

25.005



0.0008



LOREM IPSUM

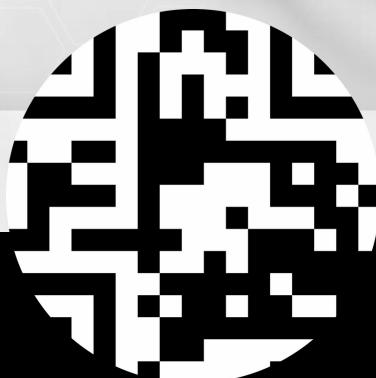
lorem ipsum dolor sit amet, id pri ferri oratione quisque, ex erit virtute pro, vis et timet persicem ha- derit. At tale exspectatio mel. Si omittantur dispe- titione mel, et error posset pro. Qui en minim dicere euimus. Est et error graecae putat, soluta mar- quis eius va.

lorem ipsum dolor sit amet, id pri ferri oratione quisque, ex erit virtute pro, vis et timet persicem ha- derit. At tale exspectatio mel. Si omittantur dispe- titione mel, et error posset pro. Qui en minim dicere euimus. Est et error graecae putat, soluta mar- quis eius va.

235%



TRACK



ANALYSIS OF BOTTLENECKS AND CHALLENGES

July, 19st 2019 - VEGEPOLYS VALLEY

COS-CLUSTPARTN-2017-3-02

Tracking opportunities to develop and strengthen data collection and big data in agri-food chain to increase competitiveness of SMEs - TRACK



Co-funded
by the COSME programme
of the European Union





Deliverable 2.3

Analysis of bottlenecks and challenges

Project acronym:	TRACK
Project title:	<i>Tracking opportunities to develop and strengthen data collection and big data in agri-food chain to increase competitiveness of SMEs - TRACK</i>
Funding Scheme:	COS-CLUSTPARTN-2017-3-02
Grant Agreement number:	822067
Coordinator:	<i>Nicolas Fégeant</i>



Project was co-funded by the European Union's COSME Programme.

Start date of the project:	October, 1st, 2018
Project duration:	24 months

Work package:	2 – Strategy (Task 2.2)
Lead beneficiary for this deliverable:	VEGEPOLYS
Authors:	Julieta Contreras
Delivery Date from Annex I (Part A):	Month 10 – July, 31 st 2019
Delivery Date :	Month 10 – July, 19 st 2019

Dissemination level		
PU	Public	x
CO	Confidential, only for members of the consortium (including the Commission Services)	
CI	Classified	

Disclaimer: *The content of this report represents the views of the author only and is his/her sole responsibility; it cannot be considered to reflect the views of the European Commission and/or the Executive Agency for Small and Medium-sized Enterprises (EASME) or any other body of the European Union. The European Commission and the Agency do not accept any responsibility for use that may be made of the information it contains.*

The TRACK Consortium

N°	Beneficiary name	Beneficiary short name	Country
1	VEGEPOLYS	VEGEPOLYS	France
2	ASOCIATIA CLUSTERUL AGRO-FOOD-IND NAPOCA	ATC	Romania
3	CLUST-ER AGROALIMENTARE	Clust-ER	Italy
4	FUNDACION CORPORACION TECNOLOGIA DE ANDALUCIA	FCTA	Spain
5	STICHTING GREENPORT WESTLAND OOSTLAND	GPWH	Netherlands

Contributors/peer-review

Name	Institution
Felix Arion	ATC
Colinda de Beer	GPWH
Emeline Defossez	VEGEPOLYS
Nicolas Fégeant	VEGEPOLYS
Célia Gavaud	Clust-ER
Rocio de la Rosa Gilabert	FCTA

Contents

Definitions	4
Introduction	5
1. Surveys implementation	6
1. ICT/TBD and agri-food experts identification	6
2. Expert interview frame (Sub-task 2.2.1)	6
3. Surveys analysis	7
4. Validation phase	7
2. Results from ICT/TBD expert surveys	8
1. Bottlenecks	9
2. Challenges	12
4. Validation of results with European partners/projects	15
1. Regions 4Food	15
2. SmartAgriHubs:	16
3. Others	17
Conclusions	18
Annex 1. TRACK ICT/TBD Expert survey template	20
Annex 2. SBOC analysis template	21

Definitions

Agriculture sector: from sowing to harvest. Examples: arboriculture, arable crops, ornamentals, vegetables (indoor and outdoor), medicinal plants, viticulture.

Agri-food process management: management of the agri-food production processes: software development for evaluating agri-food products, reduce errors during the production chain, bills, scheduling, recording.

Agri-food sector: from agriculture to food processing and distribution.

