



D7.6 (REVISED) GUIDELINE AND/OR CODE OF CONDUCT

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WP7

March 16th, 2021



DOCUMENT IDENTIFICATION

Project Acronym	IoF2020
Project Full Title	Internet of Food and Farm 2020
Project Number	731884
Starting Date	January 1st, 2017
Duration	4 years
H2020 Call ID & Topic	IOT-01-2016 (Large Scale Pilots)
Date of the DoA	2017
Website	www.iof2020.eu
File Name	D7.6 (Revised) Guideline and/or Code of Conduct
Date	March 16 th , 2021
Version	1.0
Status	Final
Dissemination level	PU
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PROJECT SUMMARY

The internet of things (IoT) has a revolutionary potential. A smart web of sensors, actuators, cameras, robots, drones and other connected devices allows for an unprecedented level of control and automated decision-making. The project Internet of Food & Farm 2020 (IoF2020) explores the potential of IoT-technologies for the European food and farming industry.

The goal is ambitious: to make precision farming a reality and to take a vital step towards a more sustainable food value chain. With the help of IoT technologies higher yields and better-quality produce are within reach. Pesticide and fertilizer use will drop and overall efficiency is optimized. IoT technologies also enable better traceability of food, leading to increased food safety.

Nineteen use-cases organised around five trials (arable, dairy, fruits, meat and vegetables) develop, test and demonstrate IoT technologies in an operational farm environment all over Europe, with the first results expected in the first quarter of 2018.

IoF2020 uses a lean multi-actor approach focusing on user acceptability, stakeholder engagement and the development of sustainable business models. IoF2020 aims to increase the economic viability and market share of developed technologies, while bringing end-users' and farmers' adoption of these technological solutions to the next stage. The aim of IoF2020 is to build a lasting innovation ecosystem that fosters the uptake of IoT technologies. Therefore, key stakeholders along the food value chain are involved in IoF2020, together with technology service providers, software companies and academic research institutions.

Led by the Wageningen University and Research (WUR), the 70+ members consortium includes partners from agriculture and ICT sectors, and uses open source technology provided by other initiatives (e.g. FIWARE). IoF2020 is part of Horizon2020 Industrial Leadership and is supported by the European Commission with a budget of €30 million.

EXECUTIVE SUMMARY

This deliverable offers a synthesis of the work we've been doing in WP7. The question that WP7 set out to answer is whether and to what extent current ethical guidelines can be improved to build more trust in data sharing. The aim of this task is to look at current available ethical guidance to help build trust in farm data sharing, such as found in the EU Code of Conduct on Agricultural Data Sharing by Contractual Agreement (hereafter, referred to as "EUCC"), and to provide recommendations for how it can be improved, as well as identify extra steps to take to build trust in data sharing with farmers and other stakeholders in the data sharing network. As lack of trust in data sharing is an important obstacle for broad acceptance and use of digital farming technology, our recommendations aim to support the further development, implementation, and use of internet-of-things (IoT) ecosystems within the agri-food domain to ensure Europe's lead in the field of Smart Farming.

The objective of this task is to provide recommendations to improve and/or supplement the EUCC, based on the findings of WP7.

Method

There were five main stages in WP7 that contribute to the recommendations provided in this deliverable:

- Step 1 (September 2018 – February 2019) Interviews with 23 stakeholders within the Netherlands and Belgium to explore (a) what values play a role in their reflections on farm data sharing, and (b) what their preferred view on the data sharing future is. This resulted in 4 vignettes representing rival ways to shape the data sharing future and a list of values. (D7.3)
- Step 2 (March 2019 – January 2020) Focus groups with 116 tech-developers and researchers and 110 (young and older) farmers across the EU, to find out what their preferred data sharing future is. The vignettes and values identified in step 1 were used as input to enhance and broaden reflection of participants in focus groups: first determining the intuitive preference for a vignette and then developing it further based on a reflection on values. This led to a broader and more varied view on the pros and cons of alternative ways to shape the data sharing future, as well as a clear perspective to the values that participants hold dear when it comes to farm data sharing. (D7.4)
- Step 3 (October 2020 – November 2020): conduct a literature review of the constituents of a good code of conduct/code of ethics.
- Step 4 (November 2020 – January 2021): evaluate the EU Code of Conduct on Agricultural Data Sharing by Contractual Agreement (EUCC) against the standards outlined in the literature, and the results of the focus groups. This resulted in a scientific article which has been submitted to the *Journal of Agricultural and Environmental Ethics* (Ryan and Van der Burg, forthcoming).
- Step 5 (January – March 2021): establish issues with the code of conduct and provide recommendations on how to improve it and steps to take to realise trustworthy and ethical data-sharing within the EU.

This report will give a synopsis of the findings until step 4 which we have also noted in an article (Ryan and Van der Burg, forthcoming), and includes in addition Step 5.

Main concerns about the EUCC

The perspective with which we looked at the EUCC is formed by the literature on codes of conduct and codes of ethics. Throughout the 1990's there has been a proliferation of codes of conduct and codes of ethics intended for companies and professional groups. The goal of these codes was to avoid business malpractice and misconduct by fostering the development of a moral culture. Codes, however, turned out to be not always effective, for three reasons:

1. Codes are not well aligned with the values of the people who need to use it.

2. Codes are often not clearly formulated
3. Codes are not always carefully implemented and administered

Based on our review of codes, supplemented with the results of the focus groups, we can conclude that the above mentioned reasons of failure of adoption of codes, are also applicable to the EUCC. This offers openings to think more precisely about what we can do to improve and foster more trust in data sharing.

First of all, the code is not sufficiently aligned with the values of stakeholders. The values put forward by the EUCC are very important, as they seek to protect a lot of the individual freedoms of people. The EUCC describes in the principles of the code (and throughout the document) values such as respect for data ownership of the data originator, respect for autonomy of the data owner who is allowed to decide about his/her data, data protection and transparency about how data are being used, privacy and security and respect for property rights. These are all very important aspects of data sharing, which need to be taken into account. However, when we compare with the values that the 226 participants in our focus groups (farmers, tech developers, researchers) brought forward, then it seems that stakeholders agree with values that the EUCC brings forward, but they also note quite important additional values that the EUCC did not include. The main values that were prioritized during these focus groups were respect for individual freedom (e.g., autonomy), trust, fairness, care for the commons, and inclusiveness. We are confident that these findings reflect opinions of stakeholders as they also strongly correlated with empirical work done by other researchers, in many different countries, on the values and concerns of those working in the agricultural sector. This suggests that the EUCC does not (completely) align with the values of stakeholders: it reflects on part of their values, but stakeholders are concerned about a richer set of values in relation to data sharing.

