NIVA – NEW IACS VISION IN ACTION

Work Package 5 – Innovation Ecosystem

D5.4 IACS Open Data environmental monitoring

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Summary

The CAP requires the collection of data to administer and control the claims of farmers. In the past three decades of this systematic CAP data collection, Member States and their Paying Agencies have optimised their processes and practices to serve the purpose of correctly and justifiably paying out the CAP payments. Now, these data are considered to be a valuable source about the state of the agriculture in the EU. Other policy domains, environment and climate in particular, would be well served with these data to assess the agricultural role in the state of climate and environment. Sharing these data is a mutual interest of the policy domains.

In this report we present the results of an analysis of different pathways of data sharing, ongoing practices and future developments. Publishing IACS data as Open Data is a possible direction that will accelerate the use of IACS data in other domains. For the implementation of Data Sharing, three key enablers are identified: Commitment of data originators, alignment of operational aspects and fast normalisation of the process. Hereto, involvement of all relevant actors throughout the ecosystem is required, as their attitude towards Data Sharing is essential to make that governance, standards and usefulness of the data is well assured.

Paying Agencies and their policy departments are encouraged to investigate the actors in their own ecosystem and trace back the sources of the collected data.

This intermediate version of the report provides the analysis and proposed pathway to investigate the ecosystem and organise the Data Sharing.

1 Introduction

The obligations from Europe's Common Agricultural Policy (CAP) make Paying Agencies (PA) collect data about agricultural holdings and agricultural land use throughout the EU. These data are collected to administer the CAP related schemes. PAs also perform quality assurance and control checks on these data, implying a very high rate of reliability. This makes IACS data a valuable source of information about European farmers and land use.

One of the goals of the NIVA project is to facilitate and accelerate the (re)use of IACS data by stakeholders outside 'Agri', referred to as "IACS Data Sharing". For this report we define Data Sharing as follows:

> *Data Sharing is the process of making data available to third party users. This involves practices, policies, technologies and structures.*

Concerning IACS Data Sharing, the main focus is on spatial data. The PA's hold a geospatial reference system, called the Land Parcel Information System (LPIS) and the crop parcels as declared by farmers, referred to as the Geo Spatial Aid Application (GSAA).

The increased availability of data also increases the interest to use digital technology to govern agricultural regulations and subsidy schemes. The proposed monitoring approach increases the role of sensors, IoT, satellites, apps and algorithms in governance, which also has an impact on the way we govern these schemes. In NIVA new data sources are explored that are required to fulfil monitoring requirements on the new CAP. This includes additional farm activity data (e.g., sowing, mowing, harvesting dates) as well as digital data supporting farmer claims, such as geotagged photos and machine data. In this way, IACS is developing a relevant database for agri-envi-climatic monitoring.

In this task, the NIVA project is investigating how to organise IACS data sharing that is relevant for other stakeholders in the domain of environmental monitoring. By reviewing different options, the project aims at providing guidance and supportive resources for policy makers at the PA's.

1.1 Introduction to this version

The current version is an intermediate report. The task in WP5 to work on the broader use of IACS data for environmental monitoring is in a turmoil environment. The EC is developing regulations to make IACS Data Sharing obligatory in the frame of the INSPIRE regulation. This will be integrated in the new CAP. At the same time the European Data Strategy is developed, which will create a single market for data and an 'attractive, secure and dynamic data economy'. And the third uncertainty is what new aspects will become part of the new CAP – in other words, what data needs to be collected and shared.

The NIVA project co-organised a number of webinars on data use in this continuum between farmer and administration. Topics as carbon farming, nutrient monitoring, digital rights in farm data sharing and the role of satellite remote sensing have been discussed. But the debate is ongoing. In the next 6 months (April 2021 – Oct 2021) this task will work on

1. Collecting ideas and converging towards a roadmap for better and more data sharing with respect to IACS data and CAP monitoring data – not only between administrations but also into

this European Data Space, where this new data economy may yield extra opportunities for farmers and data custodians to develop strategies;

2. Examples of data sharing in specific cases, for example the case of Carbon Farming, for which a first exploration is included here. This will be extended to full Policy briefs, targeted publications for policy makers, and if relevant combine it with a Stakeholder Forum Webinar;
3. Organise sessions as part of NIVA Consortium meetings to raise awareness on other uses of IACS data, and also the need for data links with other actors and systems.

2 Current situation

2.1 Integrated Administration and Control System (IACS)

IACS is a mandatory system for Paying Agencies that are involved in the CAP payments. The CAP regulation 1306/2013 defines the contents of IACS (article 68):

The integrated system shall comprise the following elements:

a. *a computerised database;*
b. *an identification system for agricultural parcels;*
c. *a system for the identification and registration of payment entitlements;*
d. *aid applications and payment claims;*
e. *an integrated control system;*
f. *a single system to record the identity of each beneficiary.*

The implementation of the IACS is done by the Paying Agency. This has developed into a collection of different systems between Member States, even between regions within Member States. The information contained in the IACSs is therefore also different, although the common base consists of the required recording of specific attributes related to the regulation. The IACS system can also have a broader use, e.g. incorporating national schemes.