AgTech: products or services integrating technologies that can be applied in the agri-food value chain, from data acquisition in the field, through data transfer, data storage, data analysis and reporting, to provide users with decision support tools (DSS), robotics or software packages to manage their business.

FR: France

GDPR: General Data Protection Regulation

ICT: Information and Communication Technologies.

ICT and agri-food experts: referent persons who are directly or indirectly involved in developing technological solutions to improve the agri-food value chain by providing AgTech products or services.

ICT/TBD: all the technologies, including ICT and Big Data, that are useful to provide Traceability in agri-food value chains.

IT: Italy

NL: Netherlands

Pilot project: study where the feasibility must be understood in small scale prior to implementing a new tool or process into the framework of an operation in full-scale. Pilot projects have to be carried out in collaboration with beta testers (AgTech users) so as to be adjusted to their needs.

Precision crop monitoring: collection and analysis of crops data. Growing optimization by use of smart sensors, intelligent control techniques and intelligent software for optimal crop production.

POC: Proof of Concept

RO: Romania

ROI: Return on Investments

Robotics: conception, design, manufacture and operation of robots and computer systems for their use. Robots can perform a task or play a role in any interface or new technology.

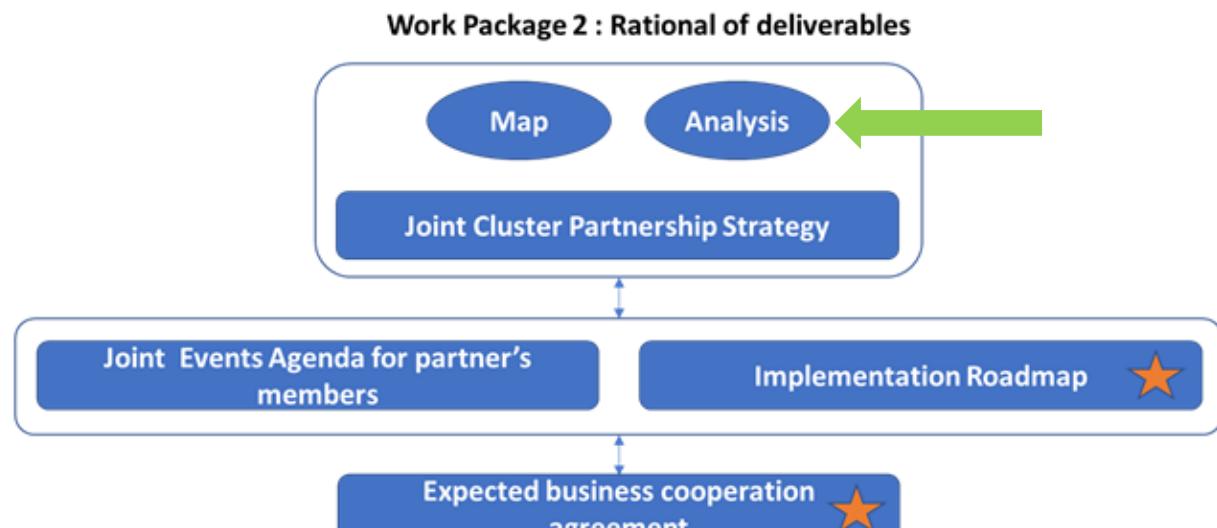
SP: Spain

TBD: Traceability and Big Data.

Introduction

Task 2.2 aims at documenting the analysis of the interviews carried out among TRACK cluster members having expertise in ICT/TBD and agri-food domains. It shed light on **bottlenecks and challenges related to data collection, big data and traceability uses in the vegetal-based agri-food value chain**. As a result, this task helps to identify good practices and projects to share within the TRACK ecosystem (and beyond) and to adapt tailored training programmes for AgTech SMEs and bankable pilot projects selected in WP4 and WP3.

To sum-up, this document is the basis of TRACK ‘strategy’. This analysis contributes to feed the “Joint Cluster Partnership Strategy” and impact the global implementation roadmap for the next year of the project, as described in the following scheme.



 Confidential document, for internal use only.

1. Surveys implementation

1. ICT/TBD and agri-food experts identification

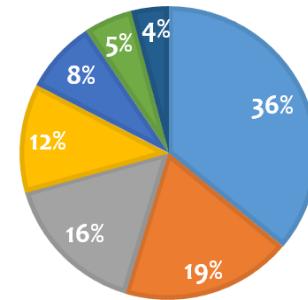
As a preparatory phase for the Analysis of opportunities and bottlenecks in targeted sectors (Task 2.2) a panel of ICT/TBD and agri-food experts was selected by each cluster in the course of the interviewing period, from March to June 2019. This panel was designed so as to include:

- Different seed and plant sectors: fruits, vegetables, ornamentals, viticulture, seeds, arable crops;
- AgTech SMEs at different levels of development (R&D, industrialization, commercialisation);
- Other stakeholders of the agri-food value chain (food processing and distributors);
- Supporting organisations: clusters, education, others;
- Research organisations dealing with ICT/TBD and in connection with AgTech SMEs for the development of AgTech products/services.

