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WorldCereal MOOC I



Techniques for reference data collection

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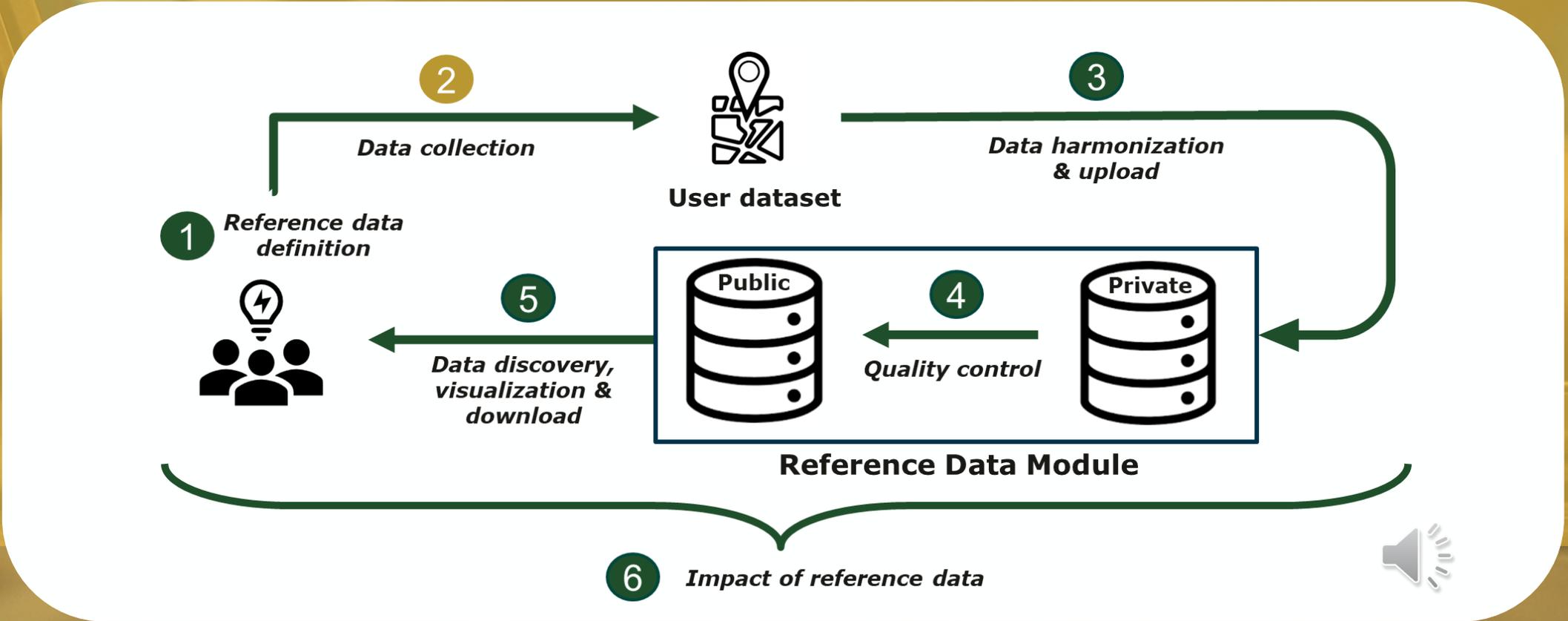


