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WorldCereal MOOC I

Introduction to reference data for crop mapping

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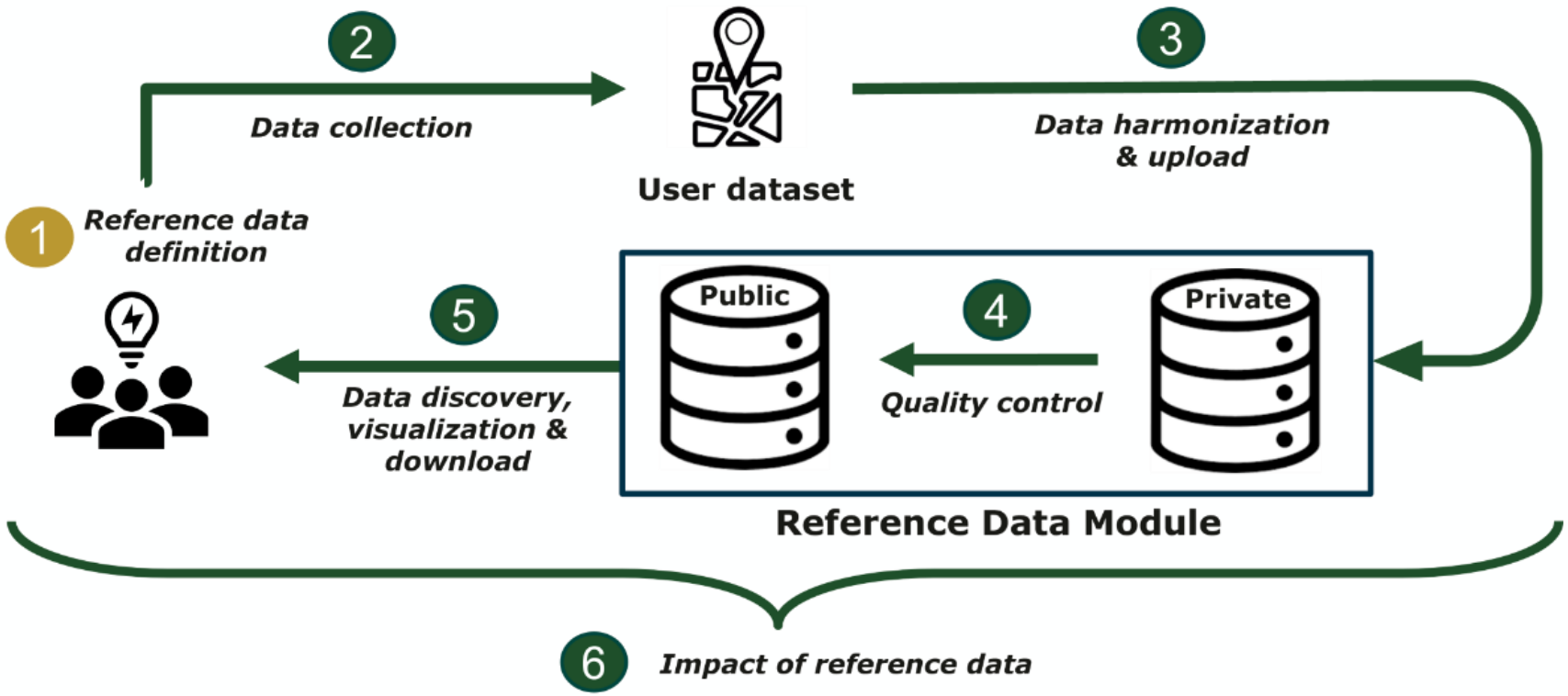
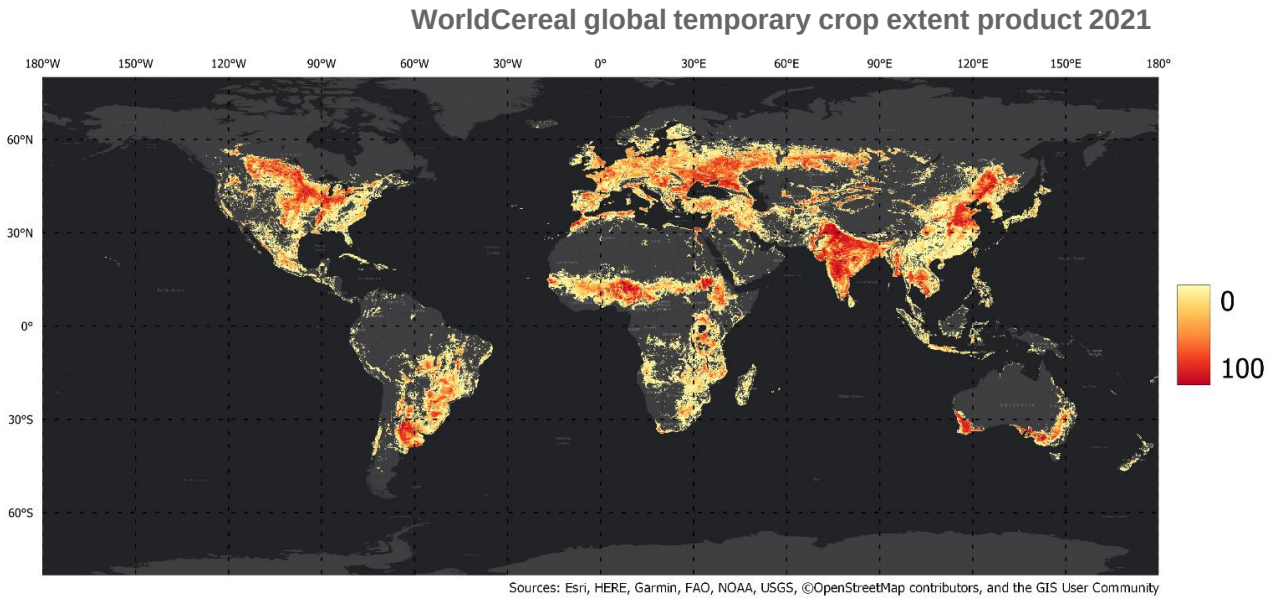
MOOC I: Outline