Number of interviewed ICT/TBD and agri-food experts by country

	FR	IT	NL	RO	SP	Total
AgTech SME	8	2	5	1	11	27
Research	8	2	3	1		14
Cluster	1	2	2	4	3	12
Other*			2	1	6	9
Distributor	4		1		1	6
Education	1	1	1		1	4
Food Processing	2			1		3
	24	7	14	8	22	75

* technological parks, consultants, territorial development.



AgTech SME interviewed experts profiles are Founders, Co-founders, Directors and General Managers.

2. Expert interview frame (Sub-task 2.2.1)

Semi-directive interviews were held in the timeframe of 4 months. Each 45-minute-interview was undertaken by telephone or conference call. A template serving as a guide was sent to each expert previously to the interview with three main objectives:

1. Identify SMEs needs to access the Agri-food & AgTech markets
2. Identify Agri-food consumers and AgTech users expectations about AgTech solutions
3. Identify pilot projects and future solutions

The survey template is available in Annex 1.

3. Surveys analysis

The “SWOT” approach was the method carried out to analyse feedback from interviewed experts, adapted here to “SBOC” analysis. This method consists of evaluating the Strengths, the Bottlenecks, the Opportunities and the Challenges identified by ICT and agri-food experts as follows:

- **Strengths** are considered as specific characteristics from the interviewed structure that makes it stand out from the others to provide answers to the challenges.
- **Weaknesses or Bottlenecks** are the obstacles and difficulties in trying to access the Agri-food & AgTech markets.
- **Opportunities**, for their part, are the leverages identified to overcome the bottlenecks.
- **Threats or Challenges** are defined as possible actions to carry out in response to AgTech users and potential user's expectations ant taking into account the global context in agri-food and ICT/TBD sectors.

The SBOC method is a useful way to organize and classify the information emanating from interviews.

Five global categories were considered to classify this information within the SBOC:

- COMMERCIAL: subjects that matter users and consumers for commercial development, sales, service dissemination, after-sales services;
- ECONOMICS: financial issues to afford business development at national scale and internationally;
- HUMAN: concerning social factors and human behaviour affecting the implementation of AgTech products or services;
- REGULATION: legal restrictions in using AgTech products;
- TECHNICAL: technological and practical issues to develop and use new technologies.

The SBOC template is available for consultation in annex 2. In this document, the focus is done on Bottlenecks and Challenges. Nevertheless, recommendations, done on chapter 3, take into account also the Strengths and Opportunities to propose feasible measure to overpass the barriers.

4. Validation phase

Once, analyse is done, VEGEPOLYS used two approaches to validate the results with third parties.

- Workshop

The workshop “Challenges of Data use in Plant Agriculture” carried out during the PIC meeting (12th and 13th June 2019) was an excellent opportunity to validate bottlenecks and challenges for targeted SME (Sub-task 2.2.3).

The aims of this workshop were:

- ✓ Comparing the opportunities and bottlenecks identified by TRACK with the needs and understanding of challenges by the participants.
- ✓ Identifying the main improvement paths for the cluster to support SMEs on this topic.

Workshop feedbacks were presented to all PIC meeting participants during the plenary session so as to integrate other points of views.

This allowed us to consolidate the survey's results with the following European regions and representatives from European projects:

Category	Name	Representative country
AgTech SME	REFARMERS	FR
	Smart Digital Farming	BE
	Agri Sud-Ouest	FR
	Terralia	FR
Cluster	Vegepolys	FR
	Clust-ER Agrifood	IT
	Greenport West-Holland	NL
	South Holland	NL
	S3HTF Partnership Intercluster	BE
	TRACK	FR
EU project	Smart Agri Hubs	NL
	Smart sensors 4 Agri-food	NL
	NEFERTITI	NL
	S3P Agri-food T&BD	SP
Research Center	Institut Paul Bocuse	FR

2. Results from ICT/TBD expert surveys

Three main axes information are analysed on this chapter:

Firstly, identified AgTech SMEs innovative services or products from the interviews concern various seed and plant sectors: viticulture, fruits, vegetables, arable crops, indoor crops (greenhouse). They cover all the agri-food value chain stage, from plant production, through food processing, to food distribution but a large majority deal with plant production (from sowing to harvest).

