# DATA SOVEREIGNTY IN AGRICULTURE

## STATUS QUO, CHALLENGES AND SOLUTION CONCEPTS

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# What is this talk about?

- **Data sovereignty as an essential factor** of digital transformation in the domain of agriculture
- Corresponding challenges in the **digital ecosystem** agriculture
- Discussion of the **overall requirements for solution concepts**

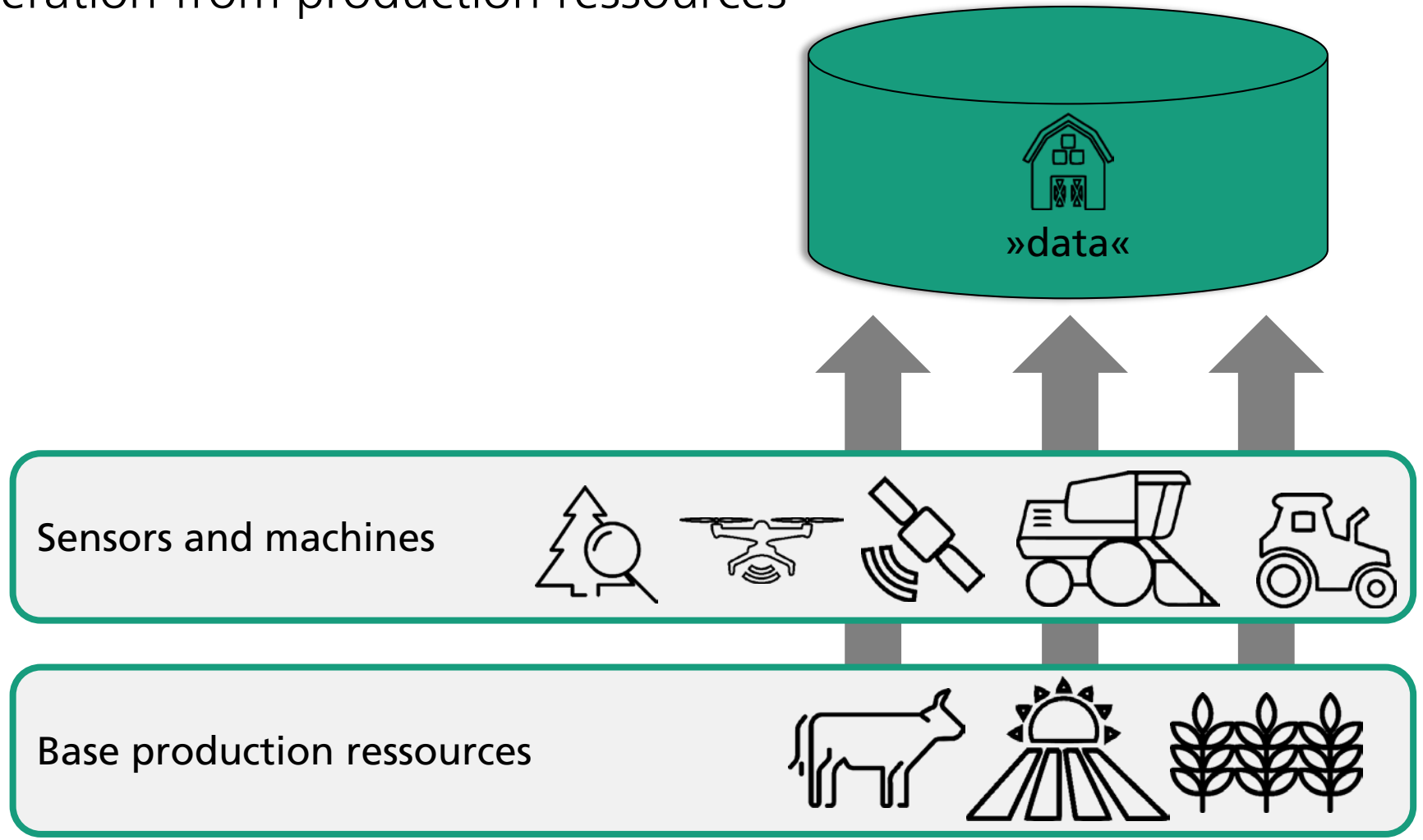
# Data sovereignty as a key requirement for digitization

