Collective Action on Inclusive Digital Ag - Briefs

The Partners in the Collective Action on Inclusive Digital Transformation of Agriculture recognize that the key driver towards the full realization of the benefits of the digital transformation of agriculture is the **inclusion of farmers in the design and governance of digital solutions, and in the negotiation of related data practices and business models**.

We need to strengthen the recognition of **farmers as central actors of innovation and innovators themselves**, generators of valuable agricultural knowledge and holders of intellectual property rights, not just recipients of others' solutions, knowledge, and data.

https://www.gfar.net/content/gfar-collective-action-inclusive-digital-transformation-agriculture.

Brief 1

FARMERS & DATA - Ethical and legal considerations about data sharing aspects of smart farming, from the farmers' perspective

1. The data dimension of smart farming

"Digital food systems" is probably the most general term used to refer to digitalization of all aspects of the food systems, from farming to supply and value chains to government policies to extension services to markets to consumption and health. "Digital agriculture" is a term sometimes used with a similar meaning, but normally used to refer to a slightly more limited subset of the digital food systems, closer to the farming activity: smart/precision farming, digital advisory services / e-extension, open data for agriculture, value chain traceability.

This brief focuses on smart/precision farming.

Smart farming can contribute to exponential income growth, enhanced decision making, better services and products, as well as productivity and profitability. "Smart" and "digital" are used interchangeably, however while digital tools in general can automate operations and transmit orders remotely, the "smart" aspect of digital solutions, the one that automates decisions and optimizes efforts, depends on the underlying data: without data (from the field or from external sources) digital solutions cannot be smart.

This is why data has become the core of the business for many agricultural digital technology providers: the quantity and quality of data to which solution provider have access adds value to their solutions and influences their market position - huge amounts of data accumulated by individual companies can create market concentrations and even monopolies. On the other hand, most farmers, especially smallholders, while contributing to these data assets with their own data - captured from their field and from their farm management information systems - feel that they do not benefit equally from the sharing and exchange of this data, do not have control on how this data is used or on the algorithms affecting their decisions, and ultimately are not fully harnessing the benefits of the digital transformation of agriculture.

Overall, in all flows of data to and from the farm, farmers can easily perceive that they are at a disadvantage: on the one hand, they have to share data in order to get digital solutions to work (and for many other purposes, like access to subsidies, access to finance and insurance, or farmer profiling)

and face risks of unclear data governance, possible data misuse, lack of benefit sharing; on the other hand, they need to access quality data sources, either directly or through solution providers, and face challenges due to availability, cost, granularity, scalability etc. Both challenges are aspects of inequitable data flows, linked to power imbalances that in part pre-exist the digital transformation, but can be aggravated by the privileged access to data by actors upstream and downstream of the farmer, who remains the weaker actor in the ecosystem.

The graph below summarizes the streams of data in smart farming. The first stream is called here 'localized' data, generated and collated on the farm for use only on the farm. The second stream is called 'exported' data, generated and collated on the farm for use off the farm (e.g. by government or solution providers or certification bodies…). The third stream is 'imported' data generated and collated off the farm, for use on the farm. The fourth stream is called 'ancillary' data, generated and collated off the farm and not used on the farm: this could represent data that farmers don't use but could potentially benefit from.

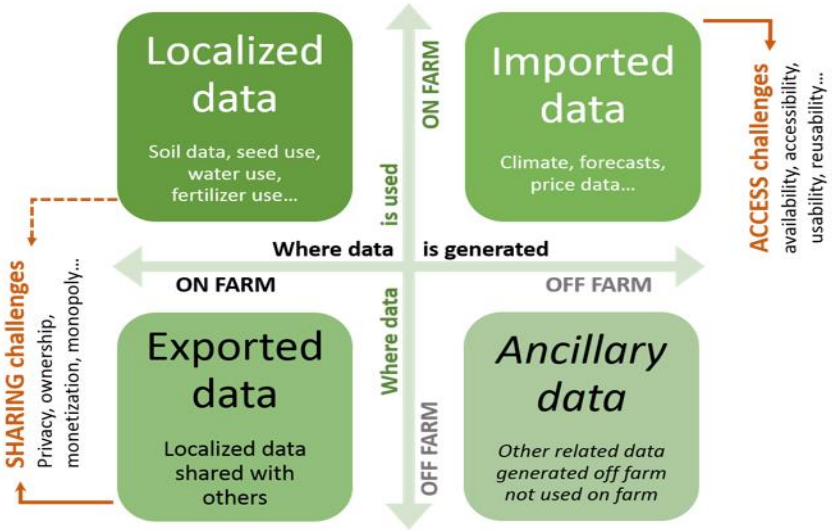

Figure 1 Streams of data to and from the farm. From [Maru et al. 2018].

