The ISO Strategic Advisory Group for Smart Farming

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The ISO SAG-SF Report

IMPORTANT: Most of the material contained in this presentation is either contained in, or refers to, the Final Report of the ISO Strategic Advisory Group on Smart Farming. Please find it here:
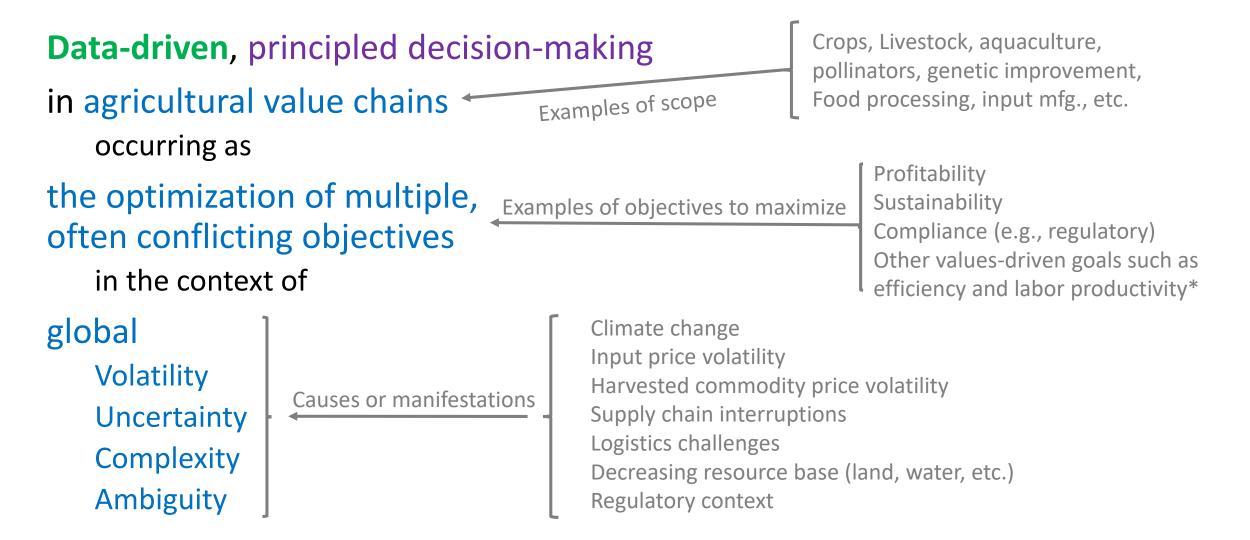

https://bit.ly/3olkd8x

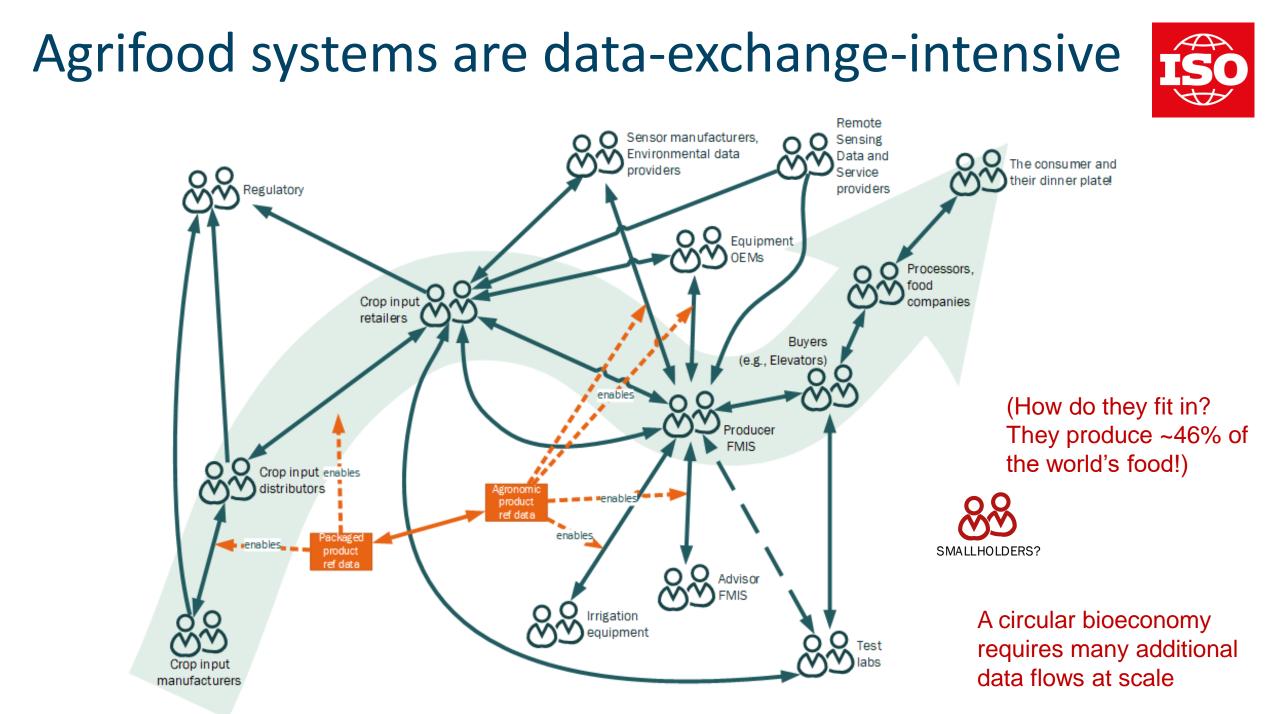# When you find yourself in a hole, stop digging

