WORKSHOP REPORT

HOW TO BUILD A COMMON EUROPEAN AGRICULTURAL DATA SPACE WORKSHOP REPORT

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1. INTRODUCTION

1.1. Purpose and target group

On the 8th of September 2020, the Directorate-General for Communications Networks, Content and Technology (DG CNECT) organised a technical workshop on a Common European Agricultural Data Space in co-operation with the Directorate-General for Agriculture and Rural Development (DG AGRI). The overall objective of the workshop was to gather views from different key data experts in the agri-food sector on how the European Commission can support the implementation of a Common European Data Space in the agriculture sector. The discussion will help the Commission to draft the first Work Programme of the Digital Europe Programme[1] that aims at supporting the development of common European Data Spaces in nine strategic sectors, following the provisions of the European Strategy for Data[2] published by the European Commission in February 2020.

The workshop was addressed to a set of different target groups, among which:

- Key experts in the fields of data sharing and provision and data needs in the agri-food sector from private and public organisations;
- Scientists;
- Horizon 2020 projects and other consortia and initiatives developing data sharing architectures and tools for the agri-food sector;
- Practitioners, advisors or IT and data specialists from companies along the agricultural supply-chain;
- Agriculture sector representatives (Agri-cooperatives, Associations, Federations, SMEs, start-ups).

2. WORKSHOP OBJECTIVES

2.1. Workshop Description

In the context of the EU Strategy for Data released in February 2020, the European Commission (EC) is gathering views from different stakeholders to gain insights on how to build a Common European Data Space for the agricultural sector. The Data Space is intended to facilitate the trustworthy pooling and sharing of agricultural data between throughout the whole value-chain. Next to private data, the data space may also include public data and has the potential to serve common good purposes, such as Research and Innovation (R&I). In the development of the data space, experiences gained stakeholder-led Code of Conduct on agricultural data sharing by contractual agreement are to be taken into account.

DG CNECT and DG AGRI, with the support of OPEN DEI[3] (H2020 Coordination and Support Action, funded under the Call DT-ICT-13-2019), organised a workshop to refine the concept of a Common European Agricultural Data Space.

The workshop was organised in the form of a public webinar, with presentations and discussions, including comments/questions raised by attendees via chat and/or slido.com. It was held in one single morning session and was targeted mainly at key experts in the fields of data sharing and provision and data needs in the agri-food sector from private and public organisations, including scientists, practitioners, advisors or IT and data specialists from

[1] Digital Europe Programme: ec.europa.eu/digital-single-market/en/europe-investing-digital-digital-europe-programme
[2] Europe Fit for the Digital Age: ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-data-

[3] OPEN DEI: www.opendei.eu

companies along the supply chain. It was also attended by e.g. representatives of the agriculture and machinery sectors (Agri-cooperatives, Associations, Federations, SMEs, start-ups) and non-profit associations.

The workshop started with the Institutional presentations delivered by representatives of DG CNECT, Unit E4, IoT (Max Lemke, Joel Bacquet) and DG AGRI (Doris Marquardt, Unit B2 Research and Innovation) (see Agenda in Annex A).[4] It then continued with eight presentations by authors selected from 20 received position papers, answering the Commission request for refining the concept of a Common European agricultural Data Space. Experts with different background (e.g. representatives of Agri-cooperatives, providers of machinery solutions, centres of research, large companies) shared their point of view addressing some or all of the seven questions (see below) that the EC included in the concept note that was circulated during the organisational phase of the technical workshop.

Questions for discussion at the technical workshop

1. Is the federation of some of the Farm Management System (FMS) platforms and other data platforms feasible?
2. Assuming that the implementation option for the Common European Agricultural Data Space for agriculture is based on a federated distributed system of existing data platforms, what is needed to implement a European Data Space from a technical point of view (definition of the interoperability mechanisms)?
3. How can we reach an agreement on a set of interoperability mechanisms (avoiding locking into existing platform architectures)?
4. Are the suppliers of FMS ready to share their data? And willing to federate their data platform with other suppliers?
5. Which existing platforms supported by ecosystems (at regional or national level) are already sharing data? In which sub-sectors are they sharing the data?
6. Which public data sets would be of particular relevance for increasing the effectiveness of the Common European Agriculture Data Space?
7. Are their experiences with taking public data sets as input to FMS, farmers' applications or Agricultural Data Spaces?

At the workshop the current gaps and other elements that are needed for achieving a well-functioning European Agricultural Data Space were discussed; it provided some much-needed clarifications on the value of public data in agriculture on the technologies to be deployed to sustain a Data Space in agriculture (e.g.: Farm-Management-Systems, Data Platforms, Data Infrastructures, and how to implement them), on the required standards, and on the concept of trust of farmers in the full respect of the "EU Code of Conduct on agricultural data sharing by contractual agreement" (promoted by COPA-COGECA[5] and CEMA[6] and other partners), as well as on data sovereignty (control of the flow of own data, GDPR issues). It also touched upon the need for adequate investments and demonstrators.

The workshop was conducted online and gathered more than 250 participants. Attendees had the opportunities to raise questions in the chat and, along the discussion session, to upload questions on slido.com, framing the QR

[4] Presentations are available at the following link: https://ec.europa.eu/digital-single-market/news-redirect/688074

[5] Copa-Cogeca: https://copa-cogeca.eu/Menu.aspx

[6] Cema: https://www.cema-agri.org/

code provided during the event. The most popular questions, voted by the attendees, were selected and forwarded in turn by the moderator to the eight experts to elicit an open round-table discussion.