WorldCereal Phase II

Where is food crop production taking place?

Which crop is grown when and where?



WORLDCEREAL provides an open, user-friendly, cloud-based processing system for global cropland monitoring at 10m resolution

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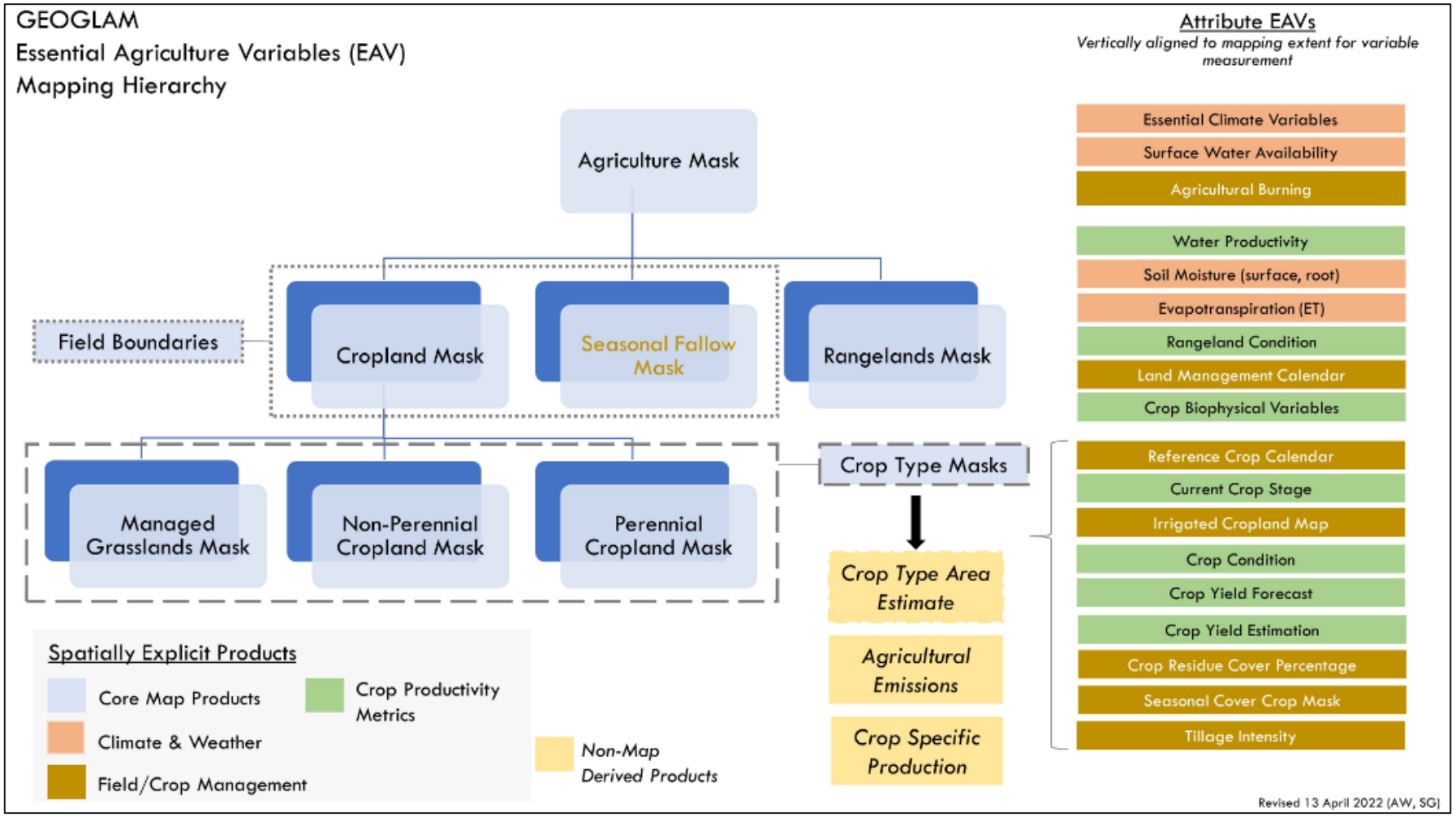
Cropland and crop type maps

- Cropland and crop type maps are key spatial layers for regional analysis of crop productivity and externalities
- Defined by GEOGLAM as fundamental Essential Agricultural Variables (EAV)
- Creating these maps requires **reference data**
  - See this paper



Why reference data?

We need **reference data** to:

- **Train** and **validate** crop classification algorithms in an efficient and robust manner
  - Sufficient quantity (temporal, spatial and thematic variation) and quality of reference data is a crucial bottleneck in crop mapping
- **Validate** crop type and land cover maps
  - Statistical sound validation has additional specifications: proper sample design, method, specific time/year
  - We will further elaborate on the topic of validation in WorldCereal MOOC III