Three main global topics characterises the project in development or developed (from TRL 5 to 9) from interviewed AgTech SMEs:

- Agri-food process management: AI & predictive systems; traceability.
- Precision crop monitoring: DSS, drone, irrigation, climate modelization, pest control.
- Robotics: crop management, phenotyping.

Secondly, Agri-food consumers and AgTech user's expectations about AgTech solutions were also analysed from ICT/TBD experts' point of view.

Thirdly, AgTech SMEs needs, bottlenecks and challenges to access the Agri-food & AgTech markets were identified, as presented below.

Finally, recommendations were provided from the analysis of the strengths and opportunities pinpointed through the interviews.

1. Bottlenecks

ICT/TBD and agri-food experts' surveys in TRACK ecosystem show that structures providing ICT/TBD services applied to Agriculture and Agri-food sectors are facing obstacles from different origins:

COMMERCIAL

- AgTech users are **reticent** to pay for new technologies because they don't have enough visibility about their profitability and utility. They consider new technologies as meaningless tools but they want to know what they can concretely expect from certain technologies. Besides, Agri-food consumers show interest for hand made products. Automatization is seen as a step in losing identity and commercial advantage. Small farmers are the most exigent clients, they need proofs of ROI to be convinced.
- From agro equipment distributors' point of view, small farms and small companies have **poor investment readiness** and consider AgTech tools very costly.
- Lack of collaborative **demonstration platforms** where pilot projects can be exposed to potential clients, especially in Agriculture sector. (link with WP3)
- Misunderstanding of **AgTech consumers and end-users needs** locally and internationally. There is currently insufficient cross-over between emerging AgTech solutions and specific needs of the modern farming community.

Farmers demand concrete results to understand AgTech utility, advantages and profitability

Examples of quotes from the interviews:

"We have to do more to better understand producer's needs"
"Farmers need tangible results"

ECONOMIC

- SMEs have very **limited financial resources** and they have difficulties to access funds and converting custom products to large scale solutions.
- It is difficult to **collaborate** with other companies dealing with the same problematics because each company wants to do business with their own added value. **Finding targeted partners** to develop POC is a real obstacle to develop collaborative projects.
- **Agri-food sector complexity** makes it difficult to build standard solutions.
- ICT specialized SMEs have **difficulties to access agri-food clients** both in public and private sectors because of the complexity of the sector.

ICT specialized SMEs need support about agri-food sector functioning

- There is lack of comprehension about **national and international markets**. (Link with WP4 and 3). Small and young companies are struggling to **penetrate the international market** because their international network is still undeveloped.

- **Searching for funds** procedures is time consuming. Applying to calls for projects is laborious for young SMEs that are lacking human resources and time.
- Different **developing rhythms** between SMEs and research structures.

SMEs early life is constraining

Examples of quotes from the interviews:

"If you don't have any person that can recommend you it is very difficult to penetrate European international market"

"Calls for projects are very complex and unclear, very difficult to apprehend"

"We promote what we do in other sectors to prove our technologies reliability"

HUMAN

- Farmers have **fear about adopting innovative technologies** due to bad experiences testimonials. Most of the time new AgTech solutions are evolving at the same time they are being commercialised. Smart irrigation, remote sensing and robotics are precise examples.
- There is a social **fear about machines replacing humans**. Digitalization and robotics could help doing low added value tasks but they would take the place of humans leading to unemployment.

Social fear about robotics

Farmers feel reticent about data sharing

- **Misunderstanding about data privacy**. Farmers don't understand how their data will be used. Hence, they avoid to share it.

- ICT companies are **seeking Agro-ICT profiles**. Most of the time Agronomic experts have technical skills in agri-food but they are missing ICT technical skills.
- **ICT SMEs need Agriculture experts support** to develop AgTech solutions but it is difficult to recruit them because they are hardly available during the agricultural campaign.
- In some cases **employees don't have interest to learn about new technologies**. In horticulture and market gardening sectors it is more and more difficult to find employees willing to acquire ICT skills.

ICT specialized SMEs providing service to agri-food sector seek for Agro-ICT skills

Examples of quotes from the interviews:

"There is a lot of psychology that needs to be taken into account"
"Farmers will easily adopt new technologies if they have concrete proofs that they work"

REGULATION

- Aerial and land robot circulation rules restrain their use.

Legal restrictions constrain AgTech solutions development

TECHNICAL

- Incomprehension about AgTech advantages and lack of ICT technical skills for using ICT tools both in Agriculture and Agri-food sectors.
- Lack of knowledge in understanding and using ICT and lack of interest for specialised human resources to work in Agriculture.
- Technical gap between plant sector (i.e. in France big data solutions for arable crops are more evolved than in Seed and Horticulture sectors).

