Crops pilot robot adaptation

### Phases in Robs4Crops

The Robs4Crops project has several stages in development of the robotic systems deployed in the large-scale pilots. The collaboration activities need to be aligned with the iterations in which the technical and non-technical activities are performed. Robs4Crops is working in three annual iterations, each of which produces a next version of a Minimum Viable Product (MVP). The MVPs are evaluated in farming practice in the four large scale pilots. Especially where industry 4.0, DIH's and other projects need to feed and interact with Robs4Crops, that is where collaboration will be required.

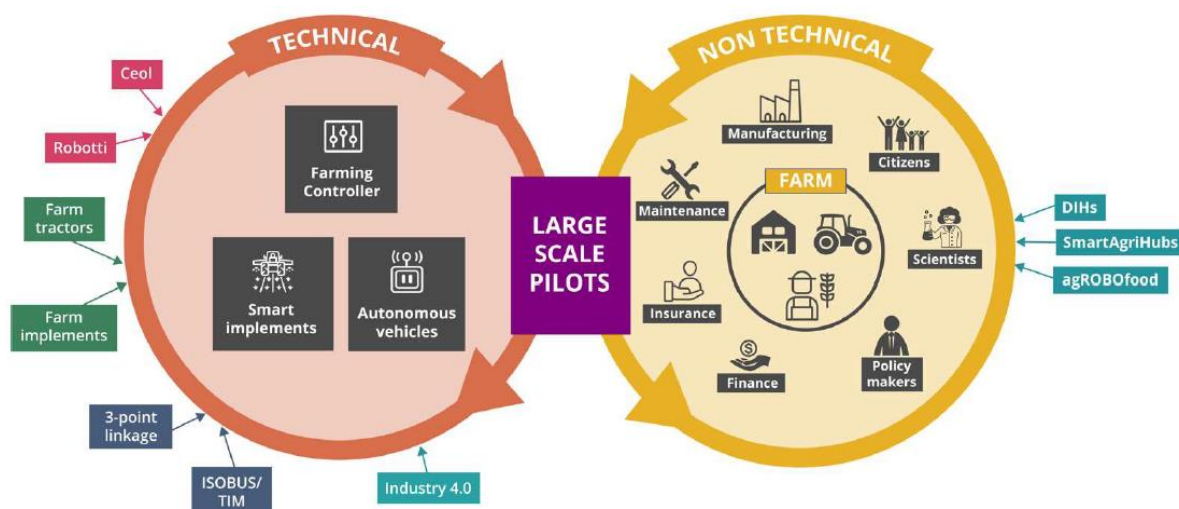


Figure 2 Robs4Crops concept, showing iterations between addressing technical and non-technical challenges in the large-scale pilots.

### Pathways towards collaboration

A combination of the technical and ecosystems activities is required in the collaboration activities. Building of the digital innovation hubs is “growing” through three phases. Namely, the “sowing”, “flowering” and “harvesting” phases (SmartAgriHubs, 2020). In our collaboration activities we can link with existing hubs and clusters. We should take into account the different stages that the innovation clusters are in. Robs4Crops activities will only be effective if they are aligned with the proper growth stage of the innovation hub.

### Joined activities

The following types of activities are suitable to exchange with other groups and projects.

- Workshops – organize and/or join
- Conferences – organize and/or join
- Meetings with Horizon Europe teams
- EU Robotics stakeholder group meetings

### Tailored mentoring approach

Apart from group activities, we propose to also work on a tailored mentoring approach. In AgRoboFood the mentoring approach has also worked to link especially smaller companies to larger companies and organisations to help them innovate and organise. When small medium enterprises are mentored, they can be assisted to get their products into the market. That is also the reason for EU to fund digital innovation hubs, to go from research initiatives to products that are commercially viable and available for end-users.

It is known that small and medium-sized enterprises (SMEs) are innovation rich, but time scarce. To be successful as a company, you need support, and finding the route in innovation landscape is difficult. Therefore, SMEs are provided with a digital innovation hub mentor, such that they are helped with their innovation.

Within Robs4Crops this mentoring approach has more or less already started due the nature of the large-scale pilots. In ever pilot the SME’s involved are joined by a larger research institute that is helping with the innovation needs and networks around. However, we can make this implicit process more explicit and collaborate with other partners to help especially to bring the product into the market in the second half of the Robs4Crops project, were we need to work from technical excellence towards commercial excellence in agricultural robotics.

## 4. Future actions

In this chapter we list the actions than can be derived from the topics and projects identified in the previous chapters.