The topic of 'imported' data (or data made available by other actors for use by the farmer) will be explored and addressed further in brief 2.

This brief focuses on "exported" data, or, as the title says, data sharing aspects of smart farming. The brief addresses the following questions:

- Why do farmers want / need to share data and with whom?
- What are the challenges and risks that farmers, particularly smallholder farmers, face with the adoption of digital technologies and the sharing of their data?
- What are the measures and safeguards to protect against exploitation when sharing data? How can smallholder farmers harness the benefits from sharing such data?

This brief is based on desk research and builds heavily on previous insights, consultations and publications by partners in the Collective Action and partners in other relevant initiatives and working groups: the Global Open Data for Agriculture and Nutrition (GODAN), the Global Forum on Agricultural Research and Innovation (GFAR), the former Technical Centre for Agricultural and Rural Cooperation ACP-EU (CTA), the Küratorium für Technik und Bauwesen in der Landwirtschaft (KTBL), and all contributors to the resulting publications and participants in the related discussions held in 2018-2019 (see citations and links at the end), who worked together on the ethical, policy, and legal aspects of open data affecting smallholder farmers by engaging with various stakeholders (governments, private sector, academia).

2. Farmers sharing data: why and with whom

Farmers share a lot of valuable data with several other actors in different data value chains, e.g. with technology providers for precision agriculture decision support systems, with farmers' associations for the purpose of registration and service provision, with suppliers and distributors for data exchange in the supply chain, with banks for creditworthiness and risk assessment, with governments for subsidies eligibility and compliance.

The main reason why farmers accept to share farm data is that providing good data about the farm allows them to get back more relevant services and products (from forecasts to advice to logistics to access to finance to subsidies).

Sharing farm data through the value chain has also benefits for society at large, from traceability of food and improved food safety to climate change adaptation and mitigation, more economic and efficient use of natural resources, resilience of agri-food market chains and SDG monitoring.

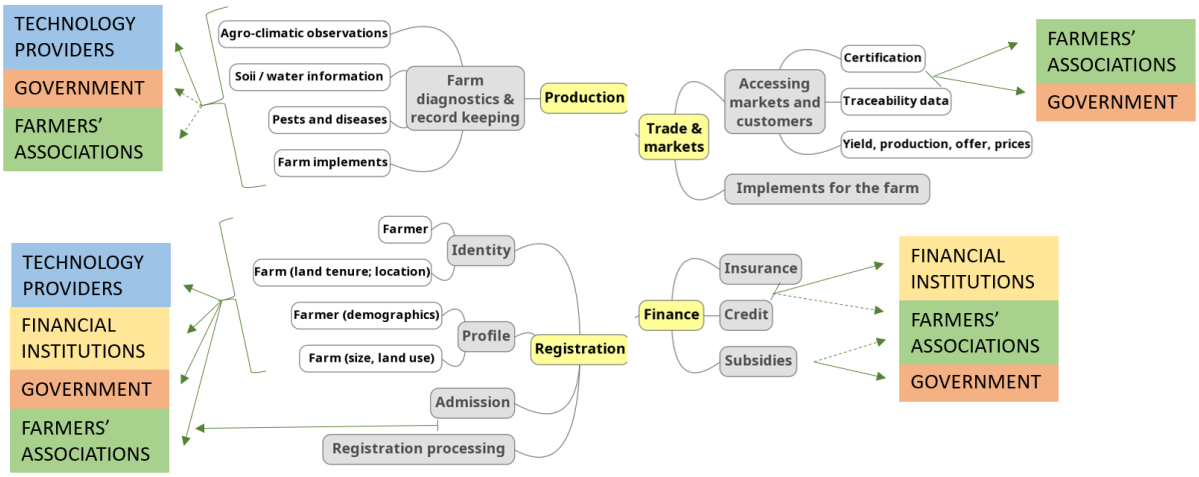

Figure 1. Diagram of data shared by farmers (white boxes) with other actors for obtaining services (yellow and grey boxes), built on the CTA Data4Ag diagram of 4 areas of services for farmers: registration, production, trade & markets, finance.