- **Data sovereignty is an important requirement for farmers** [Bi19] [Ka20] [Ga20]
  (in Germany, data sovereignty is often referred to as »Datenhoheit«)
- Not only for farmers: **other stakeholders** in the value network demand it as well
- Data sovereignty supports the **willingness to share data**, which is key for every data economy
- **Trust in digitization** is vital for the digital transformation of agriculture

# Definition: Data sovereignty

- There is no comprehensive definition yet
- Data sovereignty is a difficult concept because it is not precisely defined and is **understood differently from different perspectives**
- We propose as a definition:
  - No data use without **consent** of the respective »owner«, which includes revocation of consent
  - **Transparency** regarding the use of data by third parties
  - Possibility for **exchange and flexible use** of »own« data across arbitrary systems
- However, just agreeing on data sovereignty is likely not sufficient…

# **Typical scenario in agricultural value networks:**
data generation from production ressources



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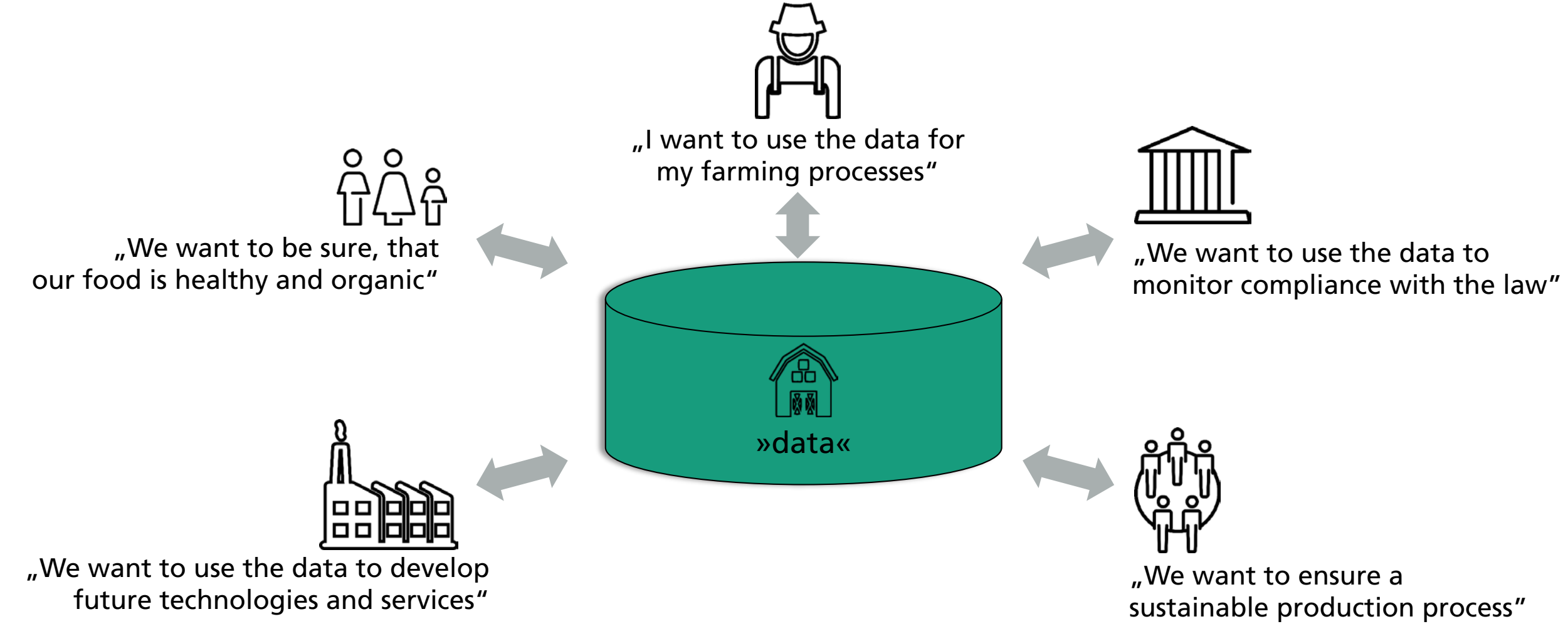
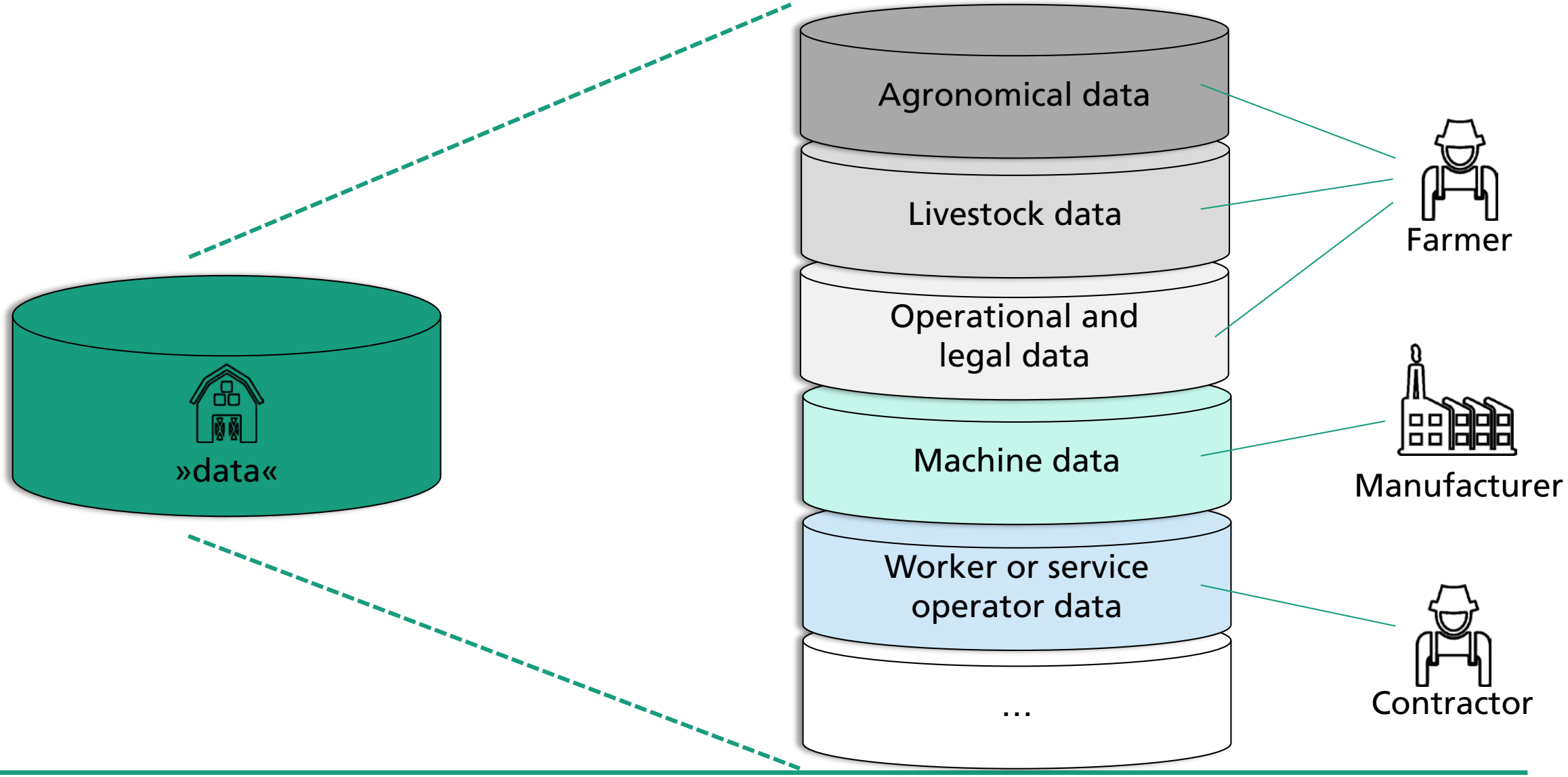
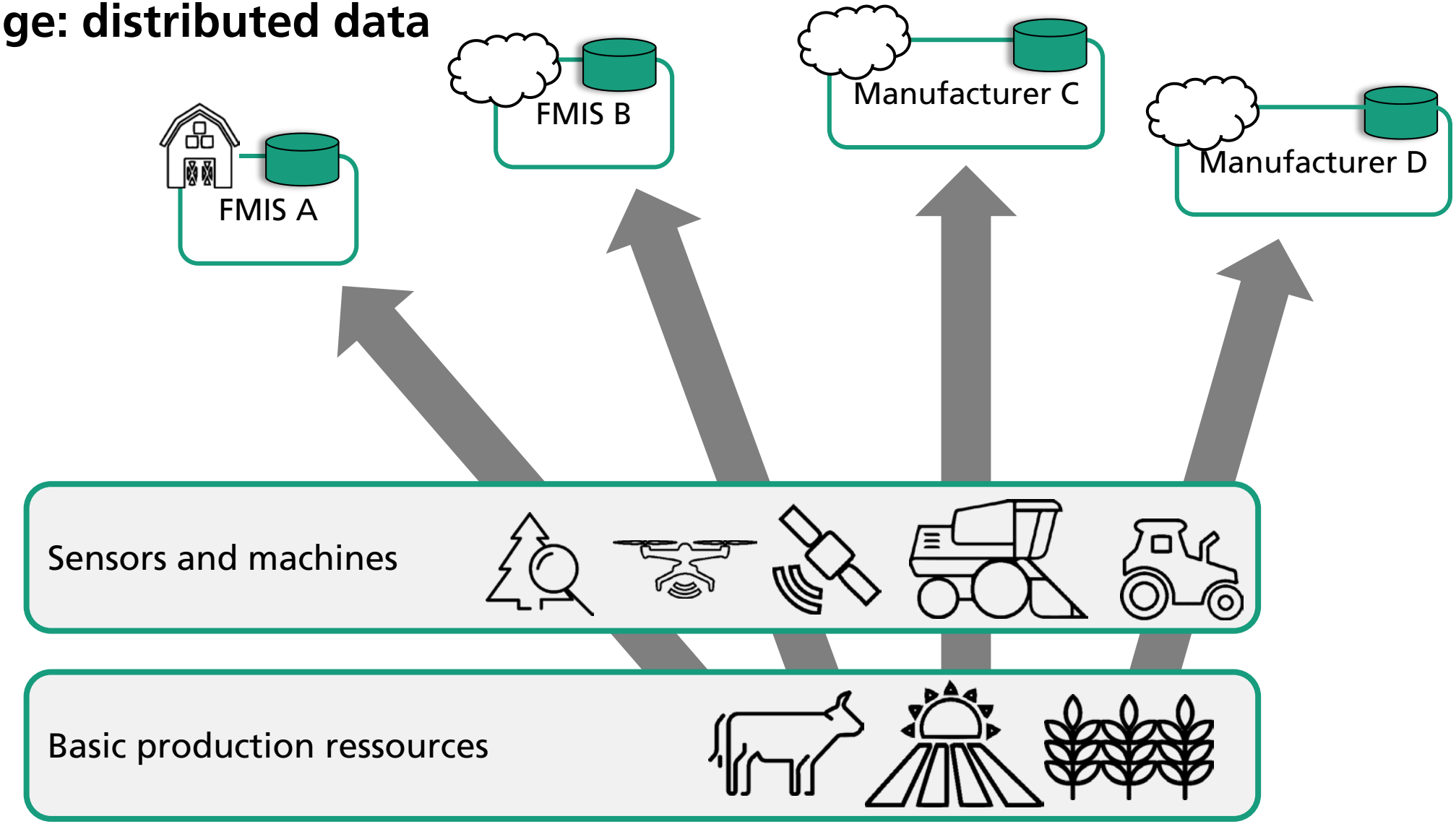
# Challenge: data and expectations of different stakeholders