(Wordsworth Dictionary of Proverbs (2006) p 283

- The global agrifood sector finds itself in a predicament: our standards are insufficient to support the data-driven, principled decision-making required to solve 21st century problems such as **enabling a circular bioeconomy**.

- This results from the bottom-up growth of both the industry and its standardization efforts.

- ISO realized this and chartered a group (joined by 21 national standards bodies) to develop a strategic roadmap to guide hybrid top-down, bottom-up action.

- The proposed Technical Committee described in this presentation is a key part of that strategy.
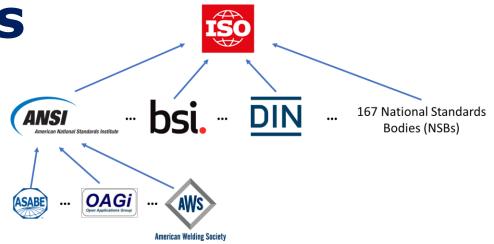
A working definition of Smart Farming

Data-driven, principled decision-making

in agricultural value chains

    occurring as

Examples of scope

Crops, Livestock, aquaculture,
pollinators, genetic improvement,
Food processing, input mfg., etc.

the optimization of multiple,
often conflicting objectives

    in the context of

Examples of objectives to maximize

Profitability
Sustainability
Compliance (e.g., regulatory)
Other values-driven goals such as
efficiency and labor productivity*

global
    Volatility
    Uncertainty
    Complexity
    Ambiguity

Causes or manifestations

Climate change
Input price volatility
Harvested commodity price volatility
Supply chain interruptions
Logistics challenges
Decreasing resource base (land, water, etc.)
Regulatory context

* These are geopolitical-context-dependent and may not be applicable in some contexts.

Agrifood systems are data-exchange-intensive

(How do they fit in? They produce ~46% of the world's food!)

SMALLHOLDERS?

A circular bioeconomy requires many additional data flows at scale

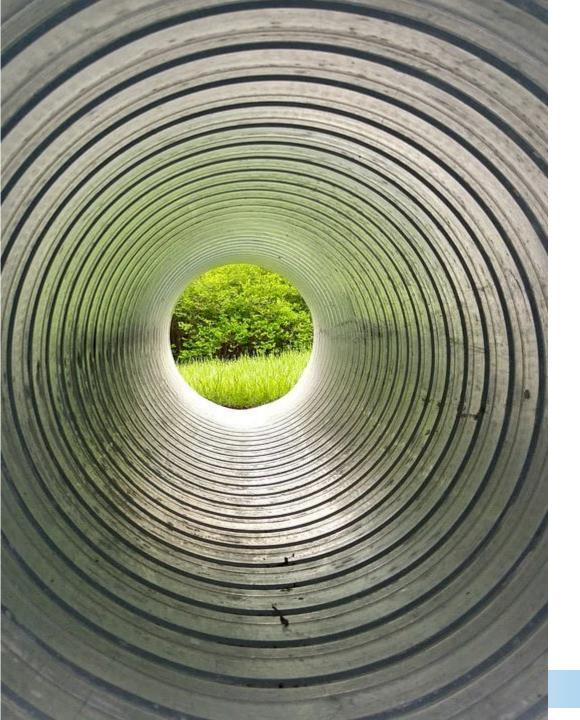# ISO and how it works

- International Organization for Standardization (ISO)
  - Member countries → National standards bodies (NSBs)
    - American National Standards Institute (ANSI) for US
  - Technical committees & subcommittees (TCs/SCs)
- ISO develops standards within the TCs and SCs
  - NSBs propose them, designate experts to develop them
  - TC/SC members (designated by the NSBs) vote to approve
    - The vote for each NSB/country is typically managed by a domain-specific national standards organization designated by the NSB
      - ISO/TC 23 (Agricultural machinery): the US rep is ASABE (Am. Soc. Agric. & Biol. Engineers)
      - ISO/TC 44 (Welding and Allied Processes): the US rep is AWS (American Welding Society)
      - TC 154 (Processes, data elements and documents in commerce, industry and administration): US rep is OAGi (Open Applications Group, Inc.)
- When a new TC or SC is created
  - Each participating NSB will designate an organization to represent it.
  - That organization (ASABE in the US for most agricultural work) will hold the TAG (technical advisory group) and determine the country's positions regarding standards in that TC/SC
  - Operating the TC/SC requires money on an ongoing basis
    - Fees to ANSI (e.g., $8000/yr for a TC)
    - Operating costs (e.g., secretariat, travel to plenaries, etc.)