An element that is very interesting for data sharing is the land use data. Each IACS has two levels of geo-spatial data related to the land use. First of all an IACS has the compulsory Land Parcel Information System (LPIS), which is intended as a reference system, representing the gross area for which CAP claims can be made. On top of that there is the data of the Geo Spatial Aid Application (GSAA), where farmers indicate agricultural parcels as being the single piece of land that is falling within a single LPIS reference parcel that is unique in terms of user (farmer) and crop. So there can be more agricultural parcels in a LPIS parcel. This GSAA data is annually collected. Now with digital aid application tools, Paying Agencies can present a farmer its last known configuration of land, so that farmers only have to indicate changes.

A growing number of Paying Agencies or member states are publishing the LPIS and anonymised GSAA (agricultural parcels) as Open Data. In this way it is available for others to use, making sure that all have the same geospatial reference for farm data.

Another interesting layer, also in the geospatial domain, is the so-called Ecological Focus Area layer. This EFA layer collects all non-agricultural land use on agricultural land, for which farmers claim support too.

2.2 Interests in IACS data

IACS systems across Europe contain data that is relevant to other stakeholders, for other purposes. The annual account of agricultural land and its landuse contains useful information to different public and private parties. Figure 1 shows an non-exhaustive overview of different stakeholders that we

envision to connect to IACS systems for data re-use. The advantage to connect to IACS is first of all that the same data should not be acquired multiple times, secondly the data has a certain quality assurance as it is also used for the payment schemes. Obviously, Paying Agencies should not share what violates GDPR or other data privacy rule and farmers consent should be arranged.

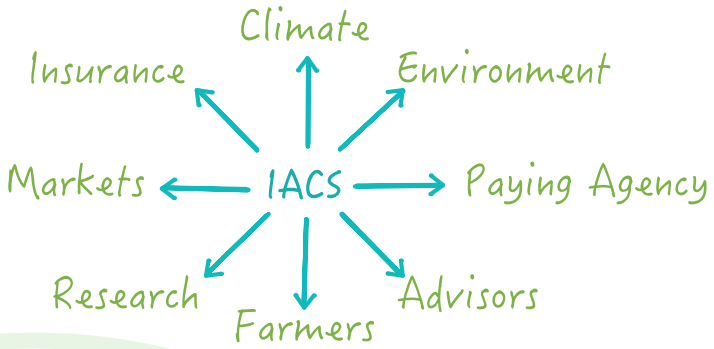

Figure 1: non-exhausitve overview of stakeholders interested in IACS data

Despite the potential however, IACS data is not used for other purposes than the administration and control of agricultural schemes. An exemption is the sharing of LPIS, agricultural parcel data and EFA layers as Open Data, which is already done by several Paying Agencies. For those Member States this data sharing is either an obligation or a display of good will. But there is no interaction with (potential) users of those data. Typically, if formats change – e.g. because of updated internal processing – there is no involvement of users to make these change. Typical issues are that crop lists are not consistent over years, and also field boundaries are not consistent over years – even when it is the same field.

The EC is preparing a regulation that will provide for a framework to share IACS-originated geospatial data alike the INSPIRE regulation. But not only administrations are interested in farm data. This figure shows how different interests in IACS data are envisaged.

The environment in which the IACS systems evolve are quite complex. As mentioned above, IACS systems are defined by regulation. Although the original regulation maintains a level of distance and remains specific on overall functionality, the different technical guidances are going more peculiar on how systems are expected to work. Furthermore, IACS systems deal with national IT infrastructures and architectures, including data. Therefore, not all IACS data sets are homogeneous. Also, systems are developed in house or by external contractors. Another complexity is the way the IACS systems interact with farmers. All MS now introduced digital portals for farmers to view and edit data, but the level of automatic linkage of data to farmer's own systems is diverse. In particular the new data requirements for proof supporting the claims like geotagged photos or farm machine data cannot be entered manually. We therefore see an increasing role of (intermediary) information services.

To underline this complexity, we have made a schematic stakeholder overview for the governance of farm data, and for digital interactions.

2.3 IACS Data Ecosystem

In the NIVA project several stakeholder inventories and analyses have been performed. For the purpose of this report, we have collected these analyses and integrated them in a harmonised single ecosystem map that provides an single glance overview of the different roles of different actors in the domain of environmental monitoring. Figure 2 shows the actor relevance for data origination, operational alignment and normalisation.