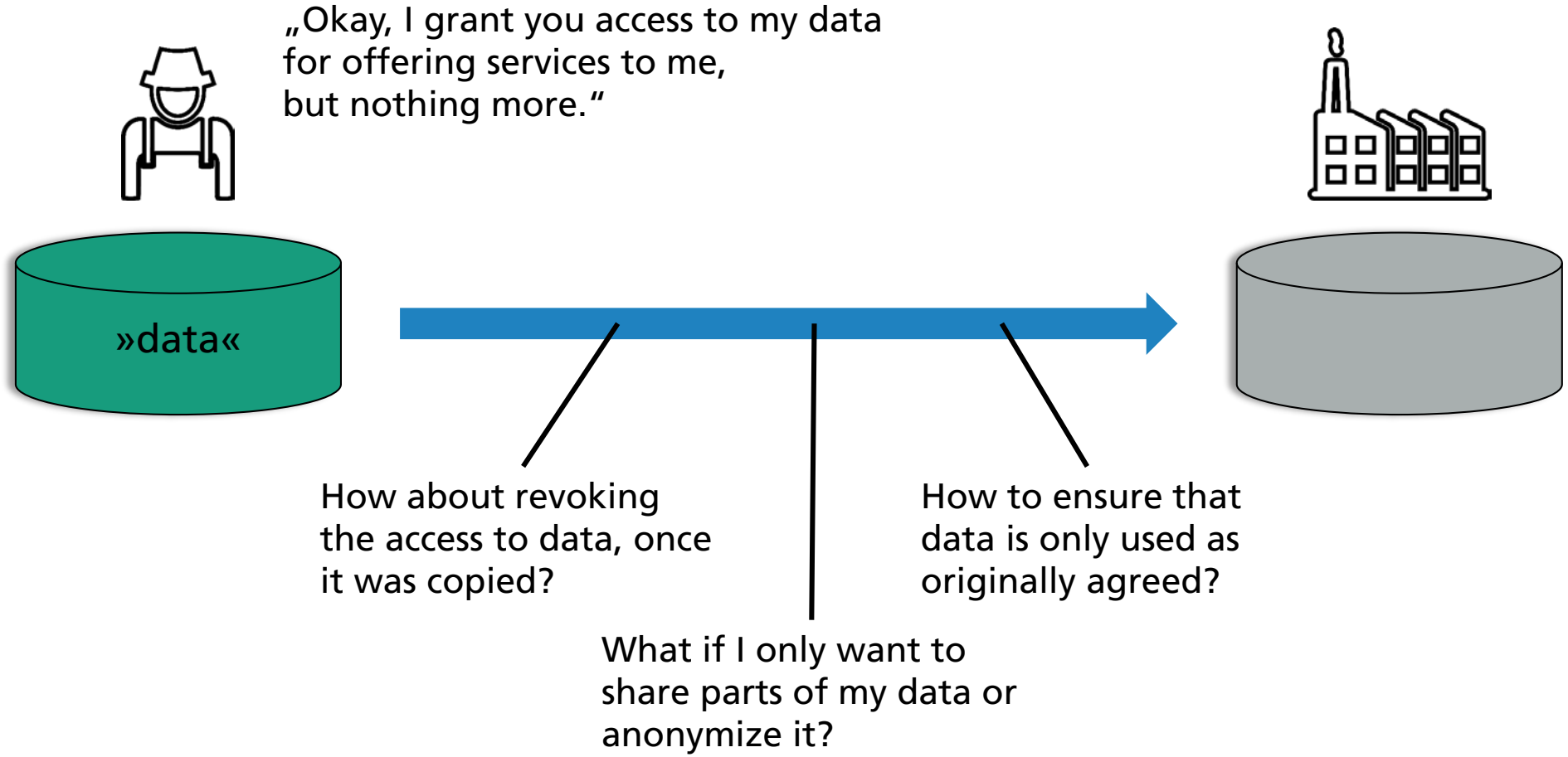
# Challenge: data sovereignty for different data „owners“