Need of training and support in ICT/TBD technologies applied to Agriculture and Agri-food sectors

Heterogeneity in data formats and origins affects interoperability between and within value chains

- Heterogeneity of data formats and quality brings **data compatibility issues**. There is a multiplicity of particular procedures along the agri-food chain making ICT solutions adaptable for isolated problems but being hardly integrated to other existing systems.

Wireless networks in Agriculture sector need to be improved

- **Telecom coverage in rural areas** is not satisfactory. Internet access in remote areas is not optimal for real time data transfer.

- ICT companies and research use specific **technical languages**. They have trouble in communicating and understanding their complementarity.

Examples of quotes from the interviews:

"There is need of Agriculture data sharing and normalization"

2. Challenges

In parallel with the above mentioned obstacles, the following challenges have been identified.

COMMERCIAL

- Growers demand user friendly, reactive and transversal tools to produce more with less. **Real time recommendation tools** are developed with historical data. AgTech tools need to be improved with new data.
- AgTech providers have to make more efforts in **considering consumers when developing AgTech solutions**. Understanding consumers' expectations allows to develop adapted technologies to their needs.

ECONOMIC

- Agricultural digitalisation makes agricultural economic model evolve **from product sales to service value**. Agricultural sector need scalable solutions to monitor crops and make decision with digital data. AgTech tools have to be oriented to specific producer needs principally in accordance with growing crops and farmland acreage.

HUMAN

- Blockchain and traceability mean **transparency** for consumers. Agri-food consumers demand **blockchain based solutions**. They consider this technology as a secure, reliable and transparent system to understand value chains.
- New technologies, like **robots**, reduce excessive human burden for laborious tasks. On the one hand, **Agri-food providers** demand more automatization, especially for greenhouses monitoring, horticulture tasks, and irrigation systems to avoid mistakes, optimise growth through targeted interventions and go faster than humans. On the other hand, some **consumers** are against agri-food processes automatization since robots replace human jobs leading to unemployment.

REGULATION

- AgTech providers seek **rural programs** to accelerate access to the internet in remote areas. Velocity in data transfer is critical for real time services.
- Guarantee respect of **data privacy**. Farmers have less power than big companies to decide how data will be shared.

TECHNICAL

- AgTech providers need scientific and technical **support from public and private institutions** to improve their pilot project performances and demonstrate their reliability.
- Data collected for agricultural applications have to be compatible with any platform that can support, structure, consolidate and share data. **Interoperability** is essential when developing new features/software tools from big data. Interoperable and **scalable applications** will allow sharing big volumes of data from different origins. Most of the time inadequacy of data quality restrain its use.

3. Recommendations

To formulate recommendations, TRACK bases its propositions according the opportunities and strengths in farming 4.0 area. In the next sections, each concerns explained above on bottlenecks and challenges sections finds a suggestions to overpass the barrier. Recommendations are organised under the same categories: Commercial, Economic, Regulation, Human, and Technical.

COMMERCIAL

Encourage the **development of experimentation and demo platforms** for developing new solutions to show how specific AgTech tools work in practice and promote digitalisation in agri-food sectors.

Create groups of entrepreneurs and professors to exchange about actual and potential activities to answer to ICT and agri-food sectors challenges. **Consortium for AgTech pilot projects** where we translate results and show finance benefits.

ECONOMIC

AgTech SMEs seek finance to afford the development of adapted pilot projects for farmers. **Operational groups** represent an interesting pipeline since they involve both private and public agri-food actors to get access to finance. For instance, EIP-AGRI¹ Operational groups are financed through the Rural Development Programs (2014-2020), which are managed nationally or regional in countries of the European Union. Rural Development Programs can provide:

- Financial support to establish a project EIP-AGRI Operational Group (draft preparation)
- Financing for the costs of a project of Operational Group (project implementation)
- Financial support for services in innovation

Create **specific financing products with commercial banks support** could be a solution for AgTech users to afford the cost of new technologies.

Develop an **inter-cluster international network** to find markets, partners, funding, promote offers and create new opportunities to invest and work together. An online virtual platform can serve as a support to set up new partnerships.

Support AgTech SMEs to apply for calls for innovative R&D projects to **attract European funds**. Innovation boosts economic growth and creates jobs. Agricultural sector needs to be stimulated about implementing new technologies and taking benefit from R&D&I funds.

Strengthen existing regional networks and create new ones involving all quadruple helix actors (public administration, enterprises, universities, consumers) responsible for digitalisation of the food chain.

¹ The agricultural European Innovation Partnership (EIP-AGRI) is part of the EU's growth strategy 'Europe 2020' for smart, sustainable and inclusive growth. It works to foster competitive and sustainable farming and forestry that 'achieves more and better from less'. It contributes to ensuring a steady supply of food, feed and biomaterials, developing its work in harmony with the essential natural resources on which farming depends.