More ISO Context

- ISO: 24000+ standards, 250+ committees, 168 members (1/ country).
- ISO committees and subcommittees tend to have narrow scopes.
- This typically leads to great results within narrowly-scoped domains.
- Smart farming, however, requires interoperability *across* domains.
- There lies the challenge, and ultimately the motivation to make a strategic coordination effort.
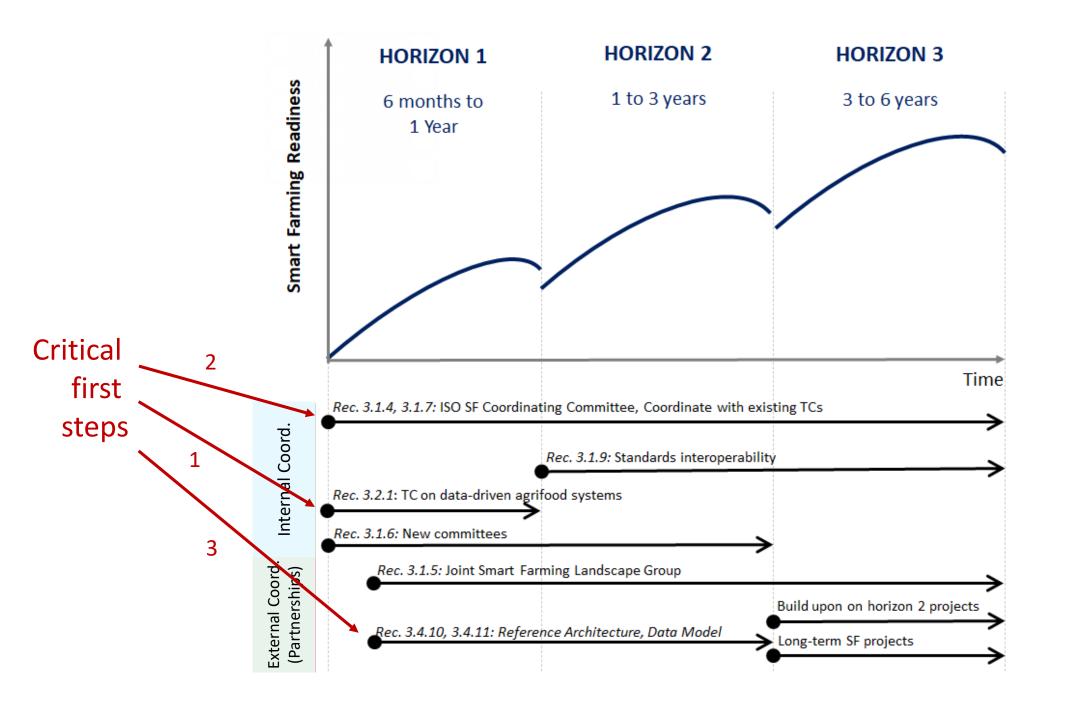- ISO is aware of this and chartered its Strategic Advisory Group on Smart Farming (SAG-SF) as a result.

The ISO Strategic Advisory Group on Smart Farming and its Roadmap

ISO and its Goals for the Roadmap on SF

- **Describe the standardization landscape** around Smart Farming across the entire food value chain in the context of the Sustainable Development Goals (SDGs).

- **Identify gaps** where standardization is needed.