2.2. Workshop Programme

9:30 – 10:15 EC presentations on the EU data strategy and Data Spaces, the agricultural perspective, and testing and experimentation facilities under the Digital Europe Programme

- Welcome & Housekeeping Rules – Oliver Trouille, CNECT/E4
- Roadmap of actions in CONNECT relative to agricultural sector – Max Lemke, Head of Unit, CNECT/E4
- Common European Agricultural Data Space – policy context – Doris Marquardt, AGRI/B2
- Common European Agricultural Data Space – context and framing – Joël Bacquet, CNECT/E4

10:15 – 11:45 Implementation of a Common European Data Space

Selected presentations of position papers by external experts, focusing on the seven questions raised in the concept paper

Chair: Joël Bacquet, CNECT/E4

- Daniel Azevedo, Max Schulman – COPA-COGECA
- Johannes Sonnen, Jens Möller, DKE Data
- Thorsten Huelsmann – IDSA
- Philipp-Anders Schmidt – Bayer AG, Crop Science Division
- Stefan Stiene, DFKI
- Vandecaveye Vik – CEMA project team leader on digital farming
- Panagiotis Ilias – ILVO, Data manager @DjustConnect
- Luis Perez-Freire – AIOTI, Chair of WG6 on Smart Farming

11:45 – 12:30 Roundtable discussion with speakers from previous session

Chair: Giorgio Micheletti, IDC – OPEN DEI Coordinator

Conclusions and next steps

Giorgio Micheletti, Joël Bacquet

Polls & Q&A session supported by Slido

3. SETTING THE CONTEXT

3.1. Overview by the EC DG CONNECT and DG AGRI

Presentation 1. ***Roadmap of actions in DG CONNECT relative to the agricultural sector***
Max Lemke - Head of Unit, IoT (E4) DG CNECT

Max Lemke, since July 2020 Head of Unit E4 (IoT), welcomed the participants and introduced the "Workshop on a Common European Agricultural Data Space in the Digital Europe Programme" as an open workshop targeting many kinds of stakeholder groups, including industry, research, innovation and representatives of Member States.

Lemke underlined the importance of agriculture in DG CNECT and presented the main actions devoted to agriculture divided into four main blocks:

1) Research, Innovation, Deployment projects within Horizon 2020, Horizon Europe and the Digital Europe Programme;
2) Infrastructure investments (Connecting Europe Facility CEF2, Recovery and Resilience Plan);
3) Policy, legal and regulatory actions (Joint Declaration, Data Strategy);
4) Actions cutting across industrial sectors and exploiting synergies, in collaboration with DG AGRI.

FIGURE 1: Overview of selected key H2020 projects related to digital technologies in the agri-food sector

As the EC is currently preparing the Work Programmes of Horizon Europe and the Digital Europe Programme, budget and details concerning future actions are still under discussion with the representatives of the Member States.

FIGURE 2: Programme's objectives focusing on the agri-food sector

The EC intention is not only to promote the uptake of digital technologies & platforms but also to strengthen the overall EU agri-food sector's competitiveness. On the policy/legal/regulatory side, the EC has implemented two different instruments (Joint Declaration & Data Strategy) with the aim to foster the adoption of digital technologies and platforms and create a Single Market for data.

FIGURE 3: Legal/regulatory/policy instruments

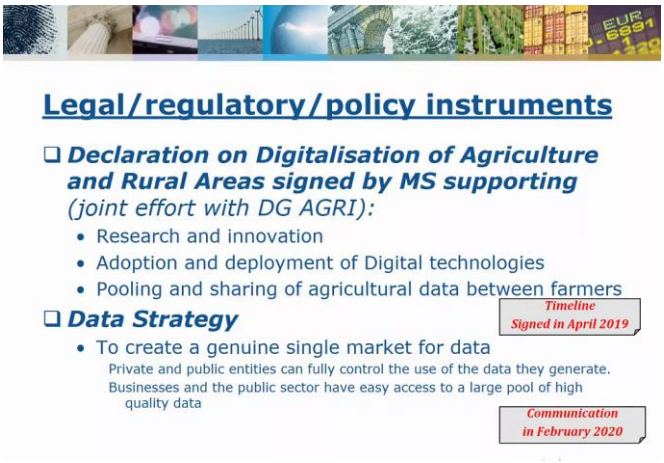
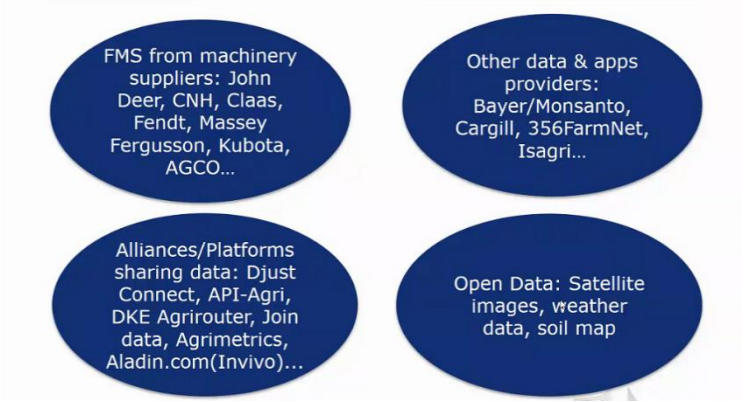


FIGURE 4: Data Strategy Actions Timeline

Focusing in particular on platforms and pilot projects, Lemke pointed to OPEN DEI as one of the key projects that the EC has funded in H2020 fostering synergies between pilots in different sectors (not only agriculture, but also manufacturing, energy and healthcare). Lemke further presented the landscape of existing data platforms including four different blocks with several examples of data platforms in agriculture. This landscape is structured along four main types of data platforms as displayed in the figure below.

FIGURE 5: Landscape of existing Data Platforms



A key objective of the workshop was to discuss the possibility to aggregate or federate all these data platforms to facilitate data exchange, increase end user flexibility and to better use the potential of data in the agricultural sector.

Key questions:

- What do we need to create a Common EuropeanAgricultural Data Space?
- What are the business models behind it?
- What do actors will need to share or be willing to share?

Presentation 2. *Common European Agricultural Data Space - Opportunities for the sector and policies*
Doris Marquardt, Unit B2, DG AGRI

Doris Marquardt introduced some of the key policy and strategic initiatives, which frame sustainable agricultural production in the EU. In particular:

- Common Agricultural Policy (CAP);
- Economy that works for all;
- Europe fit the digital age;
- European Green Deal.

One of the pillars of the European Green Deal is the Farm to fork strategy (F2F), fostering sustainable food production and consumption under consideration of three dimension of sustain inability: social + economic + environmental sustainability.

FIGURE 6: Pillars of the European Green Deal

Policy ambitions for the EU agri-food sector are articulated along two main axes:

- 2030 target for sustainable food production;
- Post 2020 CAP Objectives (in particular rebalance of power in food chain).

