Digital Transformation of the Agricultural Value Chain – Opportunities, Challenges and the Role of Science Conference under the German Presidency of the Council of the European Union jointly organised by the BMEL and the EURAGRI, 2nd -3rd December 2020, Berlin

Track 2: A governance framework for agricultural data – Deep dive

Agricultural data: diversity of players, data relations and data categories

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«a company such as Google could have so much agricultural data at its disposal, originating from sensors, for example, that a company with that amount of information available could farm more effectively than 70% of current farmers»

Anthony van der Ley, President of CEMA, 2018

«while many farmers use digital tools to help — sensors, spreadsheets and GPS have replaced pencils, notebooks and steady hands — many tell us that these new streams of data are either overwhelming or don’t measure up to the complexity of agriculture, so they defer back to things like tradition, instinct or habit. For these reasons the industry remains one of the least digitized»

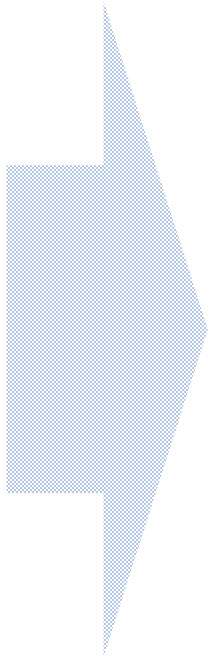
Elliott Grant, X – Moonshot Factory, 2019
(Google, Alphabet)

Key points

Agricultural data value chain is one of the most complex and problem-laden data value chains in the emerging digital economy

Current data relations between farmers and agricultural technology providers and between the public sector and the private sector do not allow for unlocking the full potential of agricultural data

Gaps in digitalization and asymmetries in data production and use may negatively affect sustainability and the European model of agriculture



European agicultural data space requires specific treatment and adjusted governance framework

Agricultural data and data-driven agriculture

Data-driven agriculture

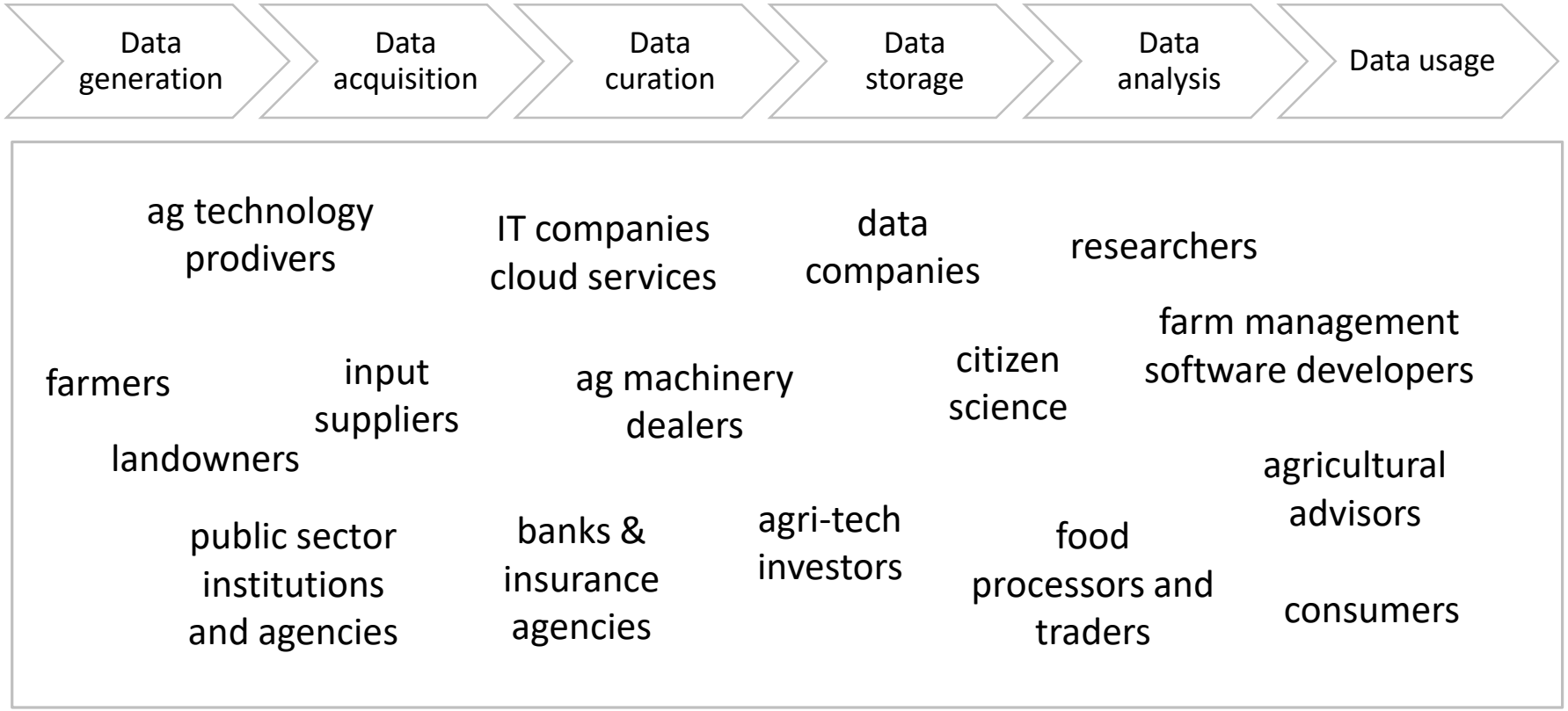
builds on farm data/producer field-level data (ag data) and other data generated outside the farm (ag and non-ag data)
(Sonka 2016)
(Wolfert et al. 2017)

