

Data Spaces to unlock greater value for farmers from agricultural data

Via trust, interoperability and federated structures

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KEY MESSAGES

Data delivers value only when contextualised and used to support farmers' competitiveness and sustainability. In this context, CEMA highlights the following messages:

- Farmers must remain in control of their data, with consent-based sharing as a core principle.
- Interoperability is essential to avoid data silos, foster innovation, and ensure a competitive market.
- Federated data spaces are the most suitable model for agriculture, ensuring resilience, scalability, and efficiency.
- Trust, security, and fairness must be embedded by design, supported by clear governance and enforceable rules.
- Data spaces are key for the full exploitation of complementary and reinforcing technologies such as Digital Product Passports and European Business Wallets.
- Broader and continued support is necessary for the development and deployment of industry-led initiatives that can provide concrete solutions, and broader cross-sector frameworks that can extend value along the entire agri-food value chain.

The value and role of data in agriculture

Data is becoming a cornerstone of modern agriculture, but data only acquires value when it is enriched with context, making it understandable, shareable, and capable of generating new insights. In primary production, this translates into tangible benefits by empowering farmers to optimise inputs like fuel, fertilizers, water, seeds, and labour—thereby improving efficiency, making better-informed decisions, and enhancing both economic performance and environmental sustainability. At the same time, data contributes to traceability, compliance, and the development of new services that strengthen the overall resilience of the agricultural sector and rural economies.

Data also plays a crucial role in improving understanding. By describing the environment in which crops grow and machines operate, it enables more accurate assessments and better decision-making. In this sense, data makes the invisible visible, revealing patterns and insights that were

previously inaccessible. The aggregation of data further amplifies this value, allowing for more robust analysis and predictive capabilities.

The machinery industry's role in trusted agricultural data exchange

The growing importance of data in agriculture is driven by the rapid deployment of precision technologies, sensors, and connectivity solutions. These developments have led to unprecedented availability of data, enabling new business models and services that were previously not possible.

However, the concentration of data also raises legitimate concerns. Large data pools can create imbalances if access is not properly governed, and the existence of data silos may lead to lock-in effects that limit competition and innovation. These effects are not intentional but often arise from the absence of appropriate governance structures and interoperability.

The agricultural machinery industry has a long-standing relationship with farmers, built on decades of cooperation and mutual trust. This relationship is reflected in a strong commitment to ensure that data is handled responsibly, securely, and in full respect of farmers' rights.

The industry has consistently recognised that farmers are the primary holders of rights over the data generated on their farms. This principle has been formally acknowledged through industry initiatives and codes of conduct, reinforcing a farmer-centric approach to data governance.

At the same time, the sector is intrinsically driven and therefore highly motivated to address the increasing complexity of modern farming. This requires the diverse ecosystem of manufacturers, software providers, and service partners to work together. Effective collaboration depends entirely on seamless data flows, establishing interoperability as a core requirement. The industry has already demonstrated the feasibility of cross-brand plug-and-play functionality. A key example is the Agricultural Industry Electronics Foundation (AEF), founded in 2008 to standardise tractor-implement electronic connectivity. These principles are now being extended to digital and cloud environments, with the set-up of a data space initiative.

Data spaces – added value and industry engagement

Data spaces represent a key enabler for the future of agriculture. By creating trusted and interoperable environments, they enhance data sovereignty while providing access to advanced data-driven services.

Secure, decentralised data-sharing networks allow stakeholders to exchange data efficiently while ensuring that farmers retain full control. In such systems, data is only shared on the basis of explicit consent and within clearly defined relationships.

Given the legitimate concerns linked to data concentration, it is essential that data governance frameworks ensure that access is granted only to trusted actors under clear and fair conditions, while preventing undue concentration of power. Embedding these conditions into concrete use cases ensures consistent enforcement for all participants in the framework.

As an example, the Agricultural Interoperability Network (AgIN) is being developed to extend the proven "plug-and-play" interoperability concepts to cloud-to-cloud communication, building on AEF's established trust mechanism for brand-independent tractor-implement electronic connection

through ISOBUS. AgIN provides a secure, decentralised, and interoperable data space for operational data exchange between manufacturers, service providers, and farmers, while ensuring farmers retain full control over their data through consent-based mechanisms suited to agriculture's distributed data environment.

At the same time, broader initiatives such as the Common European Agricultural Data Space (CEADS) provide an opportunity to connect agriculture with other sectors along the value chain. CEADS can act as a horizontal enabler, linking farm-level data with upstream and downstream actors, including food processing, logistics, and retail.

By pairing AgIN with the CEADS framework, the sector achieves both depth and scale, combining dedicated agricultural tools with a broader integration into the European data economy, as the next level of data sharing.