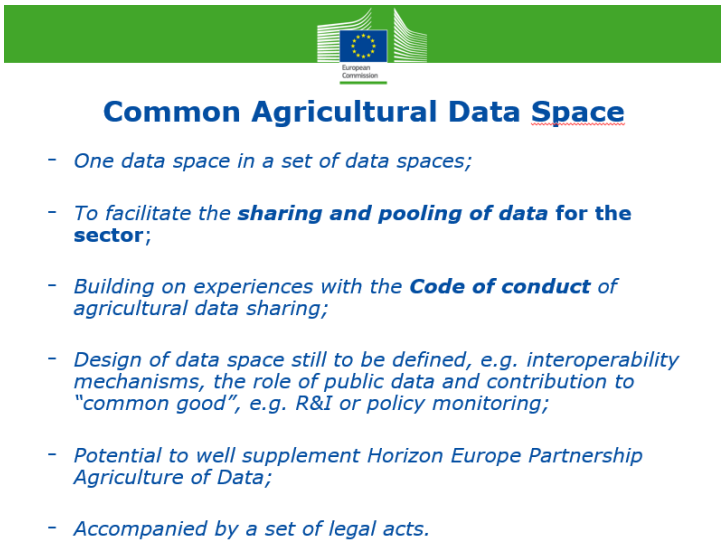
FIGURE 7: Post 2020 CAP objectives

In addition to specific objectives of the future CAP, there is also a cross-cutting/horizontal dimension: modernisation, innovation, knowledge sharing and, above all, digitalisation, which is to be seen as the key enabler underpinning the realisation of these cross-cutting ambitions and its potential to support the achievement of the specific objectives. Effectiveness of digital technologies strongly depends on data and data technologies; however, this potential is not fully exploited yet as there are many gaps in terms of infrastructure (e.g. broadband), lack of awareness of digital technologies and skills, cost-effectiveness of some technologies and insufficient trust of operators in the technology.

Data in agriculture can be seen from different perspectives:

- Private and public data that forms valuable input to precision farming;
- Digital technologies generate large amounts of data relevant for farmers and the development of the sector, for policy monitoring & evaluation, impact assessment, R&I, etc.;
- EU-wide data-sets are of added value for comprehensive analyses, e.g. for AI applications and for concepts for adapting to climate change.

FIGURE 8: Common Agricultural Data Space



Common Agricultural Data Space, in particular, is to be seen as one specific Data Space within a set of Data Spaces. This with the aim to:

- facilitating the sharing and pooling of data for the sector;
- building on experiences with the Code of conduct of agricultural data sharing.

The design of Data Space is still to be defined, e.g. interoperability mechanisms, the role of public data and contribution to "common good", e.g. R&I or policy monitoring. Depending on the design of the data space, it has for instance the potential to well supplement the proposed Horizon Europe Partnership Agriculture of Data. In the development of the data space a set of forthcoming legal acts that will accompany all data Spaces, will have to be taken into consideration.

High value data sets are seen as possible ingredients to Data Spaces. These high value data sets should be available free of charge and downloadable, as they carry important benefits for the economy and the society as a whole. Many of them will have a thematic scope. R&I in Agri-tech is essential, for instance to develop technical solutions facilitating trust in data sharing, as a key complement to the development of a common Data Space.

Presentation 3. *Common European Agricultural Data Space – context and framing*
Joël Bacquet, Programme Officer, IoT (E4), DG CNECT

Bacquet introduced the concept common European Data Spaces within the framework of the Data Strategy that was presented by the EC in February this year. The Data Strategy foresees the roll-out of 9 European Data Spaces (in 9 different sectors, including agriculture) funded under the DEP to:

- Exploit huge amount of data;
- Operationalise the data market.

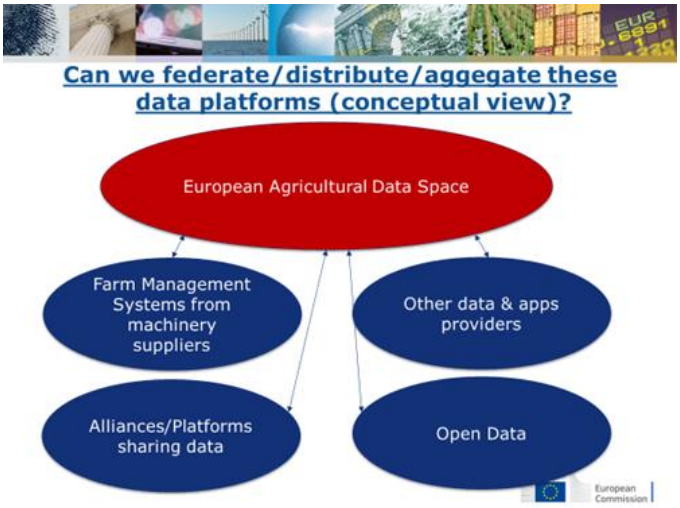
FIGURE 9: Data Space in the Data Strategy

Data spaces will include:

- Deployment of data sharing tools and platforms (webinar focus);
- Creation of data governance frameworks;
- Improvement of quality, availability, interoperability of data in specific sectors and across sectors.

Bacquet further underlined the cross-sectoral aspects of Data Spaces, whose main purpose is to allow the data flow within the EU and across different sectors. In this respect, the Data Space Centre call under the DEP, to be called by the end of 2020/early 2021, is to promote technologies, tools, modules, building blocks at EU level across different sectors, and further enable and foster EU-wide standards.

FIGURE 10: European Agricultural Data Space – Conceptual View



In this respect, the overall aim of a common European Data Space in agriculture is to allow data access in the sector, knowing that data may come from Farm Management Systems (FMS), chemical and seeds providers, and existing alliances and ecosystems which are already set up in specific sub-sectors. In this context, the EC is keen to build on existing platforms. As a result, the implementation of the Data Spaces may not be carried out from scratch but combined with existing infrastructure and current data. The main focus of the workshop is therefore to explore stakeholders' views on a set of interoperability mechanisms to implement, in practice, a common data space in agriculture.

To this aim, Bacquet introduces the group of experts that were convened from a variety of organizations and were requested to submit a series of position papers on the use of data and the concept of common European Data Space in agriculture. In particular, the papers were to respond to 7 specific questions that were chosen and elicited by the EC over the past few weeks (see Section x above).