2. Data sharing challenges for farmers

The issues of whether and why farmers are willing to share farm data, of course, are not new to the agricultural sector. As Jakku et al. (2018: 7) mention, "*issues of trust and transparency, based on normative roles between farmers and agribusinesses, have the potential to constrain the willingness of farmers to participate in smart farming technologies*."

Below is an overview of the most common and relevant risks perceived by farmers in sharing their data, as highlighted in recent literature and consultations.

Misuse

Data misuse can be intentional (**selling** data, using data for unfair competition or for not previously agreed purposes, intentional lack of data protection / anonymization) or unintentional (**weak data protection**, **weak data security**, bad application of data management practices).

The fear of data misuse is well known to farmers and it's justifiable, given that there have been quite a number of cases of data breaches in the agricultural sector. One example is the well-known data breach in 2014, when one of Monsanto's servers left exposed some customers' credit-card information as well as Monsanto employee data (Bunge and Dreibus, 2014). Another case was in 2017 when a class

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action was brought by a group of chicken farmers in the Oklahoma District Court against Tyson Foods Inc. (*Haff Poultry v Tyson et al*., 2017) and other chicken processors for allegedly sharing production data (e.g. grower payments, broiler weights, type of feed and medicine used, and transportation costs) with third parties without the consent of 38 chicken farmers. The data was shared to keep payments below competitive levels. Key issues for the chicken farmers were that the processors' data aggregation did not adequately anonymize the data and that the data was unlawfully shared between the processors to reduce grower payments (Wiseman et al., 2019)

As is shown above, data provided by farmers without any provisions of protection , without farmers having full knowledge of their rights , and without having provided their consent, can lead to issues around privacy, security, safety and liability (Maru et al 2018).

Privacy concerns

Privacy concerns are strictly related to data misuse fears.

Although laws and regulations that govern personal data are becoming increasingly common (e.g. the General Data Protection Regulation, GDPR, In Europe), there is a legislative void regarding the collection, sharing and use of data in agriculture. The challenge lies in whether all or which types of farm data are considered personal. Non-personal information such as business or commercial information is generally governed by the law of contract. The distinction between personal and non-personal information is important for agricultural industries and their stakeholders as the privacy legislation does not extend to non-personal information.

Farmers in general feel that all data that is produced on their farms is personal data (e.g. their income, the size and location of their farm) and they fear that once it is released and shared, it might fall into the wrong hands because it could be shared without their knowledge or consent. They are also concerned about third parties gaining unauthorised access to their data. Their priority is to ensure that their data is kept safe and secure.

While not all farm or agricultural data will be considered personal data (e.g. machine data), the fact that much of the data being collected on farms is linked to the GPS location raises the arguments that some of the data, particularly when linked to income and profitability, is likely to be considered personal data. This is even more probable now that a broad notion of personal information has been embraced and reinforced by the GDPR-led expansion of privacy law.

Another interesting approach to be considered, is another EU regulation that was launched one year after the GDPR about the control of non-personal data. This regulation establishes among other things that data made through precision farming is considered as non-personal data.

Power imbalances and data asymmetries

The lack of awareness of farmers about their potential data rights (consent, right of access and information, right to portability, right to opt in or opt out of a contract, see codes of conduct below), their lack of technical knowledge about data, the way data flows in digital agriculture (almost always from the farmer to other actors) and in general their pre-existing weak position in the agricultural value chain have contributed significantly to an unfair distribution of power in the digital agriculture value chain.

We mention the traditionally **weak position of farmers** in the agricultural value chain because this value chain is characterized in most countries by small and distributed producers squeezed between a strong sector of big concentrated input suppliers and a sector of even bigger, concentrated and vertically integrated processors and distributors. The fact that digital technologies and related data services are nowadays mainly administered by large companies upstream and downstream of the farmer has led to data flows that collect the data from the farm and concentrate it in the hands of the technology providers, leading to huge **data asymmetries** and contractual power asymmetries. An example of the power imbalance between farmers as data contributors and ag tech companies as data

aggregators is the inability of farmers to negotiate the standard terms of the large agri-businesses' data licenses that govern agricultural technologies (Carbonell 2016, Jakku et al.,2018).