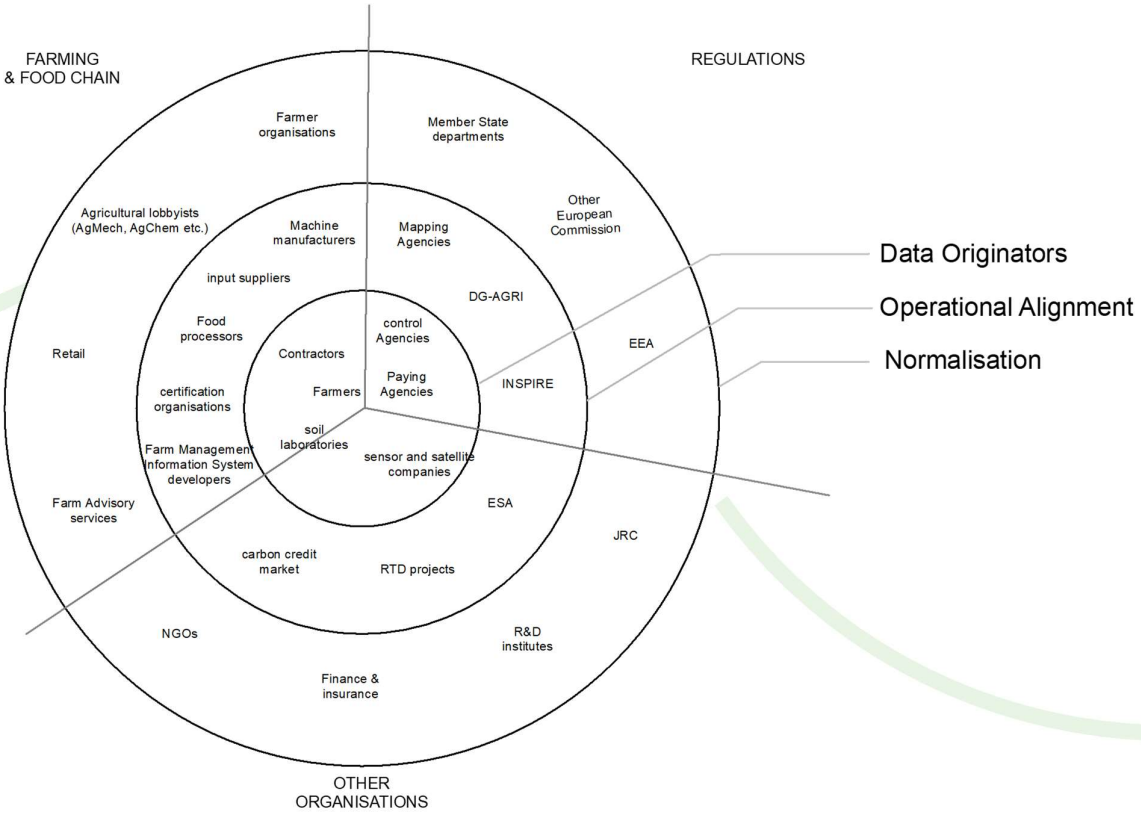

Figure 2: schematic ecosystem for IACS systems. Divided in three sectors (farming sector, RTD and Regulations) the actors relevant for data origination, operational alignment and normalisation are presented.

In order to overcome barriers, stakeholders across the whole ecosystem must align to see the benefits of IACS Data Sharing.

2.4 Farm Data

The data for environmental monitoring through IACS is originating from many sources. And nowadays these sources in general disclose their data through web-based cloud services. Farmers have an account in order to access these data. In the ideal case, all these data can be exported from these cloud services and imported in a single location. For the farm, the central data storage is often done in what is called a Farm Management Information System.

Figure 3 schematically shows data sources and depicts the FMIS as the receiving and data integration facility. From there, farmers can also share data again to others, e.g. governments. The penetration of FMIS is very diverse across the EU, and also the functionality per FMIS is quite diverse. So this is representing an ideal situation, not currently operational at all farms or in all regions.

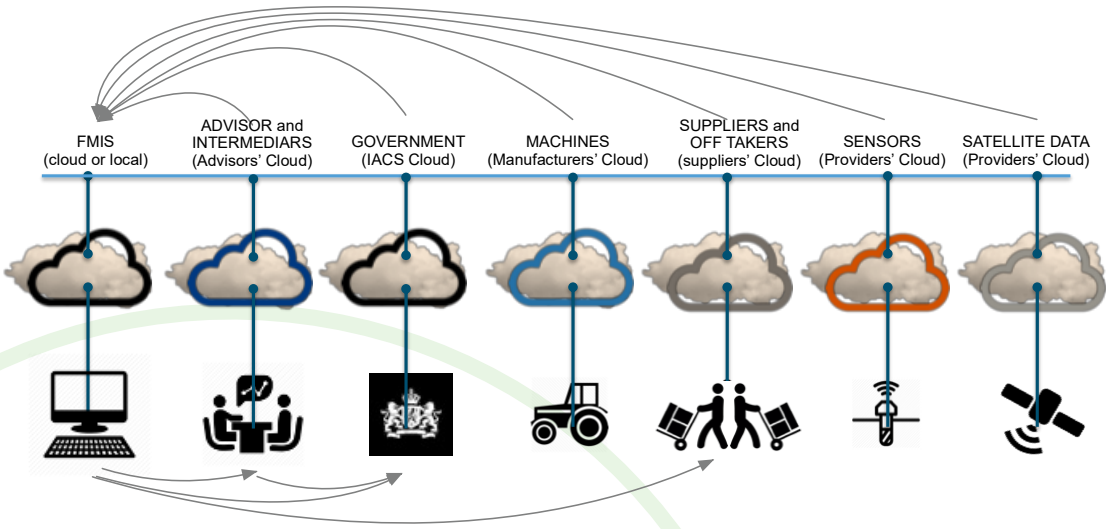

Figure 3: how data from different sources are connected through cloud based services.