Second, there are some issues with the language used in the EUCC. The team that developed the EUCC took care to choose words that their entire (multidisciplinary) team understands to avoid confusion. But this also lead to a new terminology that is unusual in the everyday world of farmers and which makes the text of the EUCC rather inaccessible for an important group of users. For farmers who try to read the EUCC, a great deal of effort, time, and money may be lost trying to understand and differentiate the complex legalistic terminology in the EUCC. This is especially problematic for the inclusiveness of the EUCC: if the farmers are to take a role in data sharing, they should at least be able to understand the text of the EUCC.

Connected to the language-issue, the form in which the relevant information is offered, can be questioned. There's a possibility that data sharing contracts are offered as a digital box-ticking exercise, with little thought or concern for whether the people who engage in contracts understand the information provided prior to entering a contract. There are already digital versions of agricultural data-sharing contracts available, which run the risk of people consenting online, without full informed consent about what they are agreeing to, nor negotiation about the content of the contract with the tech-provider. Signing such contracts may put farmers in precarious legal positions, and reduce their autonomy and control over their data, if there is no appropriate (other) protection for them in place.

Third, there are serious questions about the implementation and administration of the EUCC. The EUCC is non-binding. Non-binding agricultural data sharing codes have generally not been widely adopted (See Australia, New Zealand, and the US: Wiseman et al 2019: 13) Non-binding codes are often criticised as having no teeth and being little more than publicity stunts, or ethics-washing. In non-binding documents, such as the EUCC, it is often unclear who is responsible for their implementation and enforcement. A difficulty with the EUCC is that it is not designed for a single organisation, or even a single group of individuals; it is meant to guide the entire agricultural data-sharing industry. A clear issue with this is that it becomes very difficult to identify who is responsible for what aspects of the code how to ensure it is abided by, and clear penalties for enforcing it. There is also no outlet for whistle-blowers who wish to report malpractice, and breach of the code, within their organisation. The EUCC therefore seems to be a kind of message in a bottle that was sent offshore, without really knowing in whose hands it should land. This is problematic as Codes have been shown to have a chance to be successful only if organisations take responsibility for their implementation and administration; for example, by asserting the importance of the code by the management, making

ethical trainings obligatory, by creating a mechanism to deal with behaviour that deviates from the code and (if needed) punish non-compliance, and by offering protection to so-called whistle blowers. If there is no attention to any of these aspects in organisations, codes of conduct have little chance of becoming art of the daily practice of people.

Recommendations

The EUCC takes a huge leap forward towards the development of standards for the agricultural data-sharing sector. The document provides the industry with a valuable starting point to realise a European moral culture of data sharing. However, we propose that the EUCC, which focuses on advice for contractual law, should only be one component to institute ethical agricultural data-sharing practices. We propose two recommendations for EU agricultural data-sharing:

1. The EUCC should be kept, but improved upon, and written strictly as a text that will help to guide (legal) contract formation. It should not attempt to be (or be presented as) a text for all aspects of agricultural data-sharing. Therefore, it needs further changes to achieve this: it needs to make clear that it is about contract formation, it needs to be understandable (shorter, more practical), it needs to provide 'example contracts' for practical use and it needs checklists specifically aiming for and checklists for tech providers, who have usually different information needs.
2. Develop a new code of ethics for tech developers and tech service providers, which is to help realise trusted data sharing practices across the EU, which includes a richer set of values than the EUCC, as well as clear guidance on how to implement and administer the code of ethics within business organisations.

In the text of this deliverable we have included concrete (long) lists of points to take into account in the realisation of both these recommendations (in section 3), which provide input to design ways to move forward in the future.



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The European Commission's strategies for realising the United Nation's 2030 Agenda and the Sustainable Development Goals involves investment, development, and integration, of technological solutions to many areas that have an impact on the environment. The agri-food sector needs to adapt and incorporate greater technological developments to meet many of the ecological challenges, while also, feeding a growing population. The European Commission has been investing in digital agriculture to create innovative developments in the EU, as it is expected that this will bring sustainable, inclusive, and competitive food systems (European Commission 2020b; 2020a). Digital farming is seen as fundamental for the realisation of the European Green Deal, the European Commission's FOOD 2030 policy, and the UN Sustainable Development Goals (SDGs) (European Commission 2016b; 2016a).

IoT technologies hold great promise for the future of EU farming. However, the transition towards a digitalised agri-food sector is not always straightforward and the EU must meet these challenges to reap the benefits promised by digital farming. Much of our technological solutions are heavily dependent upon the retrieval, storage, and use of large amounts of data, both to function effectively, but also, to provide tailored solutions to individual farmers. But farmers (and other stakeholders in the value-chain) are often hesitant, or even opposed to sharing their data. They recognise that there is a great deal of power in their data, and while they accept its importance for development of technology, they are also concerned that tech companies will use their data for other purposes which will not primarily benefit farmers or even worse, or will be used against them. If digital farming is to be successful, it is important to overcome this reluctance to share data. The question that WP7 set out to answer is whether and to what extent current ethical guidelines can be improved to build more trust in data sharing.

The aim of this task is to look at current available ethical guidance to help build trust in farm data sharing, such as found in the EU Code of Conduct on Agricultural Data Sharing by Contractual Agreement (hereafter, we will refer to it as "EUCC" for simplicity sake), and to provide recommendations for how it can be improved, as well as steps to take to build trust in data sharing with farmers and other stakeholders in the data sharing network and how to implement an ethical agricultural data-sharing agenda within the EU. This is to support the further development, implementation, and use of internet-of-things (IoT) ecosystems within the agri-food domain to ensure Europe's lead in the field of Smart Farming. We evaluate the EUCC, as it is seen as the main document being used to provide guidance for fair and responsible data-sharing in the EU. We will examine this document, establish some potential drawback or issues with it, and will provide some recommendations about how it can be improved or what additional actions need to be taken for the agricultural sector to benefit from data-sharing, while incorporating the needs and values of its stakeholders. This report is based on publications and reports about the work we have done for WP7 all through the project; most notably, the three articles providing a critical perspective on the EUCC (Ryan et al. forthcoming; Giesbers et al. forthcoming; Van der Burg et al 2020a), and the reports providing an overview over the reflective focus groups about trust in data sharing with 226 stakeholders, including old and young farmers, tech-developers and researchers (D7.4: van der Burg et al. 2020b) and the interviews with stakeholders within the Netherlands which provided input to the workshops (D7.3).

This report aims to provide additional insights into agricultural data-sharing within the EU, building on the range of findings produced in WP7 throughout the project.