As well as data asymmetries between farmers and big ag tech providers, there are also data asymmetries between big and small farmers. These asymmetries have been linked to limited access of some farmers to digital technologies and the data that they generate (Kshetri 2014, Rodriguez et al. 2017, De Beer 2016, Maru et al. 2018, Ferris and Rahman 2016). This is part of the ***digital divide*** between developed and developing countries (and between big and small farmers) and is caused by a lack of means to buy the technologies required for digital farming (Kshetri 2014: 2, Maru et al. 2018, Ferris and Rahman 2016), and of scientific data skills of farmers (Ferris and Rahman 2016: 6). Another reason for this uneven distribution of knowledge is that only large farms are able to pay to access data insights, (Ferris and Rahman 2016: 8, Chaves Posada 2014) and that recommendations based on the data are not always well suited to the needs of small farms (Rodriguez et al. 2017, Kamilaris et al. 2017, Maru et al. 2018, Ferris and Rahman 2016).

Data asymmetry is a phrase that is commonly used to refer to a disparity in access to data and knowledge, but also reflects a disparity in how much data actors share and how dependent they are on other actors' data. An interesting aspect of data asymmetries is what has been called the "**excessive transparency**" of farmers (…). Smallholder farmers, with rather limited resources, reveal their most sensitive farm data to gain access to the benefits of technology, while those who can transform the collected data into useful information reveal little to nothing about the back-end processes , and about how and where the information will be stored or used. As a result, farmers become dependent on large food retailers and input suppliers for seeds, fertilizers, machinery and pesticides, who demand the application of particular agronomic practices and the quick delivery of farm products that should have certain quality features (Kritikos 2017).

Besides the fact that precision agriculture equipment reveals all details about farming conditions and techniques and other potentially **sensitive business data**, there is also data collected by other actors, especially the government, like agricultural censuses, satellite data and geospatial data in general. Combining all this data, I not adequately protected, a lot of information about a farm and its activities can be inferred. The disclosure of too much business data may negatively affect farmers' competitive edge, and there is the risk of disclosure of data to potential competitors, or the disclosure of household data (see privacy concerns below).

Unfair competition

Issues of unfair competition are also linked to power imbalances.

When farmers provide data to another actor, this can give that actor more knowledge and a **privileged position** to sell tailored services – that hopefully benefit or at least don't damage the farmer providing the data. This data can also be exploited in different ways to deny services or gain unfair advantages (Maru et al 2018).

This also presents risks of technological **lock-in**: a company's privileged and exclusive access to data may lock farmers into that company's solutions. The risk of lock-in is also linked to the lack of data interoperability of many digital solutions, which can be used only in combination with other solutions from the same provider and only with equipment from the same provider (or from a a commercial partner).

Monetization

There is a market for data provided by farmers meaning that it can be bought and sold. This needs to be made clear to farmers during data collection so that they are aware of what might happen with their data and who may benefit financially from it. Reusing data for commercial purposes – in many instances, by third parties who may not return benefits to the original data generators – raises all sorts of ethical and moral issues. (Maru et al 2018)

There are also schools of thought that believe that farmers should be paid for the data they share, although in the few cases in which this has been tried, so far it seems the value of individual data is too small, as data gains value only when aggregated. Some attempts at farmer-led platform for the sale of aggregated data exist.

Ownership issues

We leave the issue of ownership as last, as for many this is the overarching issue from which the others stem: if clear ownership of smart farming data can be established and traced at any stage of the data value chain, then the owner can decide what can be done with it and can claim it.

However it is well known that ownership as a legal concept is rather complex, and farming data is not traditionally recognized as a type of property that is subject to ownership. The currently available ownership-like rights of data are limited to intellectual property rights (copyright, patents, database rights, trade secrets, plant breeders' rights and trade secrets). However, they do not provide adequate protection of data ownership.

Regarding copyright, the data assets that could be copyrighted are datasets or databases: the European Parliament's 1996 Database Directive establishes *sui generis* rights, i.e. the unique rights of databases that fall short of the standard of an intellectual creation required by copyright law (De Beer 2016). These rights include the right of database creators to prevent extraction and/or reuse of the whole or of a substantial part of the contents of their database. To gain this protection, the database creator must establish that there has been a substantial investment in the obtaining, verification, or presentation of the contents. The term of protection is fifteen years, but it is renewable whenever the database holder makes any substantial change to the contents of the database (Wiseman et al. 2019). However, the way data flows and is reused and re-combined in smart farming makes it difficult to identify a dataset as an intellectual product at any specific stage. There are also notable exceptions to copyright law, such as facts (statistics, formulas, geo-information, news) which are not copyrightable (de Beer 2016).