In the current "big data" era, many organisations want to have a significant body of data, to make more advanced analyses – supported by Artificial Intelligence. In many cases, farmer data are redundantly acquired and stored. Also, this spread of data ignited the debate on data governance. In their report on farm data sharing (ref.!!), the IOF2020 project observed that farmer-data is best stored in data-libraries that are governed either by the individual farmer or by a representing organisation that act on farmers behalf. Interestingly, respondents in that study foresee a role of governments in the management of these data libraries, or at least in setting standards for it. In contrast, respondents also fear misuse by governments, or others for that matter, in using the data against farmer interests.

Farm(er) data is stored in many places and already many links between systems are made or are underway. With API integration, systems exchange data and keep 'eachother' up to date. This is of course not implemented in full and equally between parties.

In several Member States, a FieldBook is mandatory, which is comparable to a crop registration system as for instance is used in GlobalGAP certification schemes. The Fieldbook allows farmers to easily record and maintain details of their agricultural activity. Based on Fieldbook data, farmers can proof their compliance with specific schemes. Figure 4 shows the type of information as is obligatory to store in a Fieldbook in Estonia.

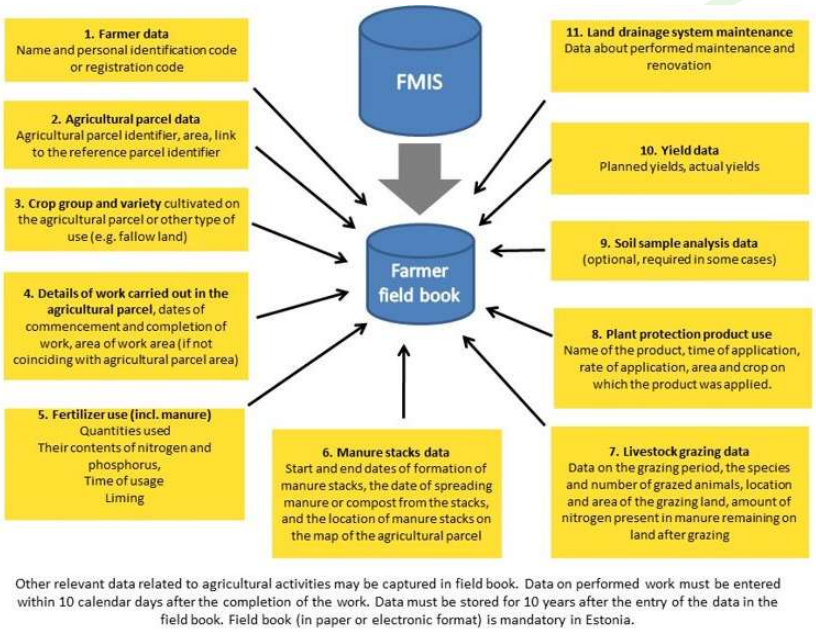

Figure 4: Fieldbook in Estonia

3 Data sharing practices

3.1 Introduction

As has been discussed above, Data Sharing has become essential for policy evaluation and decision making in agri-clima-environmental domains at regional, national, European and global level. Although it all starts with a commitment from relevant actors to the use and sharing of data, this can be challenging in reality. At this moment, there is no framework or guidelines for data sharing in the agri-clima-environmental domain. Barriers at different levels result in limited (or none) data sharing, but have not been systematically analysed unless in the context of specific case studies. Incomplete systematic evidence on the scope and variety of these barriers has limited opportunities to maximize the value and use of agricultural data for science and policy in the agri-clima-environmental domain.

Barriers in data sharing practices result in resistance from actors to participate in the data sharing. These barriers can have many different causes. Most of the barriers can be attributed to the data custodians or data originators.