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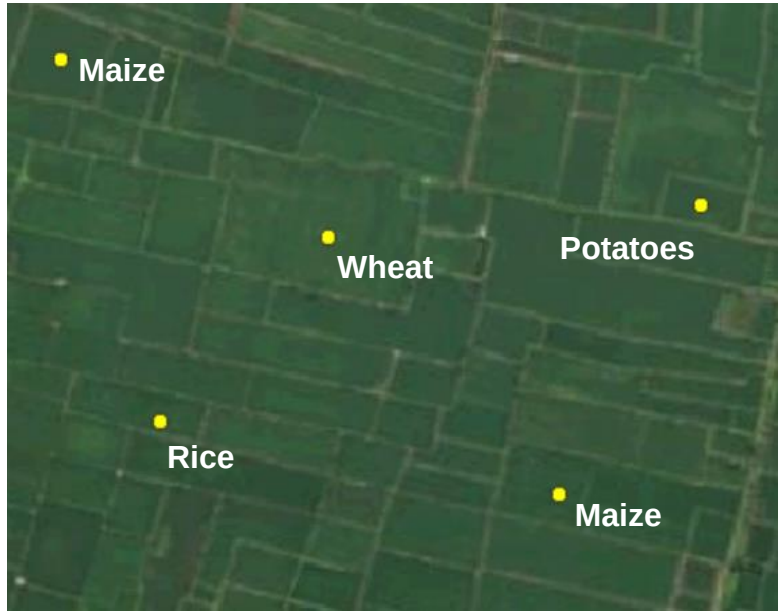
Reference data definition

Polygons
(inside field)



Points (center of field!)

Essential attributes:
Location
Land cover / crop type label
Date

2017 onwards

Each observation should represent a **homogeneous, single-cropped area with a minimum size of 0.25 ha and minimum width of 30 m**

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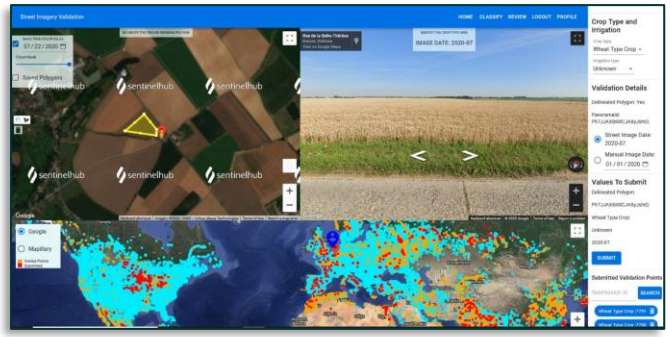
Reference data definition

- Types of Reference Datasets:
  - **Field Observation Survey** (field visit)
  - **Virtual (and/or automated) Interpretation (by photo, HR imagery etc)**
  - Automated Classification (high-quality classified map)
  - Formal Declaration (parcel registrations systems)
- We focus on the first type
- “Field Observation Survey” usually most demanding in terms of harmonization, especially legacy data

Field Observation Survey (field visit)



Virtual Interpretation

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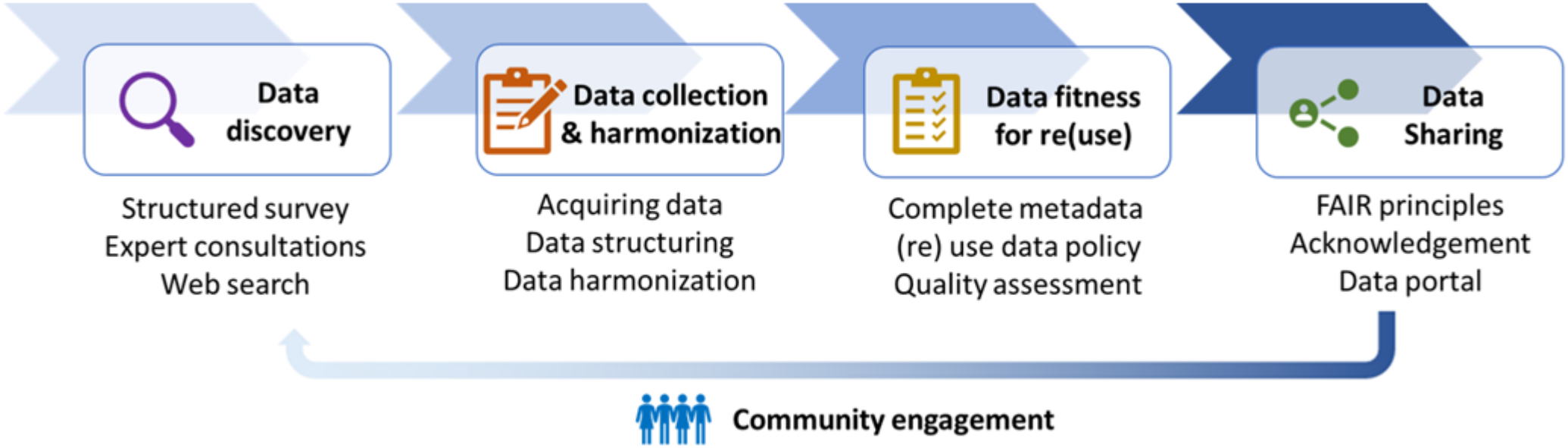
Collecting and harmonizing reference data