Data spaces to ensure fairness in data sharing

Fairness is a fundamental condition for the success of data spaces and must be embedded in their design. This can be achieved through clear governance structures that define rights and obligations for all participants.

Use cases play a central role in this regard, as they establish the specific conditions under which data is shared and used. These must be aligned with agreed ethical principles, comply with regulations, offer legal certainty and be supported by robust technical frameworks. This includes the digitalisation of compliance and reporting processes required by EU and national authorities.

Conformance testing is another key element, ensuring that all participants comply with common standards and can interact reliably within the system. This applies to practical applications such as machine data exchange, field operations, and digital agronomic tools.

Ultimately, data sharing must always be based on the explicit consent of the farmer. Once granted, data can flow automatically within the agreed framework, ensuring both efficiency and compliance with ethical and legal standards.

For farmers, one of the main advantages of data spaces lies in the ability to fully utilise all available data sources. This integration allows them to benefit not only within primary production but also across the broader value chain, linking upstream and downstream activities.

In addition, data spaces can significantly reduce administrative burdens by enabling more streamlined and aggregated data flows for compliance purposes. This ensures that farmers remain in control while benefiting from simpler and more efficient processes.

Why a federated approach for data spaces is essential

The agricultural machinery industry strongly supports a federated approach to data spaces. In such a model, data remains at its point of origin but can be accessed and shared securely within a common framework.

This approach offers clear advantages. It reduces costs by leveraging existing infrastructures and avoiding unnecessary data duplication. It enhances security and resilience by eliminating single

points of failure and reducing the attractiveness of centralised systems for cyberattacks. It also supports scalability and innovation, as new applications can be integrated without structural constraints.

A federated system can ensure that all participants operate under the same rules, including those embedded in use cases, regardless of where the data is physically stored. This creates a level playing field. Conformance tests for all participants for all relevant services/use cases (e.g. machine location, prescription maps, as applied data...) further reinforce the trust among stakeholders.

By contrast, centralised data storage models tend to be more resource-intensive, less flexible, and more vulnerable to disruptions. They may also hinder innovation and fail to address the underlying complexity of data exchange ecosystems.

Complementary and reinforcing technology developments: scaling the data economy

Emerging European initiatives offer significant potential to further strengthen agricultural data ecosystems.

European Business Wallets (EBW) could provide a trusted digital identity framework for companies and farmers, enabling secure authentication and seamless participation in data spaces. This would simplify data-sharing processes, strengthen trust between actors, lower lock-in effects, and reduce administrative burdens.

Digital Product Passports (DPPs) for agricultural products represent another important development. By linking farm-level data with product-level information, DPPs can enhance traceability, sustainability reporting, and consumer transparency. When integrated with agricultural data spaces, they can enable end-to-end data flows across the value chain, from primary production to final consumption.

Together, these tools can significantly expand the value of existing data infrastructures, enabling new services, improving compliance, and reinforcing Europe's leadership in sustainable and digital agriculture. Their integration in federated data spaces will facilitate the full exploitation of these tools.

CEMA Policy Recommendations

To unlock the full potential of agricultural data, policymakers should:

- Safeguard farmers' data sovereignty, ensuring control, consent, and transparency in data use.
- Promote interoperability through open standards and support for industry-led solutions.
- Support the development of federated data spaces as the preferred model for agriculture to prevent data lock-in and market imbalances.
- Encourage trusted data-sharing frameworks, which include embedded governance mechanisms.
- Enable innovation while ensuring security, avoiding overly prescriptive or centralised approaches.
- Enable alignment with and integration of complementary and reinforcing technologies such as European business wallets and digital product passports.

Conclusion

The agricultural machinery industry advocates for a data economy that is farmer-centric, secure, and interoperable. Unlocking the full potential of agricultural data requires governance models that protect data sovereignty and enable seamless data exchange.

Federated data spaces provide the most effective foundation for this vision. They combine flexibility, security, and scalability while ensuring that farmers remain at the centre of the system.

Such an approach is essential not only for fostering innovation but also for strengthening the competitiveness and sustainability of European agriculture in the years to come.

Industry-led initiatives already demonstrate that this vision is achievable. With a stronger alignment with broader European initiatives on data spaces and future digital tools, Europe can unlock the full potential of agricultural data while ensuring fairness, security, and innovation across the entire value chain.

ABOUT CEMA

CEMA represents the European agricultural machinery industry, comprising around 1,300 manufacturers, including global leaders and SMEs, with an annual turnover of approximately €40 billion and around 150,000 direct employees. The sector is committed to contributing to the EU's climate objectives, while ensuring the economic viability of farmers and the competitiveness of European agriculture.