Table 1: list of possible causes

	Cause		
Technical	1. Data not collected		Lots of farm data is not digital
	2. Data not preserved		
	3. Data not found		
	4. Language barrier		
	5. Restrictive data format		
	6. Technical solutions not available		interoperability
	7. Lack of metadata and standards		
Motivational/	8. No incentives		Obligations / regulation / Responsibilities
cultural	9. Opportunity cost		
	10. Possible criticism		Reputational
	11. Disagreement on data use		
Economic	12. Possible economic damage		
	13. Lack of resources		Insufficient capacity
Political	14. Lack of trust		Fear regarding misuse of shared data
	15. Restrictive policies		
	16. Lack of guidelines		
Legal	17. Ownership and copyright		Legal issues related to farm privacy and confindentiality, and approval processes are long and not well-defined
	18. Protection of privacy		Confidentiality and privacy concerns
Ethical	19. Lack of proportionality		
	20. Lack of reciprocity		

In order to address and overcome the barriers (and hence, resistance) to data sharing, actions on three levels need to be achieved. These are:

- Data Originator's consent: organize that all needed/relevant data originators align on sharing their data. In most cases this involves a farmer, but also 'aggregated' organisations play a role. It is also about building trust (despite for instance regulatory obligations) that data are not misused and safe;

- Operational Alignment: overcome all operational hurdles that frustrate adequate and seamless data sharing. Technical issues like formats, standards etc., overcoming missing values etc. etc.;
- Normalisation: Make data sharing part of a new baseline, logical and unavoidable.

3.2 Agriculture Data Spectrum

There is a gradient in how closed or open data is shared, which is captured by the Open Data Institute in the Data Spectrum figure[1], to highlight that the discussion on data sharing is not an open vs. closed, but an open AND shared AND closed discussion.

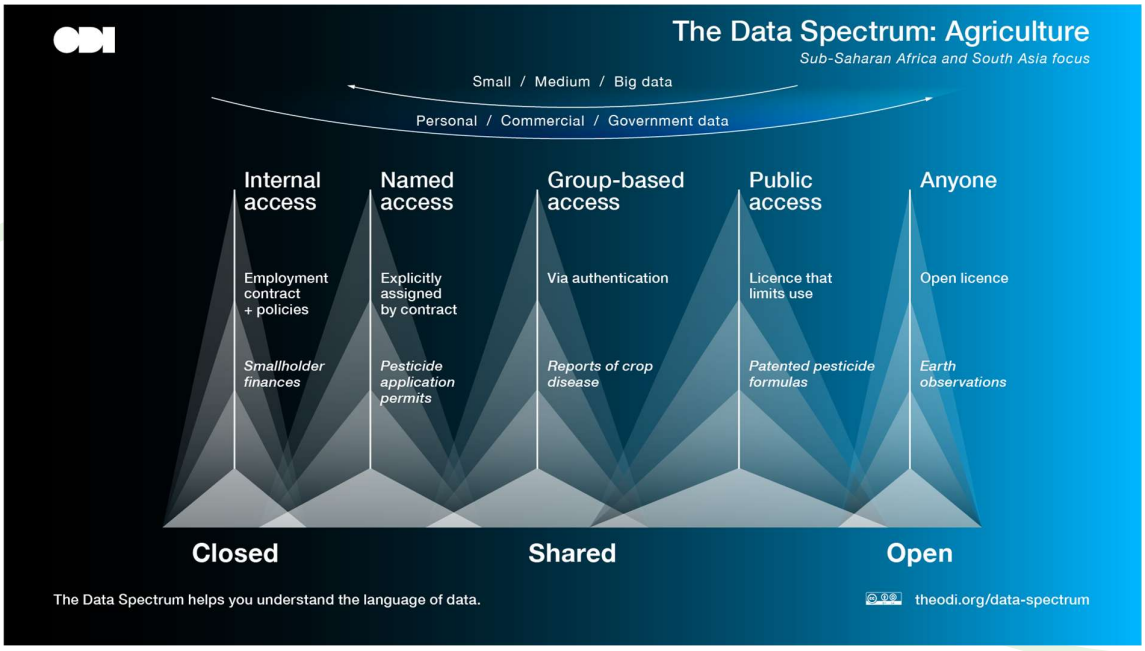

Figure 5 The data Spectrum from the Open Data Institute (CC-BY), specifically for AgriCulture

3.3 Privacy concerns

Perhaps one of the biggest issues in agricultural data sharing are the emotional aspects related to privacy. Farmers have a distrust in other organisations that their data might not be used or interpreted in the right way. Also, there are many misunderstandings in privacy and rights that different actors have or not have. These issues are collected here.

Multiple sources refer to a sentence attributed to American attorney Charles Fried, who said that "Privacy is not simply the absence of information about us in the minds of others; It is rather the control we have over information about ourselves." In our case in agriculture, this first of all implies that farmers should know what data is collected about them and their farm. Furthermore, these data should also be available to the farmer to use for his own purposes. And farmers must have the ability to correct, amend or even delete data. Thinking this further through, data privacy provides farmers

[1] https://theodi.org/about-the-odi/the-data-spectrum/

the ability to control whether his data is stored, used or shared. Therefore, farm data sharing involves two basic concepts, first of all the *farmer's consent* and secondly the *data souvereignty*.