Different EU legal regimes applying to individual data categories, no specific law on agricultural data

- gaps in the protection of farmers' interests
- lack of provisions dealing with sector-specific constraints and deficiencies in the agricultural data value chain

KEY DATA CATEGORIES
public vs. private sector data
open vs. closed data
personal vs. non-personal data
user created vs. machine generated data
structured vs. unstructured data
raw vs. aggregated data
real or near-real time vs. static data
and other…
(OECD 2013; Nguyen&Paczos 2020)

Actors, businesses and organisations around ag data



Barriers to the use of agricultural data and digitalisation in agriculture

Lack of transparency and trust
(Wiseman et al. 2019;
van der Burg et al. 2020)

Problems with data concentration, lock-in effects, different technical standards
(Wolfert et al. 2017;
Atik and Martens 2020)

- data transparency
- data ownership – data sovereignty
- data privacy
- data security
- data portability
- data sharing
- data interoperability
- data quality

Sector-specific constraints and deficiencies in the agricultural data value chain

- asymmetries in data production and use
- the need to integrate sensor data with farmers' knowledge and experience
- working with natural systems and time factors
- weak links to sustainability goals and social good

Asymmetries in agricultural data production and use

Digital transformation in agriculture more difficult and slower than in other economic sectors (Calvino et al. 2018)

- gaps in broadband connectivity in rural areas
- social, economic and financial constraints - digital skills, lower incomes in agriculture, high investiment costs

considerable differences between countries, regions and farms in terms of the adoption of precision/digital technologies may be expected

domination of large farms (Soto et al. 2019)

digital value chain failure to reflect the <u>diversity of European agriculture</u>

- market alone will continue to favour data sets from larger and more specialized farms and undersupply data from other categories of farms (economies of scale, higher costs of collecting and analysing data from smaller and more diversified farms)
- risk of growing income inequalities in agriculture, barriers to more resilient farming systems (lack of adequate digital tools for smaller farms to reduce their environmental impact), potential changes affecting the European model of agriculture

Climate and weather dependency, time factors and other limitations

- ❑ Working with natural systems under various and changing environmental conditions
  - generation of data inputs extended in time/dependent on natural production cycle; open and dynamic setting for data collection and data use vs. closed and more controllable environments in other industries
- ❑ Longer time needed to produce data and slower pace of digitalization in agriculture imply slower growth of data volumes needed to train data models
  - data-based products and predictions in agriculture may be less accurate and less reliable (particularly for smaller farms and new entrants with no historical data records)

remote sensing data not enough to understand specific production conditions and outcomes within different European farming systems

close cooperation with farmers to understand their specific needs and to include additional insights about local farming practices (cf. Kernecker et al. 2020; Posadas & Gilbert 2020)

important role of <u>human-sourced data and human advice</u>

No clear committment to sustainability and to sharing ag data for social good

❑ values attached to agricultural data: optimization, efficiency, maximum yields, profitability