- **Recommend actions and priorities** for standardization activities.
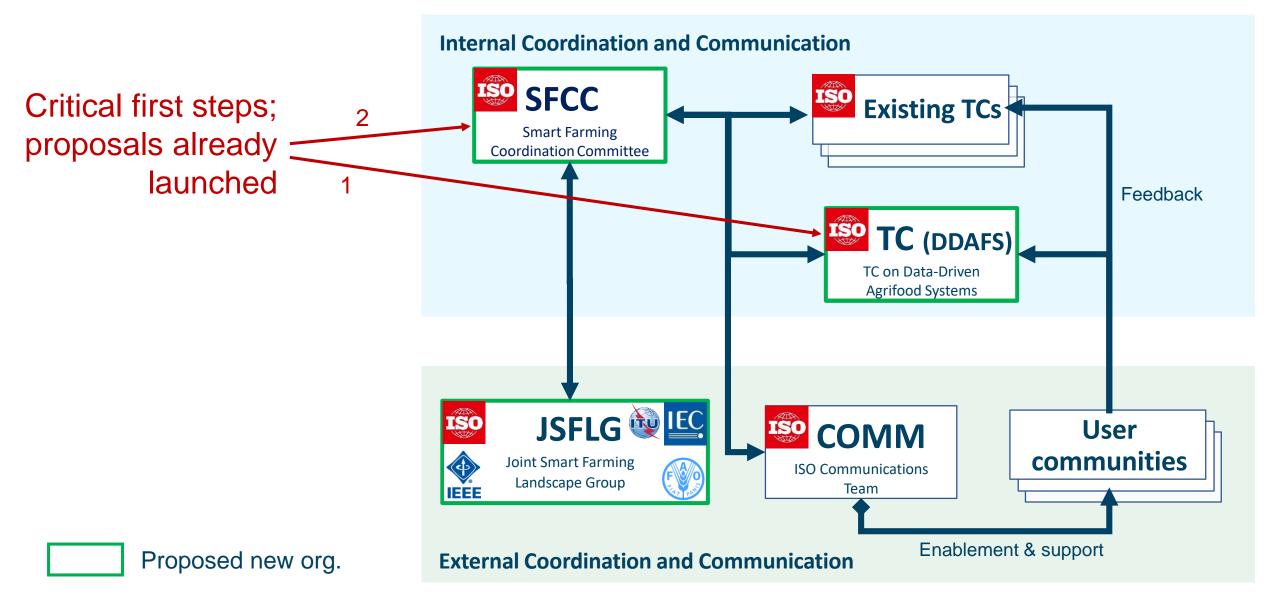
- **Publish the results** (i.e., the roadmap document).

Critical first steps

HORIZON 1 — 6 months to 1 Year

HORIZON 2 — 1 to 3 years

HORIZON 3 — 3 to 6 years

Smart Farming Readiness

Time

Internal Coord.

External Coord. (Partnerships)

Rec. 3.1.4, 3.1.7: ISO SF Coordinating Committee, Coordinate with existing TCs

Rec. 3.1.9: Standards interoperability

Rec. 3.2.1: TC on data-driven agrifood systems

Rec. 3.1.6: New committees

Rec. 3.1.5: Joint Smart Farming Landscape Group

Build upon on horizon 2 projects

Rec. 3.4.10, 3.4.11: Reference Architecture, Data Model

Long-term SF projects

Coordination overview

What's in it for ASE-16?

1. There would now be a clear ISO path for ASE-16 standards such as S629:

   - Primary go-to: Technical Committee on Data-Driven Agrifood Systems (currently balloted with the National Standards bodies)

   - Specific go-to: Subcommittee on Sustainability Metrics

2. The US will hold the chair of the TC. ASE-16 could hold the US Tag for the Subcommittee on Sustainability Metrics

Recommendation 3.2.3: Subcommittee on Sustainability Models, Metrics and Data

The SAG recommends that the proposed TC on Data-Driven Agrifood Systems create a subcommittee on sustainability models, metrics and data.

Terms of reference:

- Broadly, the Subcommittee scope is to enable the development of environmental, economic, and social sustainability models for agrifood systems through data.

- Enable standardization of the inputs (i.e., observations and measurements) and outputs of models used to assess sustainability of agrifood systems or parts thereof, including data models, standardized data exchange messages, and the semantic infrastructure (e.g., data type registry and controlled vocabularies) necessary to support them.

- Proposed placement is under the proposed TC on Data-Driven Agrifood Systems

The scope of this subcommittee includes:

- Standardizing, jointly with the Agrisemantics Working Group, the different aspects of observations and measurements (features of interest, observed properties, etc,) applicable to sustainability

- Standardizing the inputs and outputs of simulation models used in the sustainability domain, since these variables fit the data model of observations and measurements and the user community would benefit from having their definitions available through a data type registry.

- Enable prioritization through the formalization of sustainability indicators (variables) and machine-actionable methods for representing prioritization.

Other recommendation topics of interest

Implementation is Key

1. Having a strategy and a roadmap does not guarantee success.

2. Communication with user communities and other standards organizations has to grow substantially

3. Transitioning from a primarily bottom-up standards development approach to a hybrid model that includes top-down strategic planning is not simple: communicating value and having incentives will make or break the plan.

4. Additional standards are needed to make it easier to implement the fiduciary principle and data ethics by design.

5. It is difficult to get smallholder representation in these conversations.

6. Investment in semantic infrastructure and data trusts is necessary.

Use the QR code to
Access SAG documents
https://bit.ly/3olkd8x

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