3.3.1 Farmer's consent

In 2018, a joint EU Code of Conduct on agricultural data sharing was launched: the *EU Code of Conduct on Agricultural Data Sharing by Contractual Agreement*. This Code provide guidelines developed by nine (9) initially agro-associations for processing and sharing agricultural data. The Code focusses on the contractual relations. It provides guidance on the use of agricultural data, particularly on the rights to access and use. Its scope is to create trust between the partners, set transparency principles and define responsibilities. This Code of Conduct counts as one of the self-regulatory codes to contribute to a competitive data economy, as mentioned in the Regulation '*on a framework for the free flow of non-personal data in the European Union*' REGULATION (EU) 2018/1807 from 14 November 2018. It is the intention of the authors of the Code of Conduct to advance and promote the benefits ag-data circulation. This would ensure farmers seamlessly adapt to the digital era and more readily adopt technological solutions to farming (van der Burg, 2020).

The Code of Conduct is based on the concept that data sharing can only be done after an explicit, informed consent, given by the farmer. This is also in line with the GDPR requirement for personal data. Consent is not eternal and holistic and should therefore be very specific. Hence the intentions of the data use or sharing must be made explicit. Current practices show that consent is asked for by many services. However, it is not clear in how many cases the farmer has fully understood the reach of his consent.

The afore mentioned free-flow regulation makes explicit reference to agricultural data and in so doing, categorises it as non-personal data (van der Burg, 2020). In pre-ambule (9) it provides "data on precision farming that can help to monitor and optimise the use of pesticides and water" as an example of non-personal data – unless "If technological developments make it possible to turn anonymised data into personal data, such data are to be treated as personal data". As farms are family businesses in many cases, with a clear denomination of the farmer and spatially explicit data can be linked to the farmer using public resources.

3.3.2 Souvereignty

Data souvereignty refers to the rights of any individual to keep control over the possession, use and deletion of their data. Souvereignty would allow people to determine how, when and for what purposes their data are used. It would give individuals authoritative legal rights over the data, with these rights traveling as the information moved. Data sovereignty is therefore often compared to ownership although the differences are larger than the similarities. One similarity is that ownership of property typically includes rights, but also responsibility. So to the data souvereignty is providing farmers a power of self-determination with regard to their information, implying the ability to "access, create, modify, package, derive benefit from, sell or remove data, but also the right to assign these access privileges to others." Overall, the ideas of data authority and portability are appealing to many people who envision a system in which they have complete control over the use or removal of their personal information.

Even more, data souvereignty implies that farmers should be educated to exert this control in practice. As part of this souvereignty, farmers should also be able to excersie the right on data portability: to move his data between online locations without any loss or distortion.

3.3.3 Code of Conduct

In response to privacy concerns, COPA COGEKA and other organizations representing farmers have established Code of Conducts seeking to provide trust through a set of good practices that can be voluntarily adopted, and providing control to the farmers as a type of self-regulation:

- Main strengths perceived
  - It is proposed and agreed by actors in the agri-food ecosystem
  - It is a serious attempt at protecting personal interests, rights and freedoms
  - It proposes a practical and concrete solution: a contract

- Main weaknesses perceived
  - No specific attention is paid to societal values affected by data sharing
  - Business point of view, not a citizen-self-regulator point of view
  - Possible problem of scalability as network of data sharing actors expands

3.4 Open Data

A way of Data Sharing is publishing data as Open Data. This is often defined as “data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and sharealike.” Open Data strongly defines data as commons that should be shared with the society at large, thereby enabling more transparency, more economic growth through new businesses and better societal impact assessments of important decisions.

Open Data is more and more available in particular by public and semi-public organisations. In the case of agri-environmental data, the most relevant Open Data sets are geospatial data, meteorological data and market information (www.godan.info). Several Paying Agencies publish annually their LPIS and GSAA data for others as Open Data. A typical aspect of publishing data as Open Data is that the publisher establishes an agreement with the receiver through an open-data licence. Ideally published data must be well described in order to allow users to understand how data is used.

3.5 Conclusion

At the moment the innovation around data sharing seems very much stuck on many of the obstacles as earlier identified, and the Code’s of Conduct are poorly adopted and executed. Therefore new approaches seem to be required and NIVA can contribute to this activity by outlining some potential innovations and pro-actively discussing them with main stakeholders. Bullet points for consideration are, that need to be elaborated in working sessions:

- Data shared on platform are seen as “commons”

- Contracts are made when data originators share data on a platform
- Based on “play rules” that include the use of the data for societal goals
- Consider the societal purposes of sharing agriculture data: e.g. for monitoring how digital farming contributes to realize the production of higher quality, safer food, with less burden for the environment. Consider the possibility of data access for policy makers, researchers and other actors.

These actions would contribute to setting up a data space, also following the Data Spectrum (Fig. 5) where data can be more or less shared, but by which every actor can feel in control of the sharing in a way that enables societal use and innovation with the data.

As a first step in this direction, the next section discusses Carbon Farming as a case study of which data is relevant, how this can be shared, and what can than be done with the data.

4 Case: Carbon Farming

4.1 Improving soil organic carbon

Agriculture could become a solution to climate change, rather than being part of the problem. This can be done by increasing the carbon sequestration in agricultural soils and protecting the carbon stock. This would involve spreading the principles of agroecology while building resilience to climate variations and crop disease.