Objectives:

The objective of this task is to provide recommendations to improve and/or supplement the EUCC, based on the findings of WP7.

Approach:

There were five main stages in WP7 to establish IoF2020's recommendations for the EUCC:

Step 1 (September 2018 – February 2019) Interviews with stakeholders within the Netherlands and Belgium to explore (a) what values play a role in their reflections on farm data sharing, and (b) what



their preferred view on the data sharing future is. This resulted in 4 vignettes representing rival ways to shape the data sharing future and a list of values. (D7.3)

Step 2 (March 2019 – January 2020) Focus groups with 116 tech-developers and researchers and 110 (young and older) farmers across the EU, to find out what their preferred data sharing future is. The vignettes and values identified in step 1 were used as input to two rounds of reflection during the focus groups: first determining the intuitive preference for a vignette and then developing it further based on a reflection on values. This led to a broader and more varied view on the pros and cons of alternative ways to shape the data sharing future, as well as a clear perspective to the values that participants hold dear when it comes to farm data sharing. (D7.4)

Step 3 (October 2020 – November 2020): conduct a literature review of the constituents of a good code of conduct/code of ethics.

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Step 5 (January – March 2021): establish issues with the code of conduct and provide recommendations on how to improve it and steps to take to realise trustworthy and ethical data-sharing within the EU.

We integrated these steps within our research, producing a manuscript submitted to the *Journal of Agricultural and Environmental Ethics* from steps 1 to 4. This report will give a synopsis of these findings but will also include Step 5, which is new.

The following section will provide a brief overview of the origin of the EUCC, stakeholders involved in its construction, and chief values and actions it prescribes. This will be followed by a section outlining challenges faced within the EUCC. Finally, we will provide recommendations and propose a future roadmap for ensuring ethical agricultural data-sharing within the EU.

In Europe, the General Data Protection Regulation (GDPR) protects individuals' personal data, such as identifying their name, address, or sensitive information that requires protection (such as health and banking information). It is implemented to protect the safety and privacy of individuals, but there is much data that does not fall under the remit of the GDPR. For these data, the European Commission has adopted the Free Flow Regulation for non-personal data, and this regulation is used to assist and regulate the competitive data economy that has emerged over the past decade or two. Free flow allows for *relatively* uninhibited circulation of non-personal data within the EU, placing the responsibility to develop trustworthy data sharing practices *largely* on those involved in the data exchange.

Most agricultural data fall into the category of non-personal data and free flow of these data is encouraged within the EU. Only data containing personal information (such as, the farmer's name, address, contact details, etc.) fall under the GDPR. As it was clear that farmers do not readily share farm data, as the free flow regulation prescribes, the European Commission asked stakeholders to come up with their own guidance as to how trust in data sharing could be fostered. This resulted in the EU Code of Conduct on Agricultural Data Sharing by Contractual Agreement (EUCC). This is the defining document within the EU that aims to provide guidance for those sharing agricultural data within Europe.¹

The EUCC was an initiative launched in 2018.² The development of the EUCC was led by COPA-COGECA and CEMA and was developed and agreed upon by a coalition of nine organisations in Brussels on April 23rd, 2018. Those involved were the European council of young farmers (CEJA) as well as large animal breeding companies, companies developing input supplies (animal feed, fertilizer, seed) or farm machinery (beside CEMA, these included Fertilizers Europe, CEETTAR, ECPA, EFFAB, FEFAC and ESA).

The aim of the EUCC was to create a set of principles that would allow farmers and agribusinesses to form fair, ethical, and agreeable contracts for all parties involved. These contracts were considered a practical way to realise trust in data sharing between partners, which help to pay attention to the ways in which stakeholders in the sector can benefit from data sharing, while avoiding potential harms and issues caused by doing so; such as, for example, using data for other purposes than the creation of the technological service, such as for profiling of farmers, as pre-knowledge to make intelligent choices on the stock market, or as information to sell to competitors (p.4). By providing clear recommendations for ethical agricultural data-sharing contracts, it was expected to eliminate much of the mistrust in the sector. The EUCC provide five distinct principles to follow during contract formation:

1. **Data ownership:** This principle advocates for rights to be assigned to those from whose land or company agricultural data are collected (data originator). This can be done either independently or via farm machinery, sensors, or other means. The data originator is the owner of the data and is therewith given greater control over what, and how, this data is used.
2. **Data access/control/portability:** The data originator must be asked for explicit consent for their data to be accessed, used, stored, and shared with third parties.
3. **Data protection and transparency:** Data users should provide transparent information about what they do with the data to the data originator, and ask the data originator for consent. If no consent is given, then data cannot be used. If new possible uses are added, the contract must be rectified, and consent must be asked again for these new uses to the data originator.
4. **Privacy and security:** The GDPR must be respected when data-sharing falls within the bounds of its regulation. Personal or sensitive data can only be shared after consent from the data originator and/or should be anonymised, and data originators should be notified if there is a security breach.

¹ It can be found here: https://copa-cogeca.eu/img/user/files/EU%20CODE/EU_Code_2018_web_version.pdf

² This document is not unique, as there have been several similar documents drafted in the US, New Zealand, and Australia, to provide advice for agricultural data-sharing.

5. Liability and intellectual property (IP) rights: Liability must be included in contractual agreements. There must also be protection of relevant IP rights resulting from the recombination and processing of data.

These five principles provide guidance in dealings with non-personal agricultural data, in accordance with the GDPR but also when the GDPR no longer applies. It predominantly refers to non-personal data, but not exclusively. The main aim of the EUCC is to give greater authority and control to the so-called 'data originator', who is the person or organisation from whom the data stem that are used during the data-sharing process. Other individuals and organisations should understand what they are allowed and not allowed to do with these data: they can collect, store, and use these data in line with best practices and the terms agreed on within their contracts. These contracts should be transparent for those entering these agreements. Therefore, the main presumption underlying the EUCC is that trusted data-sharing can materialise by contractual agreements.

The EUCC provides advice about the content of these contractual agreements, giving recommendations about what factors should be included and excluded. The EUCC goes into detail identifying the different types of data within the agricultural sector, and clarifying the roles of the different stakeholders involved in the process, and offering a checklist for the data originator to address when in consultation about their data-sharing contracts. The end goal is to realise trusting relationships between different partners sharing data and to allow the agricultural data-sharing industry, and the agricultural sector generally, to flourish.

The aims and ambitions of this document are admirable, and we endorse and promote much of the content of the document. But we also think that it is not complete: it does just part of the work that needs to be done to realise trust in data sharing. Therefore, our analysis of potential issues with the EUCC is not meant as an overly-critical examination of the work done by COPA-COGECA et al. who made it, but aims to build upon this work to realise fairer and more inclusive, and responsible, agricultural data-sharing within the EU. We provide recommendations to further continue the work that the contributors to the original EUCC started.