Ag data value chain dominated by corporate interests: sustainability as a potential side-effect, not a major goal of data-driven innovations (cf. Clapp, Ruder, 2020; Lajoie-O'Malleya et al. 2020)

❑ no reference to sustainability goals and broader social functions of ag data in the EU code of conduct

Aims of ag data analysis and ag data usage not covered. Guidelines and principles focused on data rights, data privacy, data security and data portability

❑ limited private and public sectors' cooperation in ag data value chain

Data products and services aimed at scaling up sustainable farming practices and delivering European public goods undersupplied by the current market

critical role of public and private sectors' ag data for achieving the goals of the **European Green Deal and EU Farm to Fork and Biodiversity Strategies**

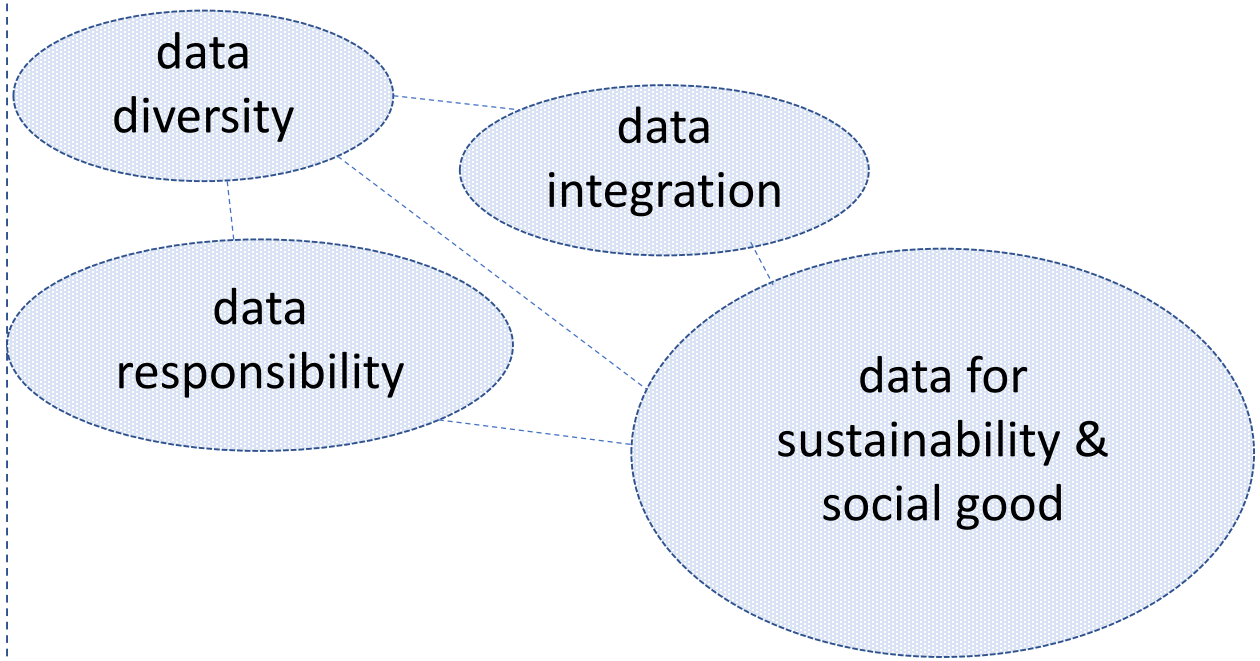
Expectations from stakeholders that data sharing will be governed by social values (van der Burg et al. 2020, IoF2020 D7.4 Report)

Conclusion

- sector-specific constraints and deficiencies in the agricultural data value chain would be best dealt with sectoral regulations (provisions)

- rules and principles for the European Agricultural Data Space

  - data transparency
  - data ownership - sovereignty
  - data privacy
  - data security
  - data access and portability
  - data sharing
  - data interoperability
  - data quality



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Thank you for your attention!

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