The soil carbon content, or soil organic matter determines the soil quality and hence on how the soil supports different ecosystem functions. Fluctations in soil carbon, even small, can have significant impact on the soil quality: on physical properties which determines root penetration ability as well as water holding capacity (relevant for crop water stress and for reduction of surface runoff and erosion). Soil carbon also impacts the chemical or fertility properties where it supports nutrients availability to plants. And soil carbon influcences soil biology.

Carbon Farming is a way of farming that focuses on storing carbon in the soil. Plants and crops can restore carbon in the soil, but only if carbon-preserving managed. It is not easy to measure the effects of carbon farming precisely, since measuring changes in Soil Organic Carbon over time has proven very time-consuming and costly (Smith et al., 2019). Therefore, several schemes focus on registering farm activities and thus account for the carbon impact these activities have. In combination with a validating sampling scheme, this provides first estimates of carbon sequestration.

The CAP offers different instruments to promote carbon farming. In the new CAP, the conditionality, the eco-schemes and the agri-environmental climate measures promote a soil improving or soil regenerating agriculture.

4.1.1 conditionality

In the new CAP, conditionality is an integral part and replaces 'greening' and cross-compliance. It sets the baseline for more ambitious and sustainable agricultural commitments through the adoption of good farming practices and standards by farmers. Conditionality links the CAP payments to environment- and climate-friendly farming practices and standards known as 'Good Agricultural and Environmental Conditions' (GAECs) and Statutory Management Requirements (SMRs). These practices and standards aim to deliver a higher level of environmental and climate action. The GAECs set standards for mitigating and adapting to climate change; addressing water challenges; soil protection and quality; land management; and protection and quality of biodiversity. There are a total of 10 GAECs in the future CAP, an extra 3 new GAECs compared to the current CAP[2].

The new CAP includes GAECs that concern soil quality. These are:

- GAEC 6 – Minimum land management under tillage to reduce risk of soil degradation including on slopes;

[2] https://ec.europa.eu/info/news/environmental-care-and-climate-change-objectives-future-cap-2019-jan-25_en

- GAEC 7 – No bare soil in most sensitive period;
- GAEC 8 – crop rotation (replaces crop diversification).

Other GAECs do not exclusively target sustainable soil management but may impact soil quality. These include: maintenance of permanent pastures (GAEC 1); Preservation of carbon rich soils such as peatlands and wetlands (GAEC 2); Maintenance of soil organic matter through ban on burning stubble (GAEC 3); Compulsory use of the new Farm Sustainability Tool for Nutrients (GAEC 5); Ban on converting or ploughing permanent grassland in Natura 2000 sites (GAEC 10).

4.1.2 Eco-Schemes

In addition to the conditionality, the future CAP also incorporates a new and innovative system, known as 'eco-schemes'. The eco schemes aim to increase national environmental and climate-care action based on local needs and circumstances. The eco-schemes are voluntarily for farmers and involve an annual 'one-year-at-a-time' commitment. It is assumed that farmers will continue in those schemes that worked best for them and ceasing those that did not. The eco-schemes present an opportunity for farmers in going beyond the mandatory and baseline requirements of conditionality and enhance environmental and climate performance based on local needs and conditions.

4.1.3 Agri-environment-climate measures

The Agri-environment-climate measures (AECMs) of the future CAP are designed to ensure best environmental and climate practices under the Rural Development framework. They aim to move towards a low-carbon and climate-resilient economy. It is important to ensure the types of interventions put in place support specific national, regional, and local needs and, in certain cases, can build on those funded in the eco-schemes. AECM interventions could include: environmentally friendly production systems such as agroecology and agroforestry; forest environmental and climate services; forestry conservation and resilience based on native species; precision farming methods; organic farming; renewable energy and the bio-economy; animal welfare; and sustainable use and development of genetic resources.

4.2 IACS data to support carbon farming

The data in IACS that can be used to determine carbon sequestration are:

- LPIS: the location and size of agricultural land and its land use (e.g. permanent grassland, arable etc.);
- Annual claims: type of crop, presence of winter cover / catch crops etc. Based on standard crop cultivation procedures, the impact of a crop on the soil organic carbon can be estimated;
- Fieldbook: occurrence, timing and conditions of different field activities will provide more specific information on the impact of the cultivation activities.