Out of the 20 position papers received, the EC selected 8 position papers that were presented during the workshop. The authors of the papers, which were not selected, will in any case will be given the opportunity to share their papers with the workshops' participants and to have them published on the EC website.

4. IMPLEMENTATION OF A COMMON EUROPEAN DATA SPACE IN AGRICULTURE

This section provides the notes from the presentation of the eight position papers introduced during the workshop.

Position Paper 1. Daniel Azevedo – Max Schulman (COPA COGECA)

D. Azevedo introduced **COPA COGECA** as one of the key associations representing European farmers and European Agri-cooperatives across 26 EU Member States plus Norway, Switzerland, and very soon the UK.

How to create an EU common agricultural Data Space?

- Through new investments to develop the use of natural resources in an efficient manner;
- Through the support of investments in data infrastructure improving data sharing thus further empowering EU farmers.

M. Schulman expanded on the key role of technology for farmers. Data has always been part of the agricultural sector but now more access to an unprecedented amount of data is possible. The sector needs therefore to be in a position to use these data in a smarter way, driven by new pressure from the society and the need to provide more and more accurate information to consumers.

Challenges lie ahead, however: first of all, **data ownership**: quite a few steps have already been taken towards a common understanding/framework of data ownership and new legislation is in the making to guide the sector.

The main points to be addressed to fully exploit data in agriculture from a technical perspective are:

- Interconnectivity: creation of a value net to be able to share data supported by widespread broadband, data interoperability, data portability, and data reusability;
- Allow farmers to grant permission for sharing sensitive data thus retaining their power over which data sets can actually be shared;
- Common EU standards and governance rules to maintain a common understanding and handle data between farmers, machine manufacturers, and paying agencies and an effective and agile way;
- Ensure trust and implement data protection mechanisms to safeguard data integrity and guarantee business viability and continuity;
- Make sure that a safe infrastructure is in place to allow data to be exchanged freely and safely from whatever point of origin they stem from, be it the farm itself or the machines employed in agricultural processes and production.

To effectively tackle these technical challenges, data need to be categorised according to different criteria:

- Reusability, level of aggregation, and quality;
- Purpose;
- Sensitivity (confidential, sensitive, private or public);
- Timeline.

In this respect, COPA-COGECA has the opinion that full access to all data would be prejudicial and counterproductive for the agricultural system (e.g. sensitive data, personal data, profiling) and would hurt investment and trust in the system. **A regulated approach ensuring transparency, defining responsibilities and creating trust would therefore be preferable**.

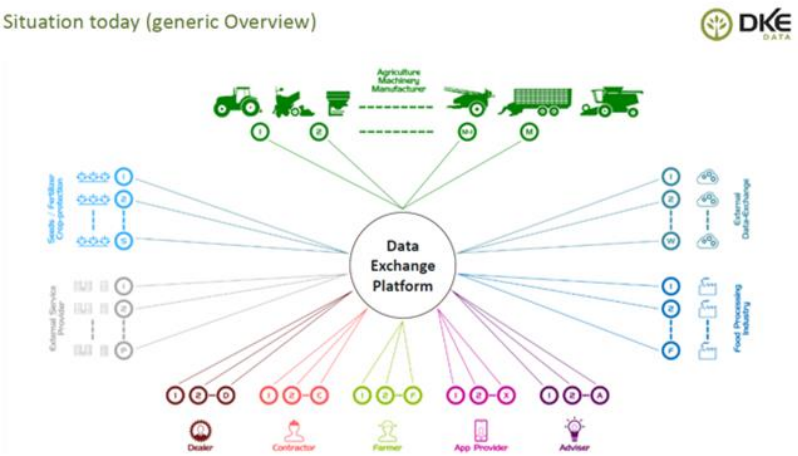
The COPA-COGECA position paper presented for the preparation of this workshop is a living document, open to consultation and acting as organisation promoting the code of conduct.

Position Paper 2. Johannes Sonnen – Jens Moeller (DKE Data)

J. Moeller introduced **DKE-Data** as a worldwide initiative that brings together a wealth of agricultural engineering companies and is open to other machinery providers and software and hardware providers along the complete value chain of agriculture. J. Sonnen continued, presenting a series of drivers from farmers perspective together with a catalogue of requirements for an effective common European Agricultural Data Space underlying the importance of open and cross-manufacturer data exchange mechanisms between machines and software products, the free choice of machines and agricultural software applications, the availability of automatic logging, interpretation and evaluation of agronomic processing data, or the use of regionally available software solutions that meet country-specific requirements. The need to avoid data storage by machine or software providers (i.e. **the self-determination for the storage of data**) and the possibility of using third-party services is also emphasized.

Sonnen outlined how the relationship between agriculture machinery manufacturers and the rest of the agricultural eco-system (food processing industry, producers of seeds, fertilizers, farmers, contractors, app providers, advisers external service providers, etc.) has been constantly changing over the past few years. Sonnen presented a few infographics displaying the relationships between these actors in 2016 and today, highlighting how the current situation is has evolved over the past few years – while in 2016 one-to-one exchanges between individual stakeholders (machinery manufacturers, food processing industry actors, external contractors, farmers, etc.) prevailed, the situation today is characterized by a centralized data exchange platform serving as a hub for the majority of data exchanges within the whole of the ecosystem.

FIGURE 11: European Agricultural Data Space – Conceptual View



The situation is evolving fast and today the trend is to move towards customer-specific agricultural data-storages because farmers do not want to store data in the app, that they have more freedom to work with the data and chose the app that they prefer rather than having in a centralized storage platform. The situation therefore evolves

towards a customer-specific data storage. For the public data, satellite data, weather information, databases on crop-production, water production zones, soil maps, etc. the exchanges can be managed by a government data platform taking over the data exchanges across all these different silos. In this case, the farmer only gives his/her GPS-based position and then gets the data needed to improve his/her production. This is public data in the view of DKE-Data. One step further has been researched under the **ATLAS** project[7] and would consist in the use and implementation of an agri-network. This is another possibility to exchange data through a cloud-to-cloud infrastructure. One additional possibility would be that the farmer in the future sends his cross-compliant documentation to the government via an app then including his/her approval for the reuse and exchange of data. The German example, in this case, could be taken as pilot to be expanded at European level.