### 2023 planned activities for collaboration

In 2023 the following activities will be scheduled for collaboration :

- Map the topics from Table 2 to the Robs4Crops partners, identify blank spots and work on those specifically.
- Join FIRA 2023 in Toulouse.
- Investigation of current EU Horizon projects where R4C partners participate.
- Join the EU Robotics forum, Odense Denmark workshop.
- Investigate Agrifood TEF opportunities with the Robs4Crops partners.
- Contribute to AgRoboFood events, e.g., pitch your robot event, stimulate membership of AgRoboFood innovation hub.
- Identify which Robs4Crops partners need specific mentoring activities to reach the Robs4Crops goals and beyond.
- Define activities for 2024 collaborations.

### 2024 planned activities for collaboration

In 2024 the following activities will be scheduled for collaboration:

- Identify links with EU projects that have started past 2021.
- Work together with other pilots and projects in Agrifood TEF locations.
- Have joint workshop with sister projects in ICT46-2020 to exchange about topics in standardisation and safety.

### Post Robs4Crops collaboration activities

When Robs4Crops has finalized, the following activities are foreseen as longer lasting actions to ensure that agricultural robots developed in the large-scale pilots will reach commercial adaptation at the end users.

- Membership of R4C project partners in robotics associations
- Research organisations keep on mentoring SMEs involved in Robs4Crops
- European and worldwide organisation like FIRA and Gofar keep connecting to new consortia and companies to accelerate the adoption of agricultural robots in practice.

## 5. Conclusion

## D1.5 Collaboration plan with other relevant projects and initiatives

A collaboration plan with other relevant projects and initiatives has been proposed and described in this deliverable. The main aspects are related to the landscape of EU projects on Agricultural Robotics, as well as digital and robotics hubs in Europe. Robs4Crops partners can now team up in the activities that help to accelerate the adoption of robotics in farming systems of our end users.

## 6. References

Inextenso, 2022. - [https://www.inextenso-innovation.fr/wp-content/uploads/2021/04/INVIVO\\_QUESTEUROTOUR2021\\_LEAFLET.pdf](https://www.inextenso-innovation.fr/wp-content/uploads/2021/04/INVIVO_QUESTEUROTOUR2021_LEAFLET.pdf). Accessed 9 December 2022.