Throughout the 1990's there have been a proliferation of codes of conduct and codes of ethics intended for companies and professional groups. The goal of these codes was to avoid business malpractice and misconduct by fostering the development of a moral culture. Codes, however, turned out to be not always effective, for three reasons:

1. Codes are not well aligned with the values of the people who need to use it.
2. Codes are often not clearly formulated
3. Codes are not always carefully implemented and administered

These reasons, described in literature, are analysed at more length in Ryan and Van der Burg (forthcoming). We think all three of these common criticisms are applicable to the EUCC. In the following we will summarize the main points of criticism, to be able to explain the recommendations.

We will first argue that the EUCC does not sufficiently reflect the values of stakeholders. We will do that by comparing between values put forward by the EUCC and values brought forward by stakeholders during 22 focus groups carried out in WP7, which involved 226 participants (110 farmers and 116 tech businesses and researchers). The aim of these focus groups was to identify stakeholders' views and values in relation to data sharing, what would be a desirable future, and how to achieve it. Some of the main values that arose during these focus groups were respect for individual freedom (e.g., autonomy), trust, fairness, care for the commons, and inclusiveness. We are confident that these findings reflect opinions of stakeholders as they also strongly correlated with empirical work done by other researchers, in many different countries, on the values and concerns of those working in the agricultural sector.³

After our comparison between EUCC values and stakeholder values we also offer a critical evaluation of the structure, style, and comprehensiveness of the EUCC and evaluate its implementation, and administration.

3.1. EUCC DOES NOT SUFFICIENTLY ALIGN WITH VALUES OF STAKEHOLDERS

Trust

While the realisation of trust is the primary reason to develop ethical guidance surrounding agricultural data-sharing, it only appears once in the EUCC. The EUCC proposes trust within the industry can result by constructing data-sharing contracts and assessing clear responsibilities for each partner involved in the data sharing contract. (ECPA 2018, p. 4). Establishing guidelines that will benefit all stakeholders within data-sharing business models will demonstrate one's trustworthiness when establishing contractual agreements. However, this is not all there is to say about trust. Trust is also built on relationships, normative commitments, and a care for the other, rather than solely or necessarily materialising from contractual arrangements (Baier 1986; Jones 1996; Luhmann 1979; and Ryan 2020; Van der Burg et al 2020a).

Similarly, in our extensive focus groups, stakeholders placed trust as one of the central themes throughout our discussions (Van der Burg et al 2020b). Farmers explained that they did not trust those looking for their data and did not trust how it would be used. Some of this was underpinned by a lack of understanding about the process and others were sceptical about who, and why, their data was wanted, and how it may be used against them. Farmers were concerned about what would become of their data once it is given away, whether their contract would protect them (if they had one), and because of the technical and legalistic jargon that they would sign over more than they were aware of. Therefore, ensuring that organisations are trustworthy and building trusting relationships within the

³ For example, autonomy and control of one's data arises in many of the empirical articles and reports that we evaluated, very often underpinned by trust issues and concern about how their data is being used (Hoes and Lan 2017; Regan 2019; Fleming et al. 2018; Ryan 2019). There was also a strong overlap with issues around transparency and data sharing practices (Regan 2019; Jakku et al. 2019) and issues of unequal data access, data sovereignty and the vagueness of data ownership (Carolan 2018; Jakku et al. 2019; Ryan 2019). Shifting power relations resulting from data was also highlighted (Bronson 2019), and balancing the benefits of using this data to the laymen (Fleming et al. 2018) and problems of a digital divide (Ryan 2019).

sector is vital for any kind of ethics code or code of conduct to be adopted and have any significant impact.

This does not mean that contracts cannot be an expression of trustworthiness (Hardin 2002), but most of the time they are either not needed (because trust is already in place) or not sufficient to build trust. For example, we trust our friends, family, and even strangers without requiring a contract. And even if one is in a contract with another, there can still be levels of distrust with one another. Therefore, to ensure fair and trustworthy agricultural data-sharing within the EU, we can't only rely on contracts as a solution.

Respect for individual freedoms

During our focus groups, the topic of respect for individual freedoms and rights came up several times. Stakeholders agreed that it was very important to respect the freedoms of the farmer to choose what they can do with their data and have control over how it is used. Farmers (young and old) claimed that having control over their data would respect their autonomy and acknowledge their important role in the agricultural data-sharing partnership.

This is the value that plays the largest role in the EUCC. The value of respect for privacy is mentioned in the EUCC (see for example the fourth principle of the EUCC, which refers to the GDPR). Respect for autonomy is not explicitly mentioned in the EUCC, but it is implied in the entire document and in the first principle which asks to respect rights of data owners who should be allowed to decide about their data. The EUCC furthermore states that parties should be respectful of the need to protect sensitive data and should ensure that it is safely stored and used (ECPA, 2018, p. 8). And most importantly: the document expresses that collection, access, and use of agricultural data can only occur after the data originators have granted their explicit and informed consent to do so (ECPA, 2018, p. 9).

Respect for individuals' autonomy or respecting farmers' freedoms is implied in the EUCC but not discussed or recommended, at all. We believe that the document would improve if it offered an explicit recommendation within the document of this value. While it puts forward the goal that data should be protected and stored safely, it does so from a legal point-of-view (i.e., do it because otherwise you are breaching your contract). It does not offer the ethical arguments to do so, which is the point of making a code of conduct or code of ethics, especially when it is supposed to fill a gap in legislation.

Fairness

Fairness was discussed in two ways during the focus groups. Sometimes it was brought forward as a value in relation to data access. Farmers thought it was unfair that sometimes they could not access their own data, or get their data back after it had been used by tech companies. Many farmers thought it fairer if they could have access to their own data and use them for purposes that they see fit. This meaning of fairness (as fair access to data) is sometimes being referred to as 'data sovereignty'. While data sovereignty is not explicitly granted in the EUCC, it would perhaps be easy to include it. Data access control and portability requires that consent be always asked in a contract from the persons from whom data stem (the data originators). This could be expanded to include that data originators should also be given the right to decide to keep the data for themselves or ask the people who collect them to return the data to them after use.

Second, fairness was also considered in relation to the benefits that data bring: the distribution of those benefits should be fair. Farmers are concerned that when they give their data, tech companies will make profits from it, which they consider not fair as it is their data and therefore, they think they should get part of those profits. Tech companies, on the other hand, have another take on the matter: they think that they should be allowed to build a business model on the data, as they need to spend time, effort, and expertise on the data to make them valuable. Furthermore, tech companies often would like to make a profit out of the data by selling them to third parties. There is therefore disagreement among farmers and tech companies about what fairness demands and who is entitled to benefit from data (Van der Burg et al. 2020a, p. 23/24).