→ THE EUROPEAN SPACE AGENCY



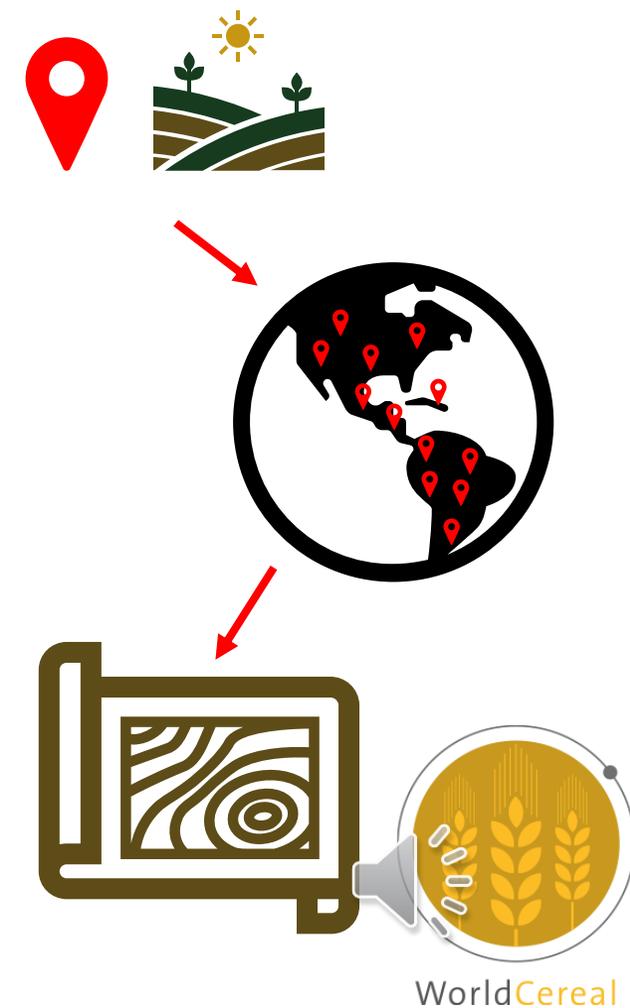
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MOOC I: Outline



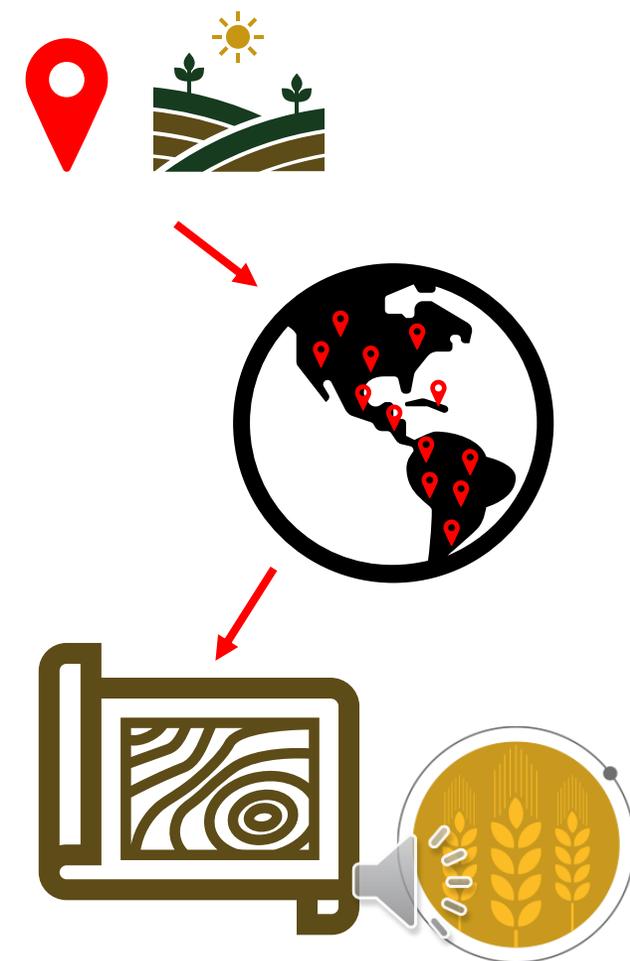
Reference data collection: Field campaign

- Sample / geo-tag areas where a specific land use is located
- WorldCereal needs thousands of samples of different crops worldwide at different times of the year
- These samples train a model that produces a “wall to wall” map – e.g. WorldCereal Maize Summer 2021



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But...
not all field samples
 are created equally



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Example: A geo-tagged maize field sample



Type:
Maize

Coordinates:
1.3658843° South
79.4180402° West

Is this a good sample?



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Example: A geo-tagged maize field sample



How was it taken?
In which direction?
When was it taken?