Research is working hard to improve contact with AgTech SMEs to better understand their needs to put in practice innovative technologies. Some examples of current collaborative innovation opportunities are as follows:

- Autonomous Greenhouse international challenge in Holland which goal is to produce an indoor crops inside a greenhouse controlled remotely.
- Digifermes network as a cross-sectoral field platforms in France to experience life-size new technologies or digital prototypes encouraging the co-construction of innovations with agricultural and digital actors.
- Smart-AKIS European Network mainstreaming Smart Farming Technologies among the European farmer community and bridging the gap between practitioners and research on the identification and delivery of new Smart Farming solutions to fit the farmers' needs.

HUMAN

Foster **pedagogy for farmers** will help them to understand AgTech use and implementation. In many cases (older) farmers need support because they are lacking awareness about AgTech potential.

Foster cross training and support on new technologies applied to the agri-food. Illustrative examples are training programmes harmonizing Agri-food (from production to consumers) and new technologies.

Knowledge sharing can help to get a step forward in developing AgTech tools (but some companies are not ready to collaborate with their competitors).

Traceability and blockchain technologies allows to centralize (private or public) data, avoid duplications and clerical mistakes and be transparent with regard to consumers.

REGULATION

Implement data privacy policies and legislative frameworks for agri-food data ownership and robotics. The **GDPR²** regulation serves as an inspiring example.

TECHNICAL

Support **harmonization and standardization in data exchange** developing a system for common data exchange in the agricultural sector internationally.

² The GDPR contains provisions and requirements that concerns the processing of personal data of individuals inside the European Economic Area (EEA). It applies to an enterprise established in the EEA that is processing the personal information of individuals inside the EEA.

4. Validation of results with European partners/projects

1. Regions 4Food³

This INTERREG project has a 4 years implementation frame. With the 7 regions involved into the consortium, the project aims mainly to improve policy instruments selected by project partners according to their relevance in terms of better exploiting ICT's potential and deliver innovation to food industry and hence, smart progress and growth. Launched in June 2018, they presented the results of their survey to different stakeholders, including TRACK in Nantes on May 28th. The comparison of results with TRACK survey is relevant in order to validate the outcomes. It is important to mention that value chains covered by this survey are in accordance with TRACK stakeholders sectors: arable crops, fruits, vegetables and viticulture.

In a nutshell, most of the conclusions done by Regions4Food is identified also by TRACK. To illustrate, in the technical field, both have mentioned the concern about interoperability between digital platforms or languages. The need from the solution's users is, as consequences, the same: more awareness on the potential benefit of ICT tools and user-friendly interface. Then, both projects share also the fact that economics is a barrier for the ICT SMEs who want to invest in new products or services, and for consumer who cannot afford the fee for digital services. This point conducts to an easier adoption of ICT solution for a large scale cultivated fields than for a small farmers (in horticulture value chain for instance).

Two results may bring another vision to TRACK approach. About human barriers, Regions4Food adopted an optimistic position considering as a strong opportunities to get a young generation already digitalized and a global change toward digitalisation. Besides, this project is run by regions, so the survey pointed out the role of policies and incentive aiming to more cooperation between players (R&D and Private), create more bridges between ICT provider and agri-food sectors, and promote digitalisation.

To conclude, the data privacy appears as a very important aspect for human and regulation matters which is covered also in TRACK analyse in more details. The main common conclusion is on the lack of knowledge throughout the agri-food sector by the ICT sector, and the lack of awareness about new technology's potential, particularly in the use and implementation of Big Data by the users.

In summary, common policy recommendations from Regions 4Food are:

- To combine policies as a suitable approach to promote digitalisation.
- To reinforce a global vision of the agri-food value chain.



Map of Regions4Food partnership (7 regions) and logo

³ <https://www.interregeurope.eu/regions4food/>

2. SmartAgriHubs⁴:

Smart Agri Hubs involved the 28 EU countries and more than 100 partners. The approach done by Smart AgriHubs must be considered in all digital projects involved in agri-food value chains. The next lines confirm that TRACK strategy can easily share a common vision and prepare actions that will support this approach.

The **Data Hub for Agri-Food** foster the use of **Farm Management Information System** (FMIS) as the absolute gateway for digital innovation at farmer's level. The adoption, especially in arable farming is low and lots of new solutions are blocked due to the **absence of a direct access of data**. Connected machines and other IoT services **need a platform to exchange** and an FMIS is indispensable for that matter. But farmers don't see the use of FMIS. Most (older) farmers have several non-integrated services. The challenge in this matter is to **integrate data-driven decision making** but offer first of all **administrative simplification** (read: digitalization and integration of certificates, documents, reports, etc.) to show the first benefits of FMIS. Later, farmers can be taught to use FMIS for other reasons.