Generic framework on in-situ reference data employed in WorldCereal

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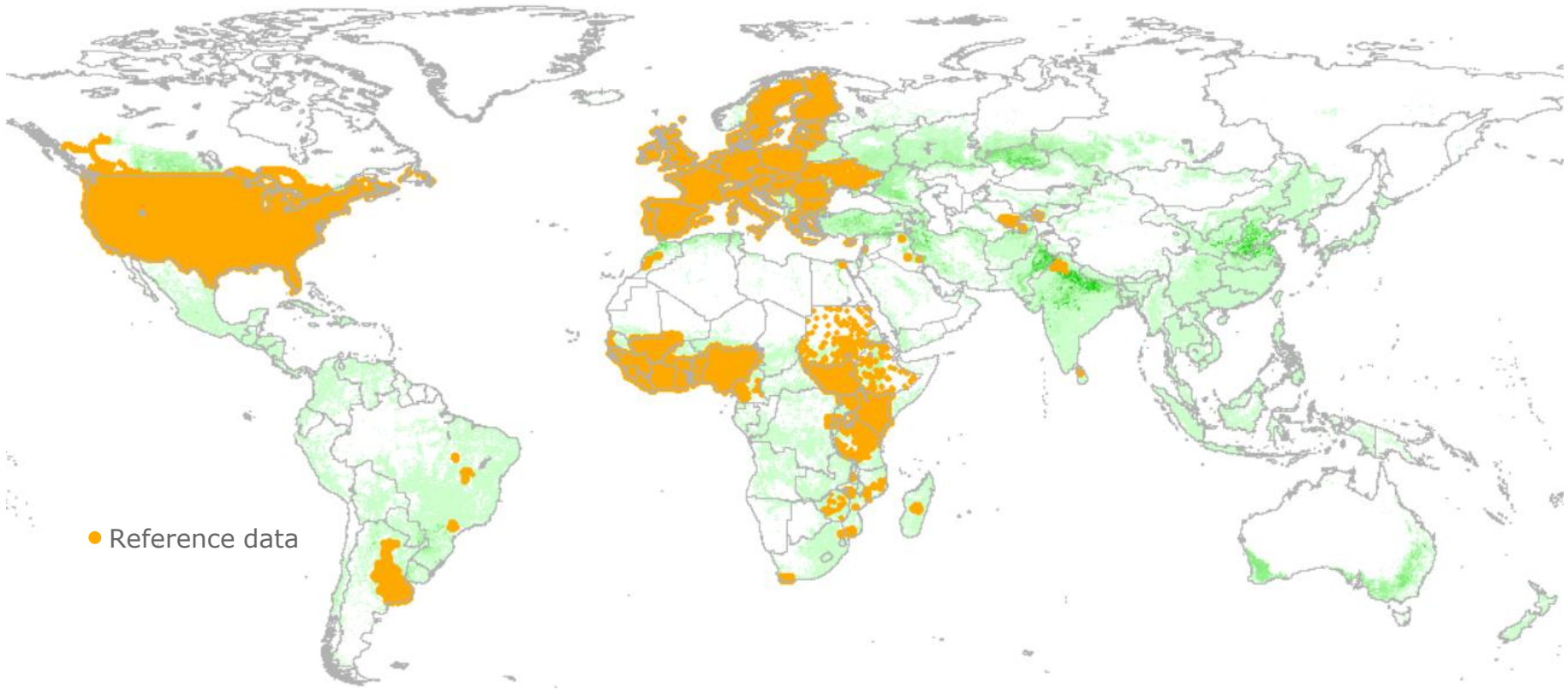
Current status reference data