Let's have a closer look:



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Example: A geo-tagged maize field sample

The picture was taken from the road



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Example: A geo-tagged maize field sample



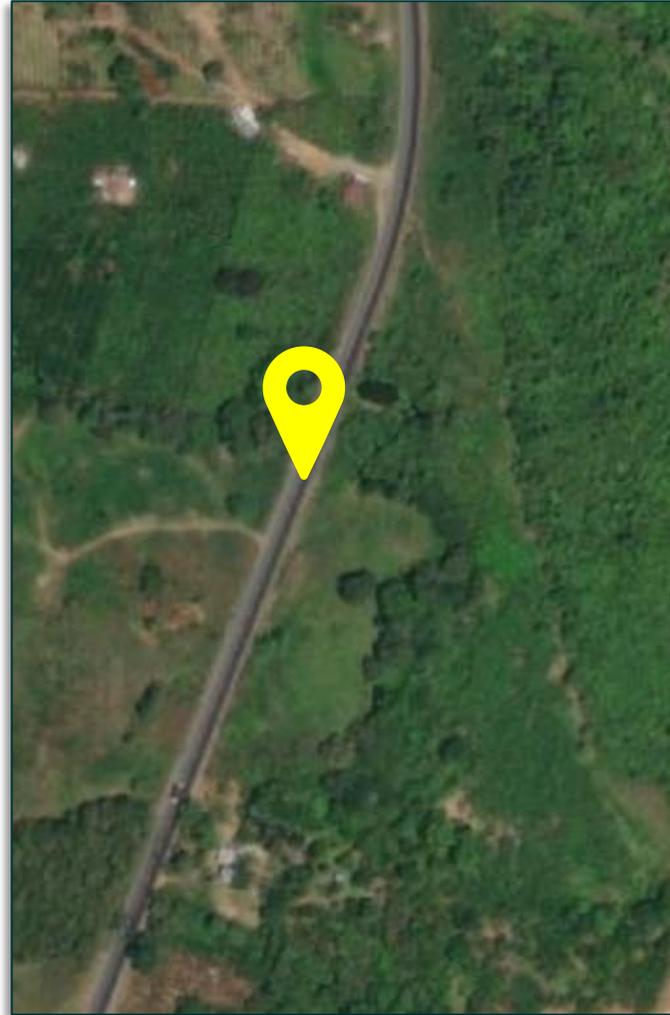
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Example: A geo-tagged maize field sample

and the
coordinates
are on the
road...

(shown on a high-
resolution satellite
image - Bing maps)

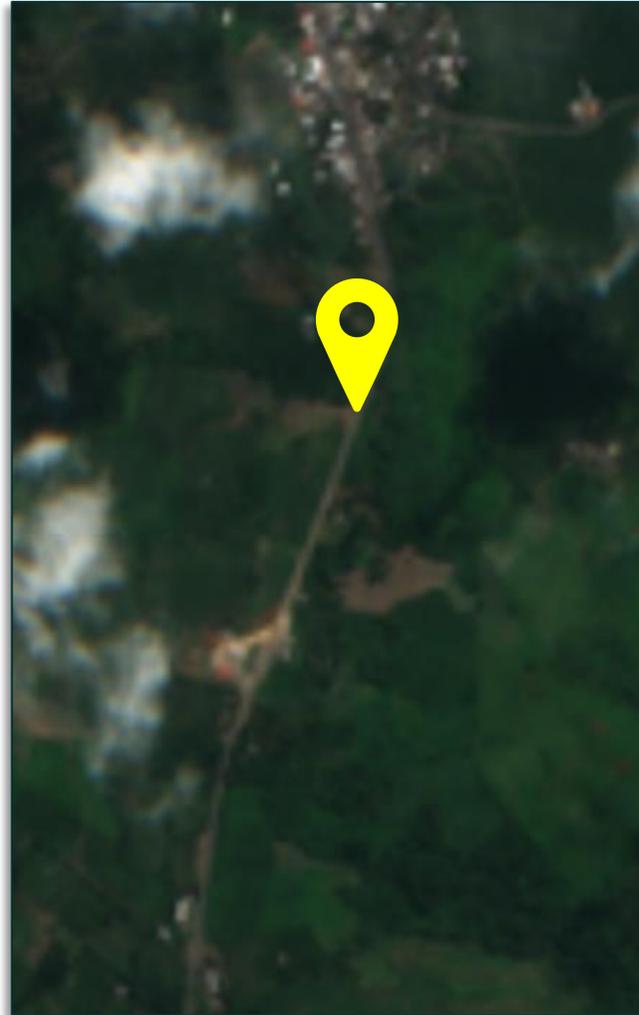


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Example: A geo-tagged maize field sample