Fairness is not explicitly mentioned in the EUCC, but some consideration about fairness plays a role in the background. The first principle of the EUCC asks to acknowledge data ownership of the person from whom the data stem (the data originator), which implies that he or she has ownership rights, which usually implies being allowed to profit from what is owned. The EUCC furthermore demonstrates the value of fairness by proposing that the data originator (often the farmer) should benefit from and/or be compensated for the use of their data by tech companies and the transformations of those data after being combined with other data (ECPA, 2018, p. 8). The EUCC therefore explicitly prescribes to settle arrangements in the contract with the data originator about who deserves what benefit. The EUCC does not however give any lead as to what counts as ‘fair’ and how the data originator and the data user can settle a distribution of benefits that deserves to be called ‘fair’. Furthermore, negotiating the ‘fairness’ of the distribution of benefits is perhaps an important ingredient of the contract formation between data originator and data user, but it is questionable whether it is feasible in practice. As the data sharing network around companies expands, discussing the distribution of benefits with every single farmer becomes a very labour-intensive task. While the value is addressed in the EUCC, there are therefore serious doubts about its actual realization in contracts.

Caring and inclusiveness

Our focus groups demonstrated that inclusiveness was a very important aspect to include when discussing issues of agricultural data-sharing. Participants were concerned about the distribution of power within the industry and how it may be allocated in the hands of a few large agribusinesses (e.g., John Deere, Monsanto/Bayer, and BASF). These large multinationals retrieve a lot of data about farmers and other agricultural businesses, which makes it difficult for other organisations to compete against them in the data economy. There is concern that there will be a greater reliance on these huge companies in the future and that they may swallow-up many smaller businesses through takeovers, mergers, and partnerships. During the focus groups farmers as well as small and medium size tech companies stated that this would lead to a situation where there was potentially little inclusion of their voices within the data-sharing process, with little direct interaction with companies using the data. Farmers stated that inclusion was a very important value for them and that they wanted to have a say in how the data-sharing industry works and what is done with their data, also after these data are no longer raw data but have become processed, connected to other data and travel through the intangible data sharing network. Inclusive data governance, which would mean they would have a say about the purposes for which data in such a network are used and the preconditions that must be satisfied before they are used, was proposed as a necessary element to demonstrate a care for their values, ideals, and visions about the industry.

One could say that the EUCC itself is inclusive as it is shaped by agrifood stakeholders. The EUCC involved nine large agri-food chain organisations, which mostly consisted of agri-companies and farmer representative groups (Wiseman et al., 2019, p. 10). While this is admirable, it also raises questions about inclusiveness, for example how representative of the end-user are these groups? These organisations largely represent larger agro-businesses within the EU, and not necessarily start-ups or smaller farms. A repercussion of this is that organisations not involved during the creation of the document may not be able to understand the content of the code, or believe their voices were not included, and therefore altogether, refuse to implement it in practice, as it is non-binding anyway.

One could also say that the EUCC fosters inclusiveness in the sense that it gives every farmer a voice in the negotiation about a contract about data sharing. The EUCC does not explicitly mention inclusiveness as a value, nor does it reflect on the meaning of inclusiveness, or point towards different possible ways in which it can be served by including farmers in a dialogue about data-sharing. It does not discuss concerns around power inequality or how this may materialize in the future. It does not mention the wider societal and power imbalances when it comes to data-sharing and the potential harm that it could have on the farmer. It briefly mentions that businesses using farmers’ data should care about their values, privacy, and security, but fails to go into detail about how this can be realized. The EUCC gives some technical solutions of how one could care about farmers’ data, such as through pseudonymization and encryption (ECPA 2018, p. 9). But it does not discuss power differences that can come about in the agri-food domain, nor does it invite farmers to engage in discussion about its

detrimental effects can be mitigated, or how farmers have more of a say in these evolving new power relationships.

Furthermore, with the future of data-contracts transferring to online box-ticking exercises, one might ask whether a contract is able to lead to more inclusiveness. In this way, farmers will be excluded from discussions around what should go into their contract, for 'pre-established' digital contracts are provided to them and accepting or rejecting is their only possible response. Either they enter contract, or they do not. This is far from how farmers in the focus groups described how they would like to be treated and included in the process. This futile box-ticking exercise should be addressed within such a document as the EUCC; however, it is not.

If contracts are the only way to include farmers, and these contracts are digitized, the farmer's role is reduced to just ticking 'yes' or 'no'. This shows little consideration for the generating power relationships, nor does it take responsibility to care for the more vulnerable party in these relationships: the farmers. Not taking care of the vulnerability of farmers in the evolving power relationships may result in farmer's refusal to share data, which eventually does not help anyone. It will mean that farmers will not have access to the advantages that digital farming brings, or the technology will not work as effectively as it should. This would be a bad result for everyone involved.

Citizenship and caring for the commons

The focus groups addressed the idea that it is important to share data for ensuring the protection of the commons. Commons they would be prepared to share data for included research and innovation, food safety, environmental protection and showing compliance with the law. They viewed data sharing for purposes such as these as an active way of participation and citizenship. They endorsed sharing their data to contribute to the common good, but also wanted this aim to be made explicit and they wanted assurance that these data would not simply be used in another way for private interests or benefit. Also, they wanted to make sure that sharing data for the common good would not harm them, for example because people would use these data to penalize individual farmers publicly.

Citizenship and farmers' values are not elaborated in the EUCC. The document indicates that effective agricultural data-sharing contracts will lead to improved business practices, which will reap benefits for the industry, society, and environment. It appears to presuppose that sharing data is economically beneficial for all parties and will subsequently also be beneficial for society. However, it fails to examine what should happen in situations when data sharing is beneficial for society, but may not reap economic benefit for those sharing it, or may even prove to have a negative impact. This can commonly be seen with the provision of environmental data from farms that may indicate less chemicals should be used or farmers should change their current polluting practices. It would require a change in practice, investments to do so, and potentially, extra governmental charges as well. In situations such as these, serving societal goals may (in the short run) conflict with economic business benefits. But the EUCC does not prescribe how to deal with such situations. It therefore remains uncommitted to public goals that may be served with data sharing, which is surprising, given that food safety, food security and a lower burden of food production on the environment are among the primary reasons why the European Commission promotes and invests in digital farming.