75 million harmonized observations with standardized metadata



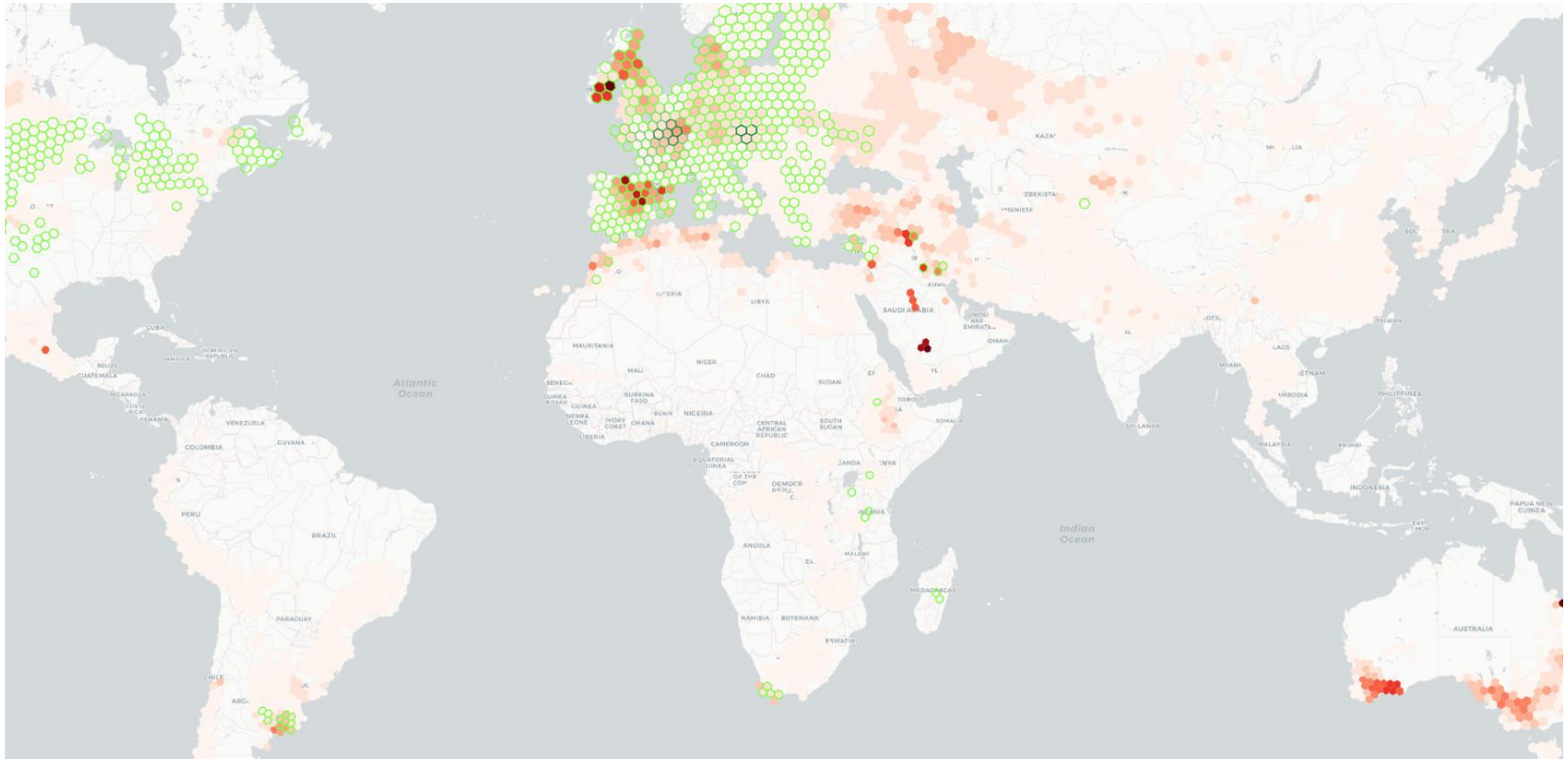
Public FO/CV data sets
- AAFC Crop Inventory
- CAWa project
- CGIAR-GARDIAN
- COPERNICUS-GEOGLAM
- Digital Earth Africa
- INPE-LEM
- JECAM-CIRAD
- JECAM site - Ukraine
- LUCAS 2018 Copernicus
- NASA Harvest - CropHarvest
- Radiant MLHub
- OneAcreFund-MEL
- OSF-AfSIS
- FAO-WAPOR
- CGIAR-CIMMYT