SmartAgriHubs, 2020, Ecosystem building strategy, smartagrihubs.eu

## D1.5 Collaboration plan with other relevant projects and initiatives

# 7. Annex

### Overview of European DIH relevant for agricultural robot development and adoption

DIH Name	Location	City	Country	Website
#DigiAgriFood	Xanthi, Greece	Xanthi	Greece	
AgroHub.BG, 205812420	4023, Plovdiv, Bulgaria	Plovdiv	Bulgaria	
Andalucía Agrotech Digital Innovation Hub	C/ Tabladilla s/n,	Sevilla	Spain	<a href="https://www.andaluciaagrotech.com/">https://www.andaluciaagrotech.com/</a>
ARAGÓN DIH	C/ María de Luna 7,	Zaragoza	Spain	<a href="https://www.aragondih.com">https://www.aragondih.com</a>
ARTES 5.0 - RESET ITALY	Viale Rinaldo Piaggio,	Pontedera	Italy	
ATTRACT DIH	Campus da FEUP, Rua	Porto	Portugal	<a href="https://attract.inesctec.pt">https://attract.inesctec.pt</a>
Catalonia Digital Innovation Hub (DIH4CAT)	Paseo de Gracia 129,	Barcelona	Spain	<a href="https://dih4cat.cat/">https://dih4cat.cat/</a>
CeADAR: Ireland's Centre for Applied AI	Block 9/10 NexusUCD,	Dublin	Ireland	<a href="http://www.ceadar.ie">http://www.ceadar.ie</a>
CETMA-DIHSME	Brindisi (BR) CAP	Brindisi	Italy	<a href="http://www.cetma.it/">http://www.cetma.it/</a>
CIDIHUB - Canary Islands Digital Innovation Hub	C/ Santiago Cuadrado	Santa Cruz de	Spain	<a href="https://cidihub.org/">https://cidihub.org/</a>
CityInnoHub	Bd. Mamaia, no. 124,	Constanta	Romania	<a href="https://cityinnohub.univ-ovidius.ro/">https://cityinnohub.univ-ovidius.ro/</a>
Cyprus DIGital INNovation Hub (DiGiNN)	20, Konstantinou	Nicosia	Cyprus	<a href="http://www.diginn.eu">http://www.diginn.eu</a>
DATAlife	Avenida Mestre	A Coruña	Spain	<a href="https://www.dihdatalife.com/en/">https://www.dihdatalife.com/en/</a>
DIGI-SI	Slomškov trg 15, 2000	Maribor	Slovenia	<a href="http://www.digi.si/">http://www.digi.si/</a>
DIGIS3 Smart Sustainable & CoheSive	Plaza del	Carbajosa de la	Spain	<a href="https://digis3.eu">https://digis3.eu</a>
Digital Accelerator of Latvia	Riga, Eksporta street 5,	Riga	Latvia	<a href="http://www.digitallatvia.lv/home/">http://www.digitallatvia.lv/home/</a>
DIVA	Chateau de la	Nantes	France	<a href="https://www.diva-dih.eu/en/home/">https://www.diva-dih.eu/en/home/</a>
EDIH BRETAGNE	263 avenue du	Rennes	France	<a href="https://dih-bretagne.eu/">https://dih-bretagne.eu/</a>
EDIH Odense: Collaborative Robots in	Forskerparken 10,	Odense	Denmark	<a href="http://www.teknologisk.dk">http://www.teknologisk.dk</a>
EDIH Ostrava	17. listopadu 2172/15	Ostrava-Poruba	Czech Republic	<a href="https://www.dihostrava.cz/en/homepage/">https://www.dihostrava.cz/en/homepage/</a>
EDIH Zuid	BIC, Eindhoven 5657	Eindhoven	Netherlands	
EDIH4IAE.LT	Mokslininku st. 6A,	Vilnius	Lithuania	<a href="https://e-dih.lt/">https://e-dih.lt/</a>
European Digital Innovation Hub CROBOHUB ++	10000 Zagreb, Croatia	Zagreb	Croatia	<a href="https://www.fer.unizg.hr/?">https://www.fer.unizg.hr/?</a>
European Digital Innovation Hub Zagore	6000, Stara Zagora,	Stara Zagora	Bulgaria	<a href="http://edih-zagore.szeda.eu/">http://edih-zagore.szeda.eu/</a>
Flanders AI EDIH	Remisebosweg 1	Leuven	Belgium	<a href="http://www.imec-int.com/">http://www.imec-int.com/</a>
HPC4Poland EDIH	61-139, Poznań	Poznań	Poland	<a href="https://www.hpc4poland.pl/en/">https://www.hpc4poland.pl/en/</a>
i4CAMHUB (Innovation for Competitiveness and	Carretera Pedro	Tomelloso, Ciudad	Spain	<a href="https://www.i4camhub.com/">https://www.i4camhub.com/</a>
INNDIH: Valencia Region Digital Innovation Hub	Avenida Leonardo Da	Paterna, Valencia	Spain	<a href="https://www.inndih.com/en/">https://www.inndih.com/en/</a>
IRIS: European Digital Innovation Hub Navarra	Calle Tajonar 20, 31006	Pamplona, Navarra	Spain	<a href="https://www.irisnavarra.com/">https://www.irisnavarra.com/</a>
JURK EDIH	Radnička 2F, 44330	Novska	Croatia	
Latvian IT Cluster	Riga, Skolas iela 11, LV-	Riga	Latvia	<a href="https://www.itbaltic.com/">https://www.itbaltic.com/</a>
Location Innovation Hub (LIH)	Vuorimiehentie 5,	Espoo	Finland	<a href="https://www.maanmittauslaitos.fi/en/rese">https://www.maanmittauslaitos.fi/en/rese</a>
MINASMART	Campus Région du	Charbonnières-les-	France	<a href="https://www.minasmart-">https://www.minasmart-</a>
North East Romania DIH - Digital Innovation Zone	Gheorghe Asachi 14,	Iasi	Romania	<a href="https://www.digital-innovation.zone">https://www.digital-innovation.zone</a>
sustAIn.brussels	Cantersteen 10/12,	Brussels	Belgium	<a href="https://sustain.brussels/">https://sustain.brussels/</a>
Trakia Digital Innovation Hub	Tsar Asen №24, 4000,	Plovdiv	Bulgaria	<a href="https://www.linkedin.com/company/digit">https://www.linkedin.com/company/digit</a>
Transilvania Digital Innovation Hub	No 1, Dimitrie	Cluj-Napoca	Romania	<a href="https://transilvaniadih.ro/">https://transilvaniadih.ro/</a>
Tuscany X.0	PISA (PI), 56126, Largo	Pisa	Italy	<a href="https://distrettogate40.it/">https://distrettogate40.it/</a>
Wallachia eHub (WeHub)	Str. Ion Ghica 13	Bucharest	Romania	<a href="https://wallachiaehub.ro/en/about-us/">https://wallachiaehub.ro/en/about-us/</a>