Position paper 3. Thorsten Huelsmann – IDSA (International Data Spaces Association)[8], CEO

The presentation "*International Data Spaces – A trustworthy architecture for agricultural Data Spaces"* started with an introductory note on Data Spaces, given the importance that this concept has gained in the latest European Strategy for Data and thanks to the fact that IDSA is working on this issue since 2016. IDSA is a non-profit association founded in February 2016 under the German law, with more than 120 members from 20 countries and 350 people contributing, not originally from agriculture domain, but they have members which are working in the agriculture domain, for instance German SMEs dealing with data in different agricultural industries, Fraunhofer and its institutes. To understand what is in in the European Strategy for Data,, IDSA envisages the free flow of data within the EU and across sectors to be based on the **FAIR principles** when it comes to the access, management and use of data; it does mean that there is a potential to deal with data treasures, but data treasures are only curated if data are shared. Challenges remain though: companies want to share data without regret; companies want to stay in control over the flow of their data and there is a lot of potential also in liking data at cross-domain level. Focusing on the **data sovereignty** aspect, IDSA emphasised an imbalance: on the one hand everyone talks about interoperability, about data exchange, about data sharing, about data centric services - *this is what discussions focused on the last years*, but the topic of data ownership, data security and data value is an issue which has challenges for the future and *data sovereignty*, as IDSA understands it, is "*the ability of a natural or legal person to exclusively and sovereignly decide concerning the usage of data as an economic asset*" and that is important. Now the question raised by IDSA is: *The European Strategy for Data foresees these different 9* **Data Spaces - "how to realise them**"? IDSA's argument is that **there is already something**. IDSA has some ideas of developments: first of all they have an open reference architecture model setting the framework conditions - based on standards; IDSA can also count on a trusted framework and scheme for data sharing together with a series of coordinating operations for essential data sovereignty services. This enables the creation of open, distributed data eco systems and marketplaces ensuring data sovereignty, proven data-provenance and audit-proofs, if requested. According to IDSA, it will therefore be difficult to concentrate on one single Data Space in agriculture, as there will be many Data Spaces that will be asked to interconnect and work together**.** IDSA stressed the importance of cross-domain activities and cross-Platform activities, because there will not be silos and the data pool will be enlarged as cross-sectoral benefits emerge.

The challenge for the future will be to **agree on a common design principle for Data Spaces** which are ensuring data sovereignty, and which are delivering or focusing on these three topics: Endless Connectivity, Trust between different security domains and Governance for the data economy. There are already some EU initiatives active on the topic, including IDS which is leading within **OPEN DEI** project a ***Task Force* on data sharing** which will realise by the end of the year a *Position Paper* on these different design principles for Data Spaces. In OPEN DEI, "Data Spaces approach" is a topic intensively discussed and this discussion is triggered by the external experts involved. What has been emerging so far is that. IDSA preconises therefore a joint approach in building Data Spaces with the

[7] ATLAS: https://www.atlas-h2020.eu/

[8] IDSA: https://www.internationaldataspaces.org/

aim not to start from scratch but using common design principles such as those set up by IDSA and other initiatives which already constitutes a valuable starting point.

Position Paper 4. Philipp-Andreas Schmidt and Martin Wietkamp (lawyer), Bayer[9] (Brussels)

The presentation highlighted the **essential factors playing a role in farmers' operations**. First of all, **having data in one place** or at least bring them together to be able to make best use of it; secondly, **obtaining general insights on the fields**; thirdly, **focus on crop production and optimised inputs in general** (BRC, crop protection, biopesticides, anything else). Bayer has a subsidiary called the *Climate corporation* that offers a data platform service to growers in order to bring data together from many different sources and help decision-making when dealing with crop production across the entire planting portfolio thus encouraging farmers to put their information to the best use. Bayer has supplementary tools and technologies that help generating a data flow while enabling the farmer to decide how the data flows from across the entire value chain are to be treated with respect to the *Code of conduc*t and, in general, with regards to privacy policies. It is very focused on the control of the data that comes from the farmer. **Data sharing** itself is absolutely critical. Bayer is very curious to see how existing platforms are dealing with these aspects together with the issue of **data quality**.

The question related to the feasibility of a federation of FMS platforms is linked to the relationship between the European Common Data Space and competition law. The existing law just says that restricted competitions are prohibited and that competitors may not exchange sensitive data. On the other hand, it may make sense to have some experiences with these federated platform system and to consider to what extent an exemption to competition law may be introduced. It is also of paramount importance to better define what we intend by "federation": after having joined this federated system is it still possible for data owners of FMS to decide on a case by case basis to what extent data will be shared or pooled together? Or is the expectation to share all their existing and future data? In other words, is it still possible for an FMS to keep exclusive data for itself or to agree on exclusive arrangements with selected partners?

With respect to FMS readiness and willingness to share data and federate with other suppliers, it is necessary that business investments and assets are protected and that return on investment is ensured in order to encourage companies to further develop and invest in new technologies. With own Climate FieldView data platform, Bayer already offers the farmers possibility to connect their data with the platforms of industry partners of Bayer.

Some other interesting questions on legal aspects and governance aspect have been raised by Bayer, which will be of course considered but not in the scope of this webinar, requiring time for discussion and trying to concentrate more on technical aspects and less on legal and governance of Data Spaces.

Position Paper 5. Stefan Stiene DFKI

Stefan Stiene is working for the **German Research Center for Artificial Intelligence (DFKI)**[10] and is coordinator of the domain Agriculture in **GAIA-X**[11] presented in his personal capacities.

According to Stiene, we have to talk about interoperability and the answer is: yes, a federation of FMS is feasible, but we have to look at all the dimensions related to interoperability not only the technical one. **Data ownership** is a complex issue to address in agriculture; it is important that the farmer's perspective is represented in this Common European Agriculture Data Space and the main goal is that the farmers will be supported in the process and be given extended data sovereignty and added value.

[9] Bayer: https://www.bayer.com/en/

[10] DFKI: https://www.dfki.de/en/web/

[11] GAIA-X: https://www.data-infrastructure.eu/GAIAX/Navigation/EN/Home/home.html

The implementation of a European Data Space from a technical point of view has been discussed in the GAIA-X community too: they are working on a list of federated services to be realised. The domain agriculture in GAIA-X has just started. Agriculture itself has contact points with other domains as food, logistic, finance, and it would be good if Data Spaces do not stop at these borders.