Responsibility

The focus groups also addressed the need to ensure responsible and accountable practices during data-sharing processes. Farmers were concerned about who would have access to their data, how it would be stored, how it would be used, and who would be responsible for all of this. They were also concerned about identifying who should be held accountable when things go wrong, what actions can they take, and how can these problems be amended (if they can). On the other hand a lot of SME's and researchers brought forward that they wanted to make transparent what is being done with the data. Some of them saw a specific mission for themselves to educate farmers about what is being done with their data, in order to show that data are being handled responsibly.

Therefore, any set of codes or best practices for data-sharing should contain a strong degree of responsibility and accountability allocation, with clear steps and procedures of actions to take. The EUCC restricts responsibility to following procedures outlined within their data-contracts, but backs

away from providing detailed advice about what should be contained within these contracts. It lacks clear guidance and reflection about the responsibility of data sharers towards one another and society. 'It does not provide advice on how to empower people or foster their autonomy, it does not prescribe to diminish harms or act benevolently, nor does it enhance reflection about the content of fairness and what it demands or what public goals should be served with data. It also does not invite people to reflect on power relationships or on how to mitigate their detrimental effects. In short, it does not do very much to enhance reflection of data sharers about the content of their responsible behaviour towards each other or to society. The EUCC does not hold stakeholders responsible for anything specific: basically, if it is agreed on in a contract, anything goes' (Ryan and Van der Burg 2021, publication pending).

3.2. LANGUAGE, IMPLEMENTATION AND ADMINISTRATION OF THE EUCC

Complexity of the language and legalistic style

The team that developed the EUCC took care to choose words that their entire (multidisciplinary team) understands to avoid confusion. But this also led to a terminology that is unusual in the everyday world of farmers and which makes the text of the EUCC rather inaccessible. For farmers who try to read the EUCC, a great deal of effort, time, and costs may be lost trying to understand and differentiate the complex legalistic terminology in the EUCC. This is especially problematic for the inclusiveness of the EUCC: if the farmers are to take a role in data sharing, they should at least be able to understand the text of the EUCC. This means also that the EUCC should be translated into local languages and that terminology should be understandable for all.

The target audience in the EUCC is not clearly defined or catered towards with the text of the EUCC. The text appears to be largely directed towards agribusinesses, who can easily afford the time, costs, and understanding of such documents. But consequently, everyone has a problem, for the farmers often have a hard time understanding the EUCC, while they do have a responsibility. The code states that those retrieving, storing, and using agricultural data have a strong responsibility for ensuring its fair and responsible use, but then leaves this responsibility to the farmer to ensure these things are included in the contract (the contract checklist at the end of the document is clearly directed towards the farmer, or the data originator). To take this responsibility, farmers need to be able to understand everything in the code text.

It is therefore unsurprising that one of the significant problems that the industry faces is that farmers do not fully understand the legalistic and technical jargon associated with agricultural data-sharing. A 'large part of the problem is that many farmers do not know if, and under what circumstances, they should share their farm data' (National Farmers Federation, 2020, p. 2). For the industry it is therefore also problematic that farmers do not always understand.

The legalistic tone and emphasis of the EUCC also has the side effect that it may appear somewhat cold and harsh to its supposed target audience, farmers. It reduces much of their interactions and relationships with those they share data with to legal contracts. Consequently, it gives little reference to the farmer as an individual with his or her own set of values, beliefs, and emotions; but, instead, reduces farmers to the abstract concept of 'data originators' (ECPA 2018, p. 9). This is not universal among agricultural data sharing guidelines, as the Australian farm data code refers to the farmer throughout and gives clearer and less convoluted language (National Farmers Federation, 2020, p. 3). This document puts less of an emphasis on contracts and places the farmer's needs at the centre of their recommendations, rather than turning them into a legal entity.

The EUCC is attempting to provide recommendations for a gap that is left by the GDPR, as non-personal data is not covered under it. They attempt to do this by providing adequate advice about data-sharing contract law, and how to implement appropriate agreements between stakeholders. As the EUCC tries to fill this gap, the tone and style of the document is quite dogmatic and leaves little room for interpretation of how to apply it in different contexts or actions to take outside of the bounds of the contract. If one's reason for behaving ethically is solely confined to what is contained within their contract, then this leaves a lot of room for acting legally, but unethically. A contract cannot, and should

not, attempt to cover everything, so a document such as the EUCC should not be used as the sole ethical yardstick for action.

Implementation

A problem with the EUCC is that there is the possibility that it is used as a box-ticking exercise, with little thought or concern for how it is to be delivered and implemented. The list of requirements at the end of the EUCC indicates that once all these issues are met, then the contract is fair and ethical. While such a list may be helpful for discussion and ensuring that many of the stakeholders' concerns are met, there is the potential that many of these will be overlooked with the increased digitalisation of contracts and agreements. There are already digital versions of agricultural data-sharing contracts available, which run the risk of farmers consenting online by ticking a box on the computer screen, without full informed consent about what they are agreeing to, nor negotiation about the content of the contract with the tech-provider. Signing such contracts may put farmers in precarious legal positions, and reduce their autonomy and control over their data.

This digitalisation of contracts may raise the question how implementation of the EUCC is arranged, and whether certain guidelines or requirements are in place as to what counts as good implementation.

Implementation and administration

It is also unclear how the EUCC was distributed and implemented in practice. The EUCC is non-binding. Non-binding agricultural data sharing codes have generally not been widely adopted, such as the EUCC but also elsewhere (See Australia, New Zealand, and the US: Wiseman et al 2019: 13). Non-binding codes are often criticised as having no teeth and being little more than publicity stunts, or ethics-washing. Until there is additional legislation, standardisation, and legal obligation, the use of ag data is too open to the whims of individuals and companies. There is little protection from the farmer entering unscrupulous contracts, despite the code's best intentions. There needs to be an effective implementation of the code by the entire EU agricultural sector through widespread dissemination, but also ethics training, and feedback, input, and amendments to the document is crucial' (Ryan and van der Burg 2021, publication pending).

In non-binding documents, such as the EUCC, it is often unclear who is responsible for their implementation and enforcement. The EUCC does not explain how it intends for organisations to ensure compliance and administering punishment for breaches of the code. A difficulty with the EUCC is that it is not designed for a single organisation, or even a single group of individuals; it is meant to guide the entire agricultural data-sharing industry. A clear issue with this is that it becomes very difficult to identify who is responsible for what aspects of the code, how to ensure it is abided by, and clear penalties for enforcing it. There is also no outlet for whistle-blowers who wish to report malpractice, and breach of the code, within their organisation. The EUCC therefore seems to be a kind of message in a bottle that was sent offshore, without really knowing in whose hands it should land. This is problematic as Codes have been shown to have a chance to be successful if organisations take responsibility for their implementation and administration; for example, by asserting the importance of the code by the management, making ethical trainings obligatory, by creating a mechanism to deal with behaviour that deviates from the code and (if needed) punish non-compliance, and by offering protection to so-called whistle blowers. If there is no attention to any of these aspects in organisations, codes of conduct have little chance of becoming part of the daily practice of people.