In addition, other data sources can be deployed to provide additional information. These are:

- Satellite Remote Sensing: estimating the biomass accumulation and density during a year as indicator of e.g. root growth, and crop remains. Also, Remote Sensing can provide additional information on ploughing, planting and harvesting events. Scientific results and some operational services even estimate soil moisture conditions, which have an effect on the carbon balance and its conversion processes;
- Farm machinery data: many modern tractors store the activities a farmer is performing on the field. Depending on the variables measured, these machine data can provide extra resolution in time and space as well as extra details on cultivation activities;

In NIVA, the agri-environmental indicator for soil organic carbon is calculated in use case 1b. In this use case, indicators are derived on three different levels of complexity:

- A basic indicator based on remote sensing data on land use and cultivation practices derived from satellite data. Carbon storage is related to the vegetative cover of a parcel;
- A field-budget method, using the method from the basic indicator to assess the captured carbon, and substract the amount of biomass harvested and add again the supply of organic fertiliser. This requires farmer's data on harvest and supply;
- The third and most complex level uses the SAFYE-CO2 carbon model to calculate accurately the fluxes of CO2 and thus calculating the the amount of carbon that is added to the soil. This model will use the meteorological and soil conditions to calculate the fluxes on a daily basis. It will use a radiative transfer model to calculate the solar energy as the 'engine' of the cycle. It is therefore a 10x10 m (sentinel-2 pixel size) grid system.

The advantages of this approach is that the field based (or pixel based) calculations can be scaled to field, farm and regional indicators of carbon sequestration. This provides means to assess and monitor the impact of the CAP measures/schemes.

ANNEX: Short description of stakeholders

A short explation of the different mentioned stakeholders:

Paying Agency (PA): accredited institution that executes the CAP schemes. PA's are responsible for the correct application by farmers and the correct processing, control and payment of these applications or claims. Depending on the country, control tasks can be organised inside or outside the PA. PA's often make use of contractors who take care of the IT aspects;

European Commission: Executive organisation of the European Union. The EC has commissioners with their cabinets, directorate-generals on different topics. For us are most relevant DG-AGRI and DG-CONNECT (digital agenda), DG-ENV and DG-CLIMA (most in need of data for environmental monitoring), DG-RTD (Horizon research programmes) and DG-DEFIS (space programmes). The EC governs the Joint Research Centre (JRC) that provides scientific and technical backstopping to the EC / DG-AGRI on CAP and IACS implementation. Also, the EC governs the European Environmental Agency (EEA);

European Parliament: The EP discusses, approves and/or makes amendments to the regulations that the EC proposes. Often the EP has no direct linkage to PA's;

European Council: It comprises the heads of state or government of the EU member states, along with the President of the European Council and the President of the European Commission. It is a collegiate body that defines the overall political directions and priorities of the European Union;

In addition there is also the Council of European Union, which is the assembly of 27 ministers from the Member States in a relevant domain. The Council of the European Union is also part of the trilogue, to amend and approve legislative proposals;

MS Government: National governments at Member States have a stake in the way PAs perform, but even more on how CAP budgets are wisely spent. Now with the National Strategic Plans, this level is filling in specific rules for the CAP implementation;

MS Parliament: National parliaments have limited stakes in the PA's performance, unless something goes wrong and farmers and citizens complain;

Farmer: The farmer is managing the farm that is applying for different schemes. The farmer is responsible for delivering the right information to the PA to support his claim, or supporting proof that he has performed in compliance with regulations;

Farmers organisation: Many farmers are member of a farmer organisation that supports the farmer in defending his interests, advices on a variety of topics and lobbying at national level;

Cooperatives:	Cooperatives are often bottom up initiatives to scale out specific aspects of the farming business that are supra-farm. Typically cooperatives are intermediates between farmer and the market, sometimes in combination with storage or processing (e.g. milk and sugar processing plants). Other cooperatives organise collective procurement or financing;
Trade:	Trading organisations help farmers to get their produce to a buyer, either in scale, with transport or to serve specific markets;
Processors:	Companies that process farmers produce in products for the market;
Suppliers:	Farmers need inputs for their cultivation and suppliers are diverse but concern mainly seeds, fertilisers, crop protection agents, advice etc.;
Machine manufacturers:	A typical group of suppliers are the machine manufacturers that provide machines and equipment for farmers. With many machines becoming digital, machine manufacturers play an important role in the collection of relevant farm data;
Lobby organisations:	The agricultural sector is well present in Brussels through different lobby organisations. In particular: CEMA: umbrella organisation representing machine manufacturers; COPA-COGECA: umbrella organisation of farmer organisations and cooperatives; ECPA: European Crop Protection Association; Etc.
RTD organisations:	In these digital revolution times, many knowledge institutes, universities etc. and companies with innovative services are active in the agricultural domain. These organisations provide hardware, software and data analytic tools. Many RTD is conducted not with farmers but with the perifere stakeholders, to get a quick leverage but also because at the aggregated level the use of digital tools is more common and financing it is easier;
Information services:	A diverse group of companies (both large industries and SMEs) that offer information services to the benefit of farmers or other agricultural stakeholders, including the PA;
Certification:	Organisation that certify that agricultural produce is complying with standards, both product standards and production standards. Certification requires documentation and is therefore linked to the information services, in parallel to the PAs;
Retail:	A powerful group of companies that deliver the food and other agricultural produce to the consumers. In some production chains, retail ask for specific quality assurance, that 'certification' can offer;
NGOs:	Organisations that voice the concerns of citizens. They are in need of good information to perform a control task.