To reach an agreement on a set of interoperability mechanisms, Stiene suggests it is important not to try to reinvent the wheel but to integrate **existing alliances, committees/standardisation organisations** like AEF, CEMA, ISO, DIN, CEN into the process. Here the farmers are extremely important. Standards that meet the wishes of consumers and offer them prevailing added valuel. Therefore, it is important to ensure that the interoperability is perceived as a low-complexity issue, that it works well and provides an added value for the farmer. This must be nurtured by continuously working examples and demonstrators.

DFKI represents the perspective of a non-profit research organisation, so the perception is that the market of FMS is in the process of change; many start-ups/companies enter the market and offer specialized apps. Classical monolithic FMS will not be able to cover this variety of applications on their own in the future. And the demand from farmers to be able to combine different services will increase with increasing digitalisation in agriculture; they have to open and incorporate these applications; more and more FMS suppliers will open their interfaces. There are many data sets that would be useful for farmers and application developers, like weather, satellite, geodata, open science data and more.

Position Paper 6. Vik Vandecaveye – CEMA project Team Leader on digital farming

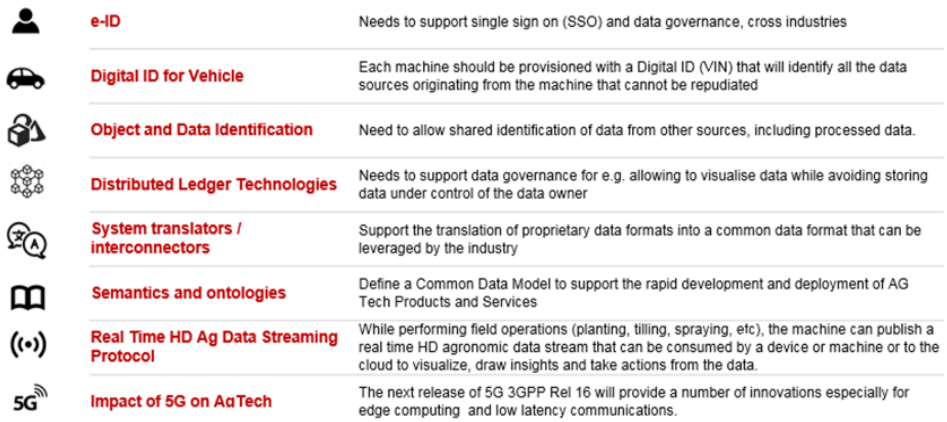
CEMA[12]'s position paper is focused on presenting the vision of the **European agricultural machinery industry** with respect to the implementation of a sectorial Common European Data Space. V. Vandecaveye's presentation started by raising some important points to be considered:

- The need to ensure all machines stay compatible and are interoperable for a long period of time, considering their long lifecycles (around 10 years);
- The question of compatibility between GDPR and public blockchains;
- The impact the data space may have on safety and data security;
- The need for standards and compliance to standards (they should be easy to implement also for small companies);
- The need to be flexible and able to adapt to a rapidly evolving situation by looking at the new legislative framework and self-certification;
- The intention for global solutions.

According to CEMA's perspective, the federation of some of the FMS platforms and other data platforms is definitely feasible and it is the right moment to start discussion. In particular, CEMA underlines their machinery is connected, they built APIs with a lot of 1-to-1 cloud connections and joined the EU-funded project ATLAS to take forward their work on interoperability. At the same time, mind-set is ready with suppliers, SDO participation has increased, but what is currently lacking is an overarching architecture. An **ecosystem architecture**, a **collaborative approach** and **common building blocks** would be essential to actually implement a Common European Agricultural Data Space from a technical point of view.

[12] CEMA: https://www.cema-agri.org/

FIGURE 12: Building Blocks



In order to reach an agreement on a set of interoperability mechanisms, CEMA suggests **market harvesting** and **stimulation**, in particular supporting the implementation of standardised modules, would be beneficial. Furthermore, government could help by leading by example and, as safety is concerned, there should be some **enforcement** with rules defined by law.

As for FMS, suppliers readiness to share their data and federate their data platform, V. Vandecaveye underlines that is important to consider most of the FMS are SMEs which cannot afford wrong choices. For this reason, support would be needed also to ensure that power balance in the ecosystem is not disturbed in favour of the more digital mature large players. Some of the platforms already sharing data, which could be monitored are DataConnect, DKE-Data agrirouter and National data hubs (JoinData, DJustConnect, etc.). With respect to public data sets, which would be of particular relevance for increasing the effectiveness of the Common European Agricultural Data Space, CEMA puts the emphasis on datasets including topological and cadastral information, satellite imaging, weather forecasts, master databases (crops, registration of agrochemicals) and road information.

Position Paper 7. Luis Freire Perez – Chair of the Working Group of Smart Farming in AIOTI

AIOTI
Alliance for Internet of Things Innovation

The **AIOTI[13] – Alliance for Internet of Things Innovation** was started in 2015 by the European Commission with the aim to strengthen the dialogue among IoT players in Europe, and to contribute to the creation of a dynamic ecosystem to speed up the take up of IoT. In the framework of AIOTI, which currently counts on more than 100 members, the **Smart farming and Food Security Working Group 6**, chaired by Luis Freire Perez, involves more than 60 members, including ICT companies developing smart farming solutions but also representatives from the demand side.

According to AIOTI's vision, the federation of FMS and other data platforms is technically feasible, however, one of the essential barrier is the **lack of architectures and standards for syntactic and semantic interoperability**, which are not widely implemented in spite of great efforts currently undergoing also in the framework of other EU initiatives like **ATLAS** and **DEMETER**[14]. Another issue is related to **compatibility with legacy farm management systems** which are intended to remain operational for many years and that we could not expect to change continuously in the future. Another key point to take into consideration is the careful assessment of **possible conflicts with existing regulations**. According to AIOTI, the federation should be considered at data level rather than platform level.