If the EUCC aims to realise a trusted data sharing culture in Europe, careful attention should therefore go into implementation and administration in organisations as well. An extra complicating factor is that the EUCC does not have a clear addressee. The text of the EUCC addresses farmers as well as tech companies. The document's 'contract check-list' has several questions that one should ask when involved in a data-sharing contract. The EUCC does not clearly specify who is responsible for this checklist, but the questions that are asked within it clearly indicate that it is meant for the farmer ('my data', 'my dataset', 'will I be updated on security breaches', 'do I need insurance', see ECPA, 2018, p. 19). However, there is no check-list for agribusinesses to abide by within the document. Responsibility is given to the farmer for ensuring fair contracts. However, usually it is the tech businesses who make the contract that farmers must sign. It could be questioned, therefore, whether it is wise to address all



stakeholders at once with a single code, as the tech businesses will have different responsibilities when it comes to contract-formation than farmers.

4. RECOMMENDATIONS

The EUCC takes a huge leap forward towards the development of standards for the agricultural data-sharing sector. The document provides the industry with a valuable starting point to realise a European moral culture of data sharing. However, we propose that the EUCC, which focuses on advice for contractual law, should only be one component to institute ethical agricultural data-sharing practices. We propose two recommendations for EU agricultural data-sharing:

1. The EUCC should be kept, but improved upon, and written strictly as a text that will help to guide contract formation. It should not attempt to be a text for all aspects of agricultural data-sharing. Therefore, it needs further changes to achieve this.
2. Develop a new code of ethics, which is to help realise trusted data sharing practices, which includes a richer set of values than the EUCC, as well as clear guidance on how to implement and administer the code of ethics.

4.1. IMPROVEMENTS TO THE EUCC

As we have demonstrated earlier, the terminology ‘code of conduct’ is not well chosen, as it is typically a set of best practices to be used in an individual organisation, among employees. Contract formation between farmers and agribusinesses is different. We propose to give it the name like ‘guideline for contracts’, or something similar. In addition, we propose that this guideline for contracts should:

- Clearly identify who the target audience is: is it agribusinesses, farmers, policymakers, or the public? It should identify a clear addressee (tech companies, who need to shape the contracts).
- Clarify the language, to allow everyone to read and understand (a) why a contract needs to be shaped, (b) what it is about (c) what the responsibilities and rights are of each player involved in the contract.
- Have player-specific checklists at the bottom of the document that lists the topics that different contractors should consider. One should be geared towards companies and agribusinesses retrieving, using, and sharing, farmers’ data, and should resemble the New Zealand Farm Data Code checklist. The other checklist should support farmers to ‘check’ whether the contract suits their interests. While this is somewhat cumbersome, it allows the document to really resonate with the questions of who it is expected to help.
- It should provide clear guidance of how ethical data-sharing can materialise in practice, steps to get there, and should be easily accessible to the end-user. This also means that information and practical explanations of different data-sharing routes should be tailored to the target audience: the one aiming for tech providers should be different than the one for farmers, which should be written in accessible language intended for non-experts in ICT.
- Investigate possibilities to make contracts, prior to data-sharing, a legal obligation.
- Data-sharing codes should clearly outline levels of accountability for the implementation and administration for when there are issues or harms arising from poor data-sharing practices.
- It should be evident who should be held accountable if data is illegitimately shared, hacked, or altogether misused. We recommend that a code of ethics should be coupled to a mechanism that helps to ensure that all parties are aware, able, and willing to implement responsible practices for data-sharing.
- There should be a strong and explicit emphasis on the importance of the farmer’s right to control their data and how it is used. This is important for the farmer’s sense of autonomy, but will also function as a motivator for tech providers to provide clear and accessible information to the farmer about the ways in which their data is used.

4.2. DEVELOP A NEW CODE OF ETHICS

While it is perhaps a good idea to have a law obliging stakeholders to form contracts, there still needs to be continued reflection about the ethical nature of data sharing. For now, the EUCC does not provide enough basis to do that. There remains a lot that needs to be done within the field to support development of a moral data sharing culture within the EU. There will be a lot that contracts do not cover, which should be contained within a code of ethics for agricultural data-sharing which prescribe how data sharers should behave regarding data. Such a code of ethics should provide guidance to distinguish between desirable and undesirable actions in relation to people or organisations and their data and help stakeholders to reflect more critically on their own and each other's behaviour and actions. As we have shown in the previous that the EUCC was lacking in three respects, we propose to improve this toward the future. We propose that a new code should:

- List the much richer set of values that the stakeholders find important in the code of ethics
- Provide guidelines that show how to implement the code of ethics in organisations which collect, process, and share data of large groups of stakeholders in the agrifood sector, which (a) shows who is in charge, (b) provides supportive material, such as instruction video's and trainings
- Provide guidelines as to how to administer the code of ethics in concrete tech companies, which also includes reprimanding/punishing measures – using the code therefore has teeth, but the teeth are organised at organisation level.

4.2.1. RICHER VALUES MEAN BROADER CONSIDERATIONS ABOUT QUESTIONS RAISED BY DATA SHARING IN SOCIETY

The issues and values that are focused on in the EUCC are quite restrictive and do not take the broader societal changes into account that data sharing brings about. It is vital that a code of ethics considers these broader societal changes, as these may raise ethical questions. Some additional suggestions for this new code of ethics include:

- As said, within the 33 Use Cases of the IoF2020 project, the interviews from D7.3, and the focus groups conducted in D7.4., there were many values discussed that were not contained within the EUCC (Ryan et al. 2021, publication pending; see also, D7.3 and D7.4). For example, trust, respect for individual freedoms, fairness, caring and inclusiveness, responsibility, citizenship and caring for the commons. These values are based on focus groups with 226 farmers and tech providers and researchers, but this is a limited group. It is important to find out whether they also reflect the values of larger groups of stakeholders, situated in different contexts across the EU. People who are situated in various societal and political contexts in Europe may encounter different ethical questions when confronted with the questions whether they want to share their data.
- Societal goals motivate governments to invest in digital farming, as they expect it will help produce more high-quality food with less burden on the environment. Until now, however, it is still quite unclear whether and to what extent digital farming helps to realise these goals, as data are not accessible. Therefore, there should be more careful reflection about conditions that make data sharing possible for the commons. Sharing data for the commons is an important value that stakeholders brought forward in our focus groups (D7.4), as 50% of our participants in the focusgroups were interested in realising a form of digital public library that allows access to data to serve public goals such as food safety, monitoring the effects of farming on the environment, or research and innovation. Most respondents wanted, however, to develop a good policy (mostly, together with companies and government actors) for such a data library which specifies under what conditions data can be shared for the commons. A code of ethics could take this into account.
- Discussions and negotiations should be organised about what a fair distribution of benefits from data sharing is or what the data-sharer gets in return for their data, how it will be managed, and what to expect from the partnership. In this discussion it should become clear what the value of data is when it comes from farmers, but also the time and effort that is spent

by tech providers to turn the data into valuable information. Coming to an agreement about what constitutes ‘fair’, demands that stakeholders have a clearer idea about the transformation process that data undergo when data are collected, processed, split or connected to other data in order to eventually become valuable resources of information.