Patents and plant breeder rights do not protect data directly but can nonetheless limit the ability to use data related to innovations in agriculture (de Beer 2016). Moreover, data transactions are currently governed by contracts and licensing agreements, in which the terms and agreements are complex. This leaves smallholder farmers with very little negotiating power, and it is obvious that a lack of trust dominates these relationships (Wiseman,2019).

Data ownership? Introducing the concept of "data originator"

The EU code of conduct (see below under Codes of conduct) introduces the concept of "data originator": "The data originator of all the data generated during the operation is the one who has created/collected this data either by technical means (e.g. agricultural machinery, electronic data processing programs), by themselves or who has commissioned data providers for this purpose": this definition avoids the complications of the ownership concept and bypasses also the issues related to the figure of the farmer as either the cultivator or the land owner: the originator is the person who collected the data or commissioned the data collection.

Since there is an opacity around the legal status of agricultural data and agricultural data ownership, it is better to ask the question: who has control and access to farm data? And indeed many of the attempts to address the legal uncertainties have moved in this direction.

3. Proposed good practices and business models

To address these issues, some approaches have been proposed in studies and in consultations:

- Self-regulation and voluntary guidelines negotiated among actors
- Farmer-led associations and platforms for farm data stewardship

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- International dialogues and platforms, possibly a Treaty

Codes of Conduct

In order to bring about a new paradigm of agricultural data governance, there is a need to develop transparent data sharing codes of conduct that are self-regulatory and adapted to the situation and needs of communities while guaranteeing an even distribution of benefits between agricultural value chain actors.

Legislation still does not cover data flows in many industries where different actors in the value chain need to share data and at the same time protect all involved from the risks of data sharing

Codes of conduct have started to emerge to fill the legislative void and to set common standards for data sharing contracts. They lay out a set of principles that the signatories agree to follow. Farm data is an example of such sensitive data flows. Farm data flows go from the farm to many other actors (extensionists/advisory service providers/agri-tech companies, farmers' associations, financial service providers, government, etc.) and then – aggregated and combined and in the form of services – back to the farm. Such flows have the potential to open up data that should only be shared between specific actors under specific conditions. In order to protect farmer's interest and privacy, this data should be anonymised. This is especially true in the case of smallholder farmers whose farm data often coincides with household data and personal data and who are in the weakest position to negotiate their data rights. (CTA paper 2019).

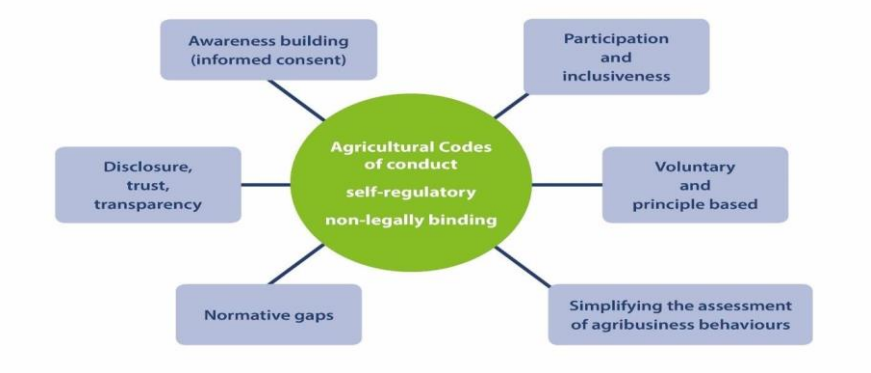

Figure 4. Key characteristics of agricultural codes of conduct (Zampati,2019)

As of 2021, there are five main agriculture data codes:

- the US American Farm Bureau Federations' Privacy and Security Principles for Farm Data
- the New Zealand Farm Data Code
- the EU Code of Conduct on Agricultural Data Sharing by Contractual Agreement
- the French *Charte sur l'utilisation des données agricoles* (French Charter on the use of agricultural data)
- the Australian Farm Data Code

The existing codes of conduct cover central issues such as terminology, data ownership, data rights (including right to access, data portability, and the right to