The **Internet of Food and Farm (IoF) 2020 Machine Interoperability** project is an example of data integration. Data projects should focus on the integration of different data sources in order to **maximize the extraction of knowledge**. As long as tech providers will work individually doing 'their own thing', farmers will be reluctant to adopt several **solutions which are scattered in apps over their computers (if any) and smartphones**.

Flanders' FOOD Flemish cluster is preparing projects where primary production and food process companies work together on 'the **digital passport**'. It is the product of a data platform offering information of crops (and correlation analysis) between all stakeholders for everyone's benefit. For instance, **Data Solanaceae project** will create a batch passport for potatoes. The promise of the end result (tool) offers information regarding a batch of potatoes during the growing season and/or after stocking. The potato company can adapt/optimize its production process if it knows upfront what kind of potatoes will be delivered tomorrow. It can be combined with geo-ICT initiatives such as WatchITgrow (online platform using satellite data, weather data, etc. to monitor canopy evolution, greenness and possible diseases) or other digital passport such as information about soil and erosion.

Data have more value in agri-food value chains if the knowledge derived from the process can be shared up and down the chain. In this way, learning machines are built but **it is important that the farmer is part of the developing process and that he/she knows who is doing what for whom**. The authorization 'pop-up' that will be provided in the DataHub tool is an example of the farmer staying in control.



⁴ <https://smartagrihubs.eu/>

3. Others

In this willingness to compare our vision and get validation of TRACK survey results, other projects would be also relevant to include. Unfortunately, this work of analysis was limited in time. TRACK identified and is identified by NEFERTITI, DIVA, CONNSENSYS, S3FOOD project as actors in digitalisation of agri-food value chains. Coordination of projects are in the network of S3 platforms which helps to share ideas and even planned common events.

One event organized by TRACK allowed to exchange with some of members of those projects and others players. As explained in section 1.4 of this document, the Plant InterCluster (PIC) Meeting⁵ had a specific workshop “Challenges of Data use in Plant Agriculture” led by VEGEPOLYS and Clust-ER in Naaldwijk, Netherlands. During 2,5hours, a specific group exchanged on this topic with TRACK survey’s results as basis. The main outcomes are just below and approved by participants.



Name of the workshop:
Challenges of Data use in Plant Agriculture



Name of workshop moderator: *Julieta Contreras*

Conclusions of the workshop:

- Poor degree of **digitalization** in Agriculture
- **Interoperability:** heterogeneity of data formats, compatibility issues
- Lack of **technical skills** for using ICT applications in agriculture and agri-food
- Difficulty to estimate the **ROI** and provide **standard applications** for all value chains

Project ideas:

- Business case DataHub for Agri-food in diary (European Forum of Regional Development)
- “Adapt” forthcoming standard for agriculture machine interoperability (IOF H2020)

Statement:

Stepwise introduction to digital solutions for producers



⁵ <https://greenportwestholland.nl/pic-2019/>

Conclusions

The first step in supporting ICT/TBD and agri-food actors is not searching for a way to use a specific technique, but to explore the opportunities to provide added value with existing or developing technologies.

We observe that the majority of the ICT/TBD SMEs seek for R&D partners to adapt their solution to the agri-food sector. They are also seeking for organisms having the capacity to bring funds to foster their development.

TBD technologies are more evolved in food processing and food distribution value chain stages than in plant production. TBD applied to plant production sectors need more developing support and investments. ICT/TBD stakeholders need to be more pedagogic when providing AgTech, particularly when dealing with data privacy.

Stepwise introduction to digital solutions for Agri-food consumers and AgTech users is a priority as social factors represent an important challenge in agri-food digitalization. Economics and Social Research laboratories are exploring together new ways to **better understand human habits in using ICT for the agri-food sector**.

The results described in this deliverable highlights bottlenecks and challenges in targeted sectors that need to be considered to develop collaboration opportunities and value chain linkages. They are valuable information to develop the Joint Cluster Partnership Strategy (D2.1) and find the methodology to efficiently raise awareness of the threats and opportunities and potential benefits of big data and traceability (D3.3).

On the next page, a table summarizes the document with the key obstacles identified.