# Challenge: distributed data



# Challenge: data sovereignty is more than granting access to data



# Consequences

- We have
  - A lot of **diverse data from different agricultural processes**
  - A **multitude of stakeholders**, each with their own interests in the data and respective requirements towards their own data sovereignty
  - A technological ecosystem with **distributed systems**, each with its own storage locations
  - Not yet a **technological framework** to fully enable data sovereignty in agriculture

- Challenges
  - Besides lack of interoperability, media breaks and no comprehensive data exchange
  - How to ensure (easy understandable) data sovereignty in such a complex setting?

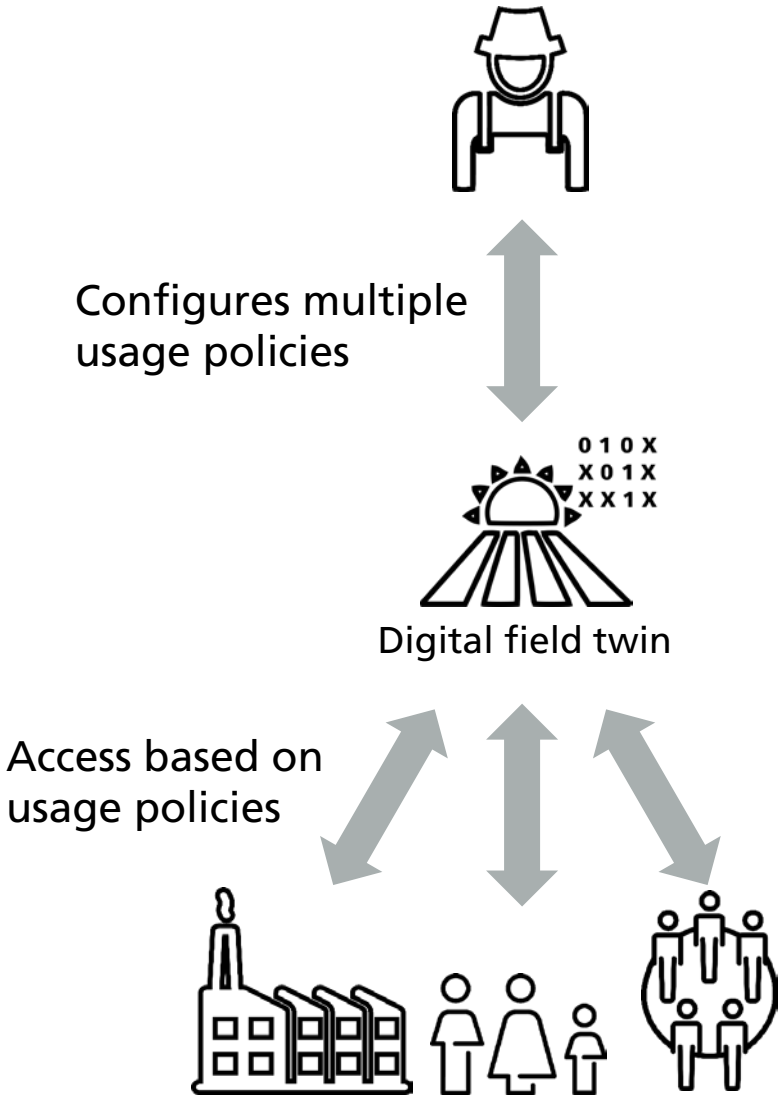
# Solution space

- Legal scope
  - (At least in Germany,) there **is no legal ownership of data** and you may not want to have any [Vo20]
  - **Contracts between legal entities**: possible, but especially demanding for farmers
    Terms and conditions, code of conduct, …

- Technological scope
  - Activities addressing **data sovereignty as a core concept**
    (Gaia-X [GX20] Domain Agriculture, International Data Spaces [ID20], Fraunhofer Lighthouse-project Cognitive Agriculture [FH19], …)
  - **Technology can provide data sovereignty**, but it needs a common ground

# Exemplary solution concept: digital twins for agriculture

- Encapsulation of all data of a physical asset in a digital twin, which is a virtual representation of the real thing [Ra20]
- The owner of the physical asset has control over the digital twin, i.e. he or she can determine how the data may be used by third parties
- Benefits:
  - Consolidation of data and authorization in one place
  - Data sovereignty implemented in the twin object
  - Digital twins enable comprehensive data exchange
  - Enables, but does not require decoupling of data and originating systems or services



# Solution requirements

- Data sovereignty is **one aspect** of the digital transformation in agriculture
- A concept like digital twins **is one possible building block** for data sovereignty
- How to implement one building block in a **huge and complex ecosystem** with its diverse value network?

- Solution concepts require holistic approaches. There is **no single aspect** that can address all challenges
  - Rather a **combination of multiple aspects** like law, contracts and technology
  - Talk to farmers and take farmers' perspective

# Conclusion

- Status quo: We have a **highly complex technological ecosystem** in **huge value networks** and a **need for data sovereignty**
- **Data is vital for digital transformation**, be it digitization of processes or innovation
- Stakeholder **trust in digitization is essential** for sharing data
- There are **many activities** that address these challenges, but they require a **holistic coordination**, as do solution concepts
- Covering single aspects does not solve challenges. It is the **combination of aspects**

# Thank you!

- Fraunhofer lighthouse project »Cognitive Agriculture«
  - Envisioning an **agricultural data space (ADS)**
    www.cognitive-agriculture.de
  - https://www.dataspaces.fraunhofer.de/de/vertikalisierungen/agricultural_data_space.html

- Contact: bernd.rauch@iese.fraunhofer.de

# Literature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