Public FD/AC datasets:
- LPIS / EUROCROPS / SIGPAC
- Cropland Data Layer (CDL) – USDA

Private data sets:
- Buenos Aires Grain Exchange
- ESA - Sen2Agri
- ESYRCE-Spain
- INTA-field-data
- LISTA-field-data
- NASA Harvest - Ukraine
- WFP-field-survey

Current status reference data

Example for barley



- Red = harvested area according SPAM (the more red, the more harvested area)
- Green = regions with reference data (the more green, the more reference data)

Sufficient (public) reference data and quality is a concern!

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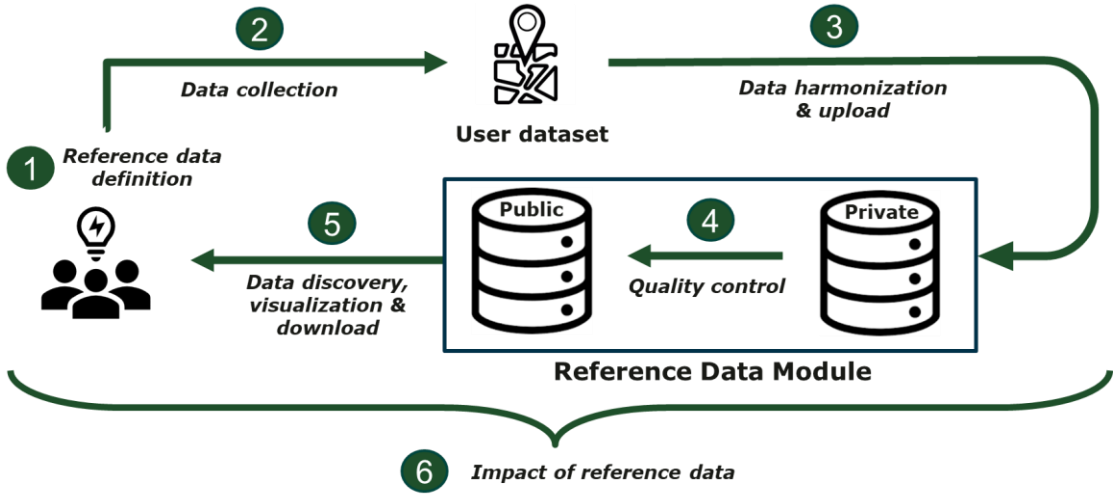
Topics ‘reference data for crop mapping’

In the remainder of this MOOC, we will cover the main aspects of collecting and preparing reference data:

2. Techniques for reference data collection
3. Reference data harmonization and cleaning
4. Quality assessment of reference data
5. Introduction to the WorldCereal Reference Data Module (RDM)
6. Impact of reference data on crop mapping



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THANK YOU

Interesting links:

About ref data → https://esa-worldcereal.org/en/reference-data

RMD UI → https://rdm.esa-worldcereal.org/

Documentation → https://worldcereal.github.io/worldcereal-documentation/rdm/overview.html

Questions? → WorldCereal Forum MOOC I

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