THE AG- DATA TRANSPARENCY EVALUATOR

A process was developed in 2016 to certify the ag tech providers whose contracts complied with the 13 principles of the american farm bureau federation's privacy and security principles("principles for farm data", 2014). This tool, in which atps voluntarily submit their data contracts to a ten-question evaluation, was created by the American Farm Bureau federation and is backed by a consortium of farm industry groups, commodity organisations and technology providers.

https://www.agdatatransparent.com/

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erasure/right to be forgotten), privacy issues, security, consent, disclosure, and transparency. In general, these codes of conduct attempt to harness the benefits of ag-data sharing while protecting producers' privacy and security. Even though they are not legally binding, since they are a form of self-regulation that relies on the goodwill and social responsibility of industry and agribusinesses, these codes help build awareness around data use and sharing and the importance of transparency in agricultural data flows (Wiseman et al.2019, Sanderson et al 2018).

THE GODAN-CTA-GFAR ONLINE TOOL ON AGRICULTURAL CODES OF CONDUCT

Recognizing the value of self-regulation (codes of conduct, guidelines), in May 2020 GODAN, CTA and GFAR launched an online tool to facilitate the creation of tailored codes of conduct or the selection of sets of suitable contractual clauses. The aim of this tool was to provide guidelines, in the form of selected contractual clauses, for fair data management practices for farmers and agri-businesses and associations who collect, manage, and share data, with a greater focus on farmers' perspective and needs. These principles and guidelines are not intended to be exhaustive and are no substitute for a robust institutional framework that should guide and operationalize decision making related to privacy, ethics, and so on.

https://www.godan.info/codes

Farmer-led associations and platforms for farm data stewardship

Farmer-led associations are best placed to play a fundamental role as farm data stewards for their farmers. This role can be played I different ways.

For instance, they could play a leading role in the creation / negotiation / adoption of a code of conduct on behalf of their farmers (and possibly in making adhesion to codes mandatory, e.g. requiring accreditation for any business dealing with their farmers).

Or they could steward farmers' data in data sharing platforms, e.g. creating or participating in farm data cooperatives. Data stewardship could be in farm-led platforms or in independent multi-stakeholder platforms: many experts agree that the use of independent platforms should be encouraged. "Farmers, consultants, advisers, and related companies need a data infrastructure that can collect, store, visualise, exchange, analyse and use large amounts of data, and they require a legal framework to deal with the ownership and the use of data outside of the farm premises" .

Trust in such data platforms can be boosted if platforms are governed by a trusted organization of network members. The bodies governing these platforms should be recognized as "Trust Organizations" that are entitled to verify, validate and authenticate data flowing as also assure fair, just, inclusive and equitable data and information flows in agri-food systems. There are already a few examples of stakeholder-led platforms, like ….

International dialogues and platforms

Considering the cross-border nature of agri-food systems, there have been repeated suggestions (most notably and very recently in the GFFA Communiqué) to coordinate guidelines at the international level: in particular, the GFFA called upon the Food and Agriculture Organization of the United Nations to lead these efforts. Such coordination could lead to international voluntary guidelines, or a set of standards, or an international Agreement or Treaty (on the model of the International Treaty on Plant Genetic Resources for Food and Agriculture).

For the moment, international collaboration is taking place in the GODAN Sub-Group on Data Codes of Conduct.

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Conclusions

Data issues are altogether more complex in agriculture as there are many varied actors throughout the agri-food data value chain, each with their own specific needs and interests.

Many farmers, especially smallholders, currently do not benefit from the sharing and exchange of data that epitomizes the digital age, leaving them feeling disempowered.

Monopolies, data asymmetries, discrimination , the lack of transparency, trust, and legislation & regulation on data ownership, data rights and privacy issues are some of the basic challenges that farmers face in relation to digital agriculture. Therefore, in many cases they are often reluctant to share their data because they either feel it might be unsafe, or they may be unaware of its value. The fact that they do not capture many of the benefits from it only serves decrease their interest in participating.

One good example of engaging farmers and including them in discussions about the adoption of digital technologies is the development of ag codes of conduct. These principles and guidelines, although not legally binding, are seen as a good way to improve transparency and fairness in agricultural data practices. They provide a framework for best practice in data management through the engagement of stakeholders at every level (especially farmers) in an open dialogue to find solutions that address their differing needs and concerns. Codes of conduct could contribute to a cultural shift of how the agricultural sector and specifically agribusinesses, technology providers perceive farmers rights and needs and engage them to an open dialogue in order to trust to be strengthened throughout the value chain.

October 2021

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