- Related to the previous: perhaps a clearer connection should be made between data ethics and business ethics for the further development of a code of ethics, as data sharing introduces new (virtual) ways to collaborate (and negotiate a fair distribution of profits) between businesses, which may give rise to ethical problems that could benefit from a business ethics perspective.
- Development of a new code of ethics should be inclusive. While the EUCC included ‘representatives’ of farmers, it is questionable how inclusive this truly is as farmers across the EU are diverse and do not always seem to share the pro-tech attitude of the representatives delegated from Copa-Cogeca or CEJA.
- Farmers and tech developers are not solely concerned about money and want to help improve the industry, ensure sustainability, and contribute to society. While economic benefits of data-sharing are important, it should not be the sole emphasis. There are many instances where data could be used for non-economic ends, which should also be included in a code of ethics. When considering the commons to share data for, however, careful consideration should go into the business interests as well. The two should be more in balance.

4.2.2. HOW TO IMPLEMENT THE NEW CODE OF ETHICS

Those responsible for implementing any code of ethics need to include follow-up procedures for those adopting it; such as, the development of trainings in order to make sure that users of the code understand the content of the document and practical advice for the management of companies regarding how to make it part of the organization’s culture. As there is no binding agreement to ensure businesses and their employees abide by the content in the document, perhaps, the implementation of regulatory or binding agreements may be useful to support the effectiveness of such a document. For example, other voluntary codes, such as the one by the Forest Stewardship Council (FSC) has implemented legal and regulatory obligation to great effect. The ethics code implementation could benefit from:

- The provision of certification for products and/or organisations that meet a minimum ethical data-sharing practices. This certification should not be a ‘one-time thing’, but the organization should be regularly evaluated to ensure they are meeting the criteria outlined in the requirements.
- Regulation needs to be in place to protect the intellectual property of individuals and organisations. A fear within the sector is that one’s intellectual property will be breached, so reducing the possibility of this will build greater trust.
- There should be designated ethical training, workshops, and dialogue between those who should realize the goals and practice of such a document.
- Any form of agricultural data-sharing code should not be solely confined to business relationships, because data-sharing between governments and the agricultural sector offer great benefits and rewards, albeit, not always in an economic sense.
- Data-sharing partnerships with public bodies offer benefits, such as increased data-sharing pool, greater collaboration, and for greater sustainability and the benefit of society.

4.2.3. HOW TO ADMINISTER THE NEW CODE OF ETHICS

A code of ethics should be administered in a clear way. While a challenging task, there are certain steps one can do to further ensure the success of a code’s administration.

- For example, the New Zealand Farm Data Code provide accreditation for those who agree to follow their code, which gives them stronger credibility, as they are provided certification for this (Farm Data Code of Practice Authority 2014). They are provided with an annual licence



and certificate, which demonstrates to others that they promote the farm data-sharing principles and have been evaluated for this.

- Clear steps outlining who is responsible for ensuring that data is stored correctly, transferred, and used, and how it should be protected from hacking, abuse, and misuse.

5. A WAY FORWARD

As has been demonstrated in this report, the aims of the EUCC were ambitious, trying to be a tool for everyone involved in data-sharing, storing, and use, within the EU. However, this is not easily done within one document, no matter how detailed and comprehensive. There are many small steps to better improve the EUCC, which we have recommended, but for the most part, we would like to see an additional code of ethics, which covers many additional topics that cannot fit within the parameters of a document on contract formation. However, contracts should not take the centre stage as they are not the only, or most important, aspect of building trusting relationships, fair data-sharing practices, and building a future European agricultural industry that we would want. We would like to propose a potential agenda for development to achieve this.

Firstly, more research needs to be conducted about why there is a level of mistrust within the agricultural industry by involving all relevant stakeholders to an inclusive, deliberative, dialogue on the topic (a lot of which was covered in our focus groups and interviews in D7.3 and D7.4). While our research in the IoF2020 project identified that trust was an important value and different values have been identified that play a role in fostering this (lacking) trust, we do not know yet whether these values sufficiently cover the ethical questions that come up in the various socio-political context across the EU. Furthermore, while we proposed many ways to build a more trusting relationship within the industry, it would be valuable to identify what variously situated stakeholders perceive to be the best ways to bridge this gap, through (additional) participatory and engaging processes.

Secondly, a new set of ethical guidelines should be created to guide best practices for agricultural data-sharing. This should involve a set of broad overarching principles to abide by, with further refinement to mid-level requirements with advice and procedures of how they should be implemented in practice. Examples and hypothetical situations should be given to provide clarity and real-life instances one may be faced with. These guidelines could be divided into different target audiences, but for the most part, would probably be sufficiently broad for all to be involved, understand, and implement.

Thirdly, concrete advice could be given to those entering contractual agreements, in much the same way, as the EUCC document does. However, this updated version of the EUCC would have the advantage of being able to incorporate much of our feedback and recommendations, in addition to building upon the findings of the ethical guidelines, standardisation, and economic recommendations, just discussed. The contractual agreement document could be split into two, one for farmers and another for agribusinesses. Or it could simply have two different checklists and sets of requirements for contract formation, intended for farmers or for tech providers.

Lastly, there needs to be an active effort at communicating the findings and information to farmers and agribusinesses. This could take many forms, from dissemination at farming fairs, newsletters, communication workshops, and interactive conferences. Furthermore, this information can be supported by a widespread EU education effort to upskill farmers to make them 'data literate'. With the benefit of digital technology, this could be easily achieved through online activities, webinars, or courses such as MOOCs (to name but a few examples). The availability of this course should be subsidised by EU bodies and distributed through many of the farming cooperatives, who farmers support and trust.

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