From the technical point of view, **standard APIs, reference architectures and data processing protocols** will be essential for the implementation of the Common European Agricultural Data Space. **Common security and trust**

[13] AIOTI: https://aioti.eu/
[14] DEMETER: https://h2020-demeter.eu/

mechanisms for preserving farmers' data ownership leading to automated implementation of the Code of Conduct should also be in place. In a realistic scenario, however, there will not probably be a single agreed standard, but **several standards will co-exist**: Naming Authorities should be able to map these ontologies and make data discoverable and interoperable.

As explained by Perez Freire, in the current FMS landscape there are no dominant players, it is important therefore to proactively stimulate dialogue among stakeholders to reach agreement on minimum requirements and share best practices. In some specific cases, a regulatory push will be important in order to reach an agreement. FMS suppliers do not own farmers' data, the farmers should stay in control (according to the concept of **data sovereignty**). To stimulate data sharing there should be incentives and ROI.

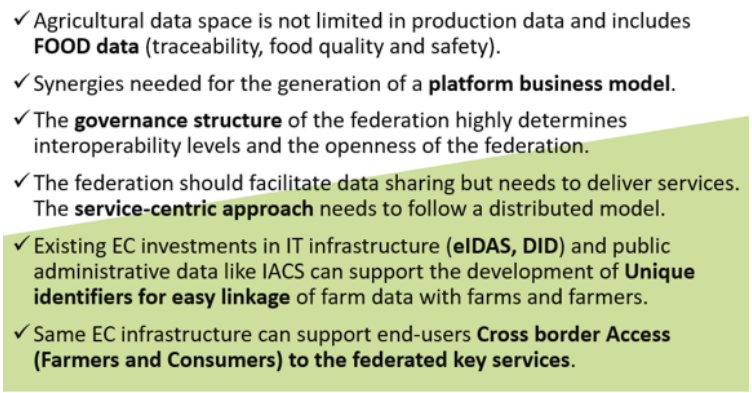
Position Paper 8. Panagiotis Ilias - Data manager @DjustConnect, ILVO

ILVO[15] is a Flemish Research Institute for agriculture, fisheries and food hosting the Flemish Smart Digital Farming Digital Innovation Hub (DIH). **DjustConnect**[16] is a platform developed by SDF for data sharing and reuse in the agri-food domain which is an example of a federation effort.

In terms of feasibility, according to ILVO integration of data and applications between platforms is possible, but what is needed is a **federated platform business model** behind it. Synergy between FMS and involved third parties will be key to create a vision for a federated business model at EU level. From a technical point of view, through the implementation of a Common European Agricultural Data Space we have the option to follow a democratic/distributed approach to support farmers and consumers control of their data and digital identity through **eIDAS** and **DIDs** (De-centralised Identifiers).

For FMS to federate their services and adopt a network-based business model, a **governance structure** is needed which will determine the adequate legal, organisational, semantic and technical interoperability levels. There are several reasons why FMS would be willing to federate: first of all, FMS are aware of the need to reach new markets and scale-up, sometimes they are too small to do this, or their target markets are too small. Secondly, they have to deal with high infrastructure investment costs which they could not afford without acting as a federation. Thirdly, FMS would benefit from getting access to end costumers and engaging with third parties. All these conditions have increased FMS willingness to federate their platform and follow a **service-centric approach**. Among the public data sets that would be of particular relevance to support the establishment of a Common European Agricultural Data space, ILVO puts the emphasis on harmonised Public administrative data like IACS.

FIGURE 13: ILVO's Position Paper – Key messages



[15] ILVO: https://www.ilvo.vlaanderen.be/
[16] DjustConnect: https://djustconnect.be/nl/

5. ROUNDTABLE DISCUSSION

A roundtable discussion on a set of questions collected via the app "slido" was held after the presentations provided by the eight selected experts. The roundtable discussion was chaired by Giorgio Micheletti (IDC – OPEN DEI Coordinator) and focussed on questions, which were brought forward by the participants and were addressed to the eight experts.

Q1. How can data sovereignty be ensured for farmers?

Giorgio Micheletti (IDC): The concept of *data sovereignty* has been mentioned a couple of times together with *data ownership* during the workshop. Redirected this question to IDSA colleagues.

Thorsten Huelsmann, IDSA: In the IDS reference architecture, the so-called "IDS *connectors*" guarantee *data sovereignty* and the control of data when and where the data are shared with other entities; they also specify under which conditions data import is carried out. Within this IDS connector, several technologies are running and there are different levels of trust.

Q2. Do you have any legal interpretation regarding spatial data? In many countries, these data are considered as personal data and cannot be made public (GDPR).

A few answers where provided to this question, even if the workshop focused more on technical aspects.

Martin Wietkamp (lawyer), Bayer: very specific GDPR question, not possible to provide a detailed answer right now, but if photos from satellites are used to approach individual farmers than theoretically GDPR kicks in, because then the data are produced for example checking which farmers in Germany have raised corn for example. Theoretically, they could be approached to sell them crop protection products and, in this case, at least the GDPR would apply. Generally speaking, if there is not a link to personal data, we can assume that GDPR is not applicable.

Q3. We already see that middle-size farms are disappearing. How can we ensure that not only big enterprises will have access to the benefits of digitalisation?

COPA-COGECA, Max Schulman:

- Important to have a good extension service, to be able to explain it and demonstrate it to the farmers, even to the smaller ones. To show what can be done, in the different sectors or farming sectors, through digitalisation, through data sharing, etc. So, seeing is usually believing. So, important to have "demonstrators" forms.
- Important to have possibilities to invest, and it also means to make involvement from the banking and finance sector.
- Reduce taxation on machineries, possibilities to have some equipment deducted
- Having all the different parts of the society understanding that this is needed, then we will be able to scale it down. It is a long process requiring some time.

CEMA, Vik Vandecaveye:

- From the practical side, there are some solutions that require some competences that the farmers do not always have, so middle-size farms could use an external advisor that helps the farmers with digitalisation. This is not common in the EU, but a lot more widespread in the US and in other regions.
- Encourage farmers to work together and create a sort of data cooperatives where best practices can be exchanged, and advices can be shared is another option. This could lead to solutions where digital technologies are managed externally thus leaving the farmers to focus on farming activities without having to take care of digitalisation directly.

Q4. How will the data spaces reuse existing initiatives, like INSPIRE? See initiative for spatial data sharing of IACS through the INSPIRE infrastructure.