Bottlenecks		Challenges	Recommendations
Commercial	<ul style="list-style-type: none"> - Poor readiness of added value. - Misunderstanding between languages from ICT and Agrifood 	Involvement of the farmers to get user-friendly tools	<ul style="list-style-type: none"> • Develop more Demo-farms • Enhance the creation of mixed groups for AgTech pilot projects
Economic	<ul style="list-style-type: none"> - Not easily into collaborative actions - Not enough funds - Not enough time to demonstrate and test 	Evolution of Agriculture economic model from product sale to service value adapted to each case (crop and size).	<ul style="list-style-type: none"> • Continue operational groups on Rural Development Programs • Specific financial products from Bank • Enhance EU projects and interclustering actions.
Human	<ul style="list-style-type: none"> - Reluctant to change - Fear for data privacy - Agrifood does not have to do effort toward ICT 	Implementation of Blockchains Guarantee the employment, not replacing but remove the excessive burden tasks.	<ul style="list-style-type: none"> • Develop cross training program for harmonize the understanding between agrifood and ICT suppliers. • Gain in transparency toward consumer.
Regulation	<ul style="list-style-type: none"> - Legal constraints for AgTech development 	Guarantee privacy	<ul style="list-style-type: none"> • Clarify agrifood data ownership.
Technical	<ul style="list-style-type: none"> - Data compatibility issues - Telecom coverage - Use of several ICT Languages 	Implementation of scalable applications Create tools with interoperability.	<ul style="list-style-type: none"> • Harmonization and standardization on data exchanges.

Annex 1. TRACK ICT/TBD Expert survey template

Objective n° 1. Identify SMEs needs to access the Agrifood & AgTech markets

- A. **Bottlenecks** for developing solutions. Examples.
 - I. **Technique**: agricultural problems, regulation, technological obstacles. TEST CASES: thematic, problematic, geographical location.
 - II. **Business**: difficulties to access the targeted market, key partnerships, key resources (human, land, capital...), and human resources training to improve business development and industrialisation processes, barriers on commercial development, value proposition, and advantages/differentiation compared to competitors.
 - III. **Economics**: main economic resources for the company, for innovations, for partnerships.
- B. **Opportunities**. Examples of successful AgTech solutions. Success indicators (economics, quality, innovation, TRL...)
- C. **Other** feed-back/propositions for this item?

Objective n° 2. Identify Agri-food consumers and AgTech users' expectations

- A. Main **challenges** about AgTech: ICT / data acquisition, Big data, Traceability, other.
- B. AgTech tools user? If not, why?
- C. Challenges by industry sector. Compatible/incompatible subjects?
- D. **Difficulties** to access New Technologies market.
 - a. Costs, HCl...
 - b. Existing after-sale service, coaching...
 - c. Special skills needed to use AgTech tools? Training?
 - d. Results interpretation: constraints in processing data to make decisions.
 - e. Obstacles to exploit results (time consuming, agro-equipment are not adapted to precision maps preconisation...)
 - f. Non users' acceptability (neighbours, consumers...)
- E. **Challenges** to fulfil producers' expectations. Tangible potential examples.

Objective n° 3. Identify pilot projects and future solutions

- A. Examples of pilot projects. How they will respond to user's demand?
- B. What solution(s) do you imagine in 5 years?

Annex 2. SBOC analysis template

	<i>category</i>	<i>subcategory</i>	<i>examples</i>	<i>profile</i>	<i>core business</i>						
					<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>
STRENGTHS	<i>c1</i>	<i>sc1</i>	1	<i>p1</i>	x	x		x		x	
STRENGTHS	<i>c2</i>	<i>sc2</i>	2	<i>p2</i>							
BOTTLENECKS	<i>c3</i>	<i>sc3</i>	3	<i>p3</i>							
BOTTLENECKS	<i>c4</i>	<i>sc4</i>	4	<i>p1</i>							
OPPORTUNITIES	<i>c5</i>	<i>sc5</i>	5	<i>p1</i>	x	x				x	
OPPORTUNITIES	<i>c6</i>	<i>sc6</i>	6	<i>p2</i>							
CHALLENGES	<i>c7</i>	<i>sc7</i>	7	<i>p3</i>			x	x			
CHALLENGES	<i>c8</i>	<i>sc8</i>	8	<i>p3</i>							

Some illustrative examples of:

- *Categories*: commercial, economics, human, regulation, technical.
- *Subcategories*: agrifood industry complexity, agtech test platforms, business development, collaborative projects, demo farms and POC, intellectual property, internet access, sharing data/open platforms, skills/instruction.
- *Profiles*: Food processing, AgTech SME, Cluster, Distributor, Education, Other, Research.
- *Core business*: agro equipment, arboriculture, business development, drones, electronics, greenhouses, horticulture, informatics, phenotyping, precision agriculture, technological park, territorial development, viticulture.



Co-funded
by the COSME programme
of the European Union



www.trackgrowingdata.eu