DKE, Jens Möller – important to know that these initiatives do exist, and what characteristics, features, capabilities of these initiatives are available. Very often acronyms are well known by specialists, but what is really behind these initiatives?

Q5. Is data sovereignty the real question or is it how to ensure that farmers can choose what they can do with their data?

ILVO, Panos Ilias: Sometimes there are different definitions of *data sovereignty* – IT mainly focuses on security, data safety. Two other dimensions/perspectives: (i) how to use and control data and (ii) how to use data as a way to make profit out of it or gain services from them or getting benefits.

AIOTI, Luis Perez-Freire: with reference to the *Code of conduct*, how to make this framework (basically a kind of contractual agreement) and how to implement it in a way that is easy to use by the farmers and easy to integrate with the management system. Need to make the *data sovereignty* issue a non-issue by means of technologies.

ILVO, Panos Ilias: agrees with that, need not to spam farmers with too many messages and help the farmers without distracting their way of life and business

Stefan Stiene, DFKI: *data sovereignty* is closely related to control of the data flow, talking on KPIs, data standards and how farmer is enabled to get data from one point to another

Q6. Which will be the most notable pan-European standards, enabled through the Data Space Center?

CEMA, Vik Vandecaveye: AEF Agriculture Electronic Foundation – link with the industry to adopt these standards

Q7. Are there any examples of farmer-led projects? Or examples of farmers' really benefiting from sharing their data outside the farm gate?

Kevin Doolin – coordinator of the H2020 DEMETER project, a very much farmers' led project. Have a look at the website: https://h2020-demeter.eu/

Stefan Rilling, ATLAS coordinator: the project is not led by farmers, but has a large involvement of farmers, defining use cases: https://www.atlas-h2020.eu/

In addition to DEMETER and ATLAS, Harald Sundmaeker: LSP IoF2020, a farmer- led project which has a catalogue implemented of use cases (IoT catalogue), points to: https://www.iof2020.eu/ and having a look also at GitHub data marketplaces

Max Schulman: Many projects where farmers are involved are in contact with COPA-COGECA so the association website could be of help.

John Hyland, TEAGASC: coordinator of FAIRshare project (2018-2023) with 40 use cases: https://www.h2020fairshare.eu/

Q8. Can we discuss the business aspects of sharing data? Since data owners are probably self-interested then in order to share their data should be compensated

Philip-Andres (Bayer): Sharing data is part of the business, acquire data costs money. What is the "value" that each party will get? Key discussion.

Bayer is curious to know how the EC defines the "Federated Platforms".

CEMA, Vik Vandecaveye: we never discussed business aspects when we talked, we only discussed technical solutions because we are talking about data spaces and interoperability, which means collaboration between different

partners; we're also not talking about sharing data, we're talking about aligning technical solutions so that the farmers can in an easier way leverage their data as a service. A lot of investments done in the data space.

Final Remarks: OPEN DEI is currently organising a series of Task Forces: Task Force 1 is operating now and is about *data sharing* and *data sharing spaces*. A *Position Paper* expected by the end of the year is considered as particularly beneficial also in the light of the aim of this workshop.

6. CONCLUSIONS AND NEXT STEPS

The workshop put a strong emphasis on the creation of value from agricultural data and on the need to share this value fairly among all the agri-food stakeholders, in particular the farmers, across the entire supply chain. Hence, it is of paramount importance to hear from farmers and, in general from the private sector, to understand their perception, interests and needs.

The need to involve the entire **supply chain** is another important aspect that emerged from the discussion. Understanding the value created by data sharing and its usefulness for the farmers, the food industry and the food supply chain as a whole, including the consumers, is a key strategic success factor for a Common European Agricultural Data Space. More information spreading is needed to fully inform agri-food operators and consumers about the benefits of a Common Agricultural Data Space.

The **EU Code of Conduct,** promoted by COPA-COGECA, CEMA and other partners has been recalled several times during the workshop, underlining that it is important to understand how to structure contractual agreements and how to implement them.

Trust remains one of the key issues to tackle to make sure that farmers are adequately involved and motivated. Trust must be considered under a wide perspective:

- Absence of regret to share data;
- "Data sovereignty", considered under different points of view: data security, data safety, control of data flows, but also freedom to put their own data to use as a way to generate profit and derive benefits from them. **GDPR** has been touched upon different contributions to the workshop and the need to clarify as soon as possible what is considered "personal data" in agriculture emerged quite prominently.

High Value Data Sets (HVD), which are currently selected by Member States and the EC, and will be defined in a legal act, is ae concept pointed to by DG AGRI as a possible ingredient of public data to data spaces. Selected as HVD are such data sets, which can generate important benefits for the economy and the society. They should be available free of charge, in machine readable formats, provided via APIs and, where relevant, as bulk download in all MS.

Compatibility and interoperability are other key elements. Creation of data silos must be avoided, as it goes against the idea of developing a thriving European Single Market for data.

As there are already many existing operational platforms sharing data, it was recommended to endorse a pragmatic and incremental approach and to accept the situation where different systems and platforms that adopt different standards continue to co-exist. The objective of a common European data space would be to focus on their interconnection and getting them to work together.

Most participants agreed that federation of FMS and other existing data platforms is feasible, but an agreement is needed on a set of interoperability mechanisms involving existing alliances, committees/standardisation organisations like AEF, CEMA, IDSA, ISO, DIN, CEN into the process.

An agreed overarching architecture, standards for syntactic and semantic interoperability, collaborative approach and common building blocks would be essential to actually implement a Common European Agricultural Data Space from a technical point of view. There will probably not be a single agreed standard, but several standards

will co-exist. It is important therefore to proactively stimulate dialogue among stakeholders to reach agreement on minimum requirements and share best practices.

Technical implementations of an Agriculture Data Space should favour the **federation of existing systems** whenever possible rather than creating new ones completely from scratch. Strong preference in the technical implementation is for **distributed architectures** (rather than centralised ones) building on **public-private cooperation**. Public administration, not only private actors, should also play a role in data-sharing, data use and data reuse.

In this sense, there is a big opportunity in **learning and growing from existing initiatives.** First, it is important to know that they exist, what their characteristics are and what is behind their modus operandi and their objectives.

The workshop represented a first step in the process: the discussion on how to implement a Common European Agricultural Data Space will continue and further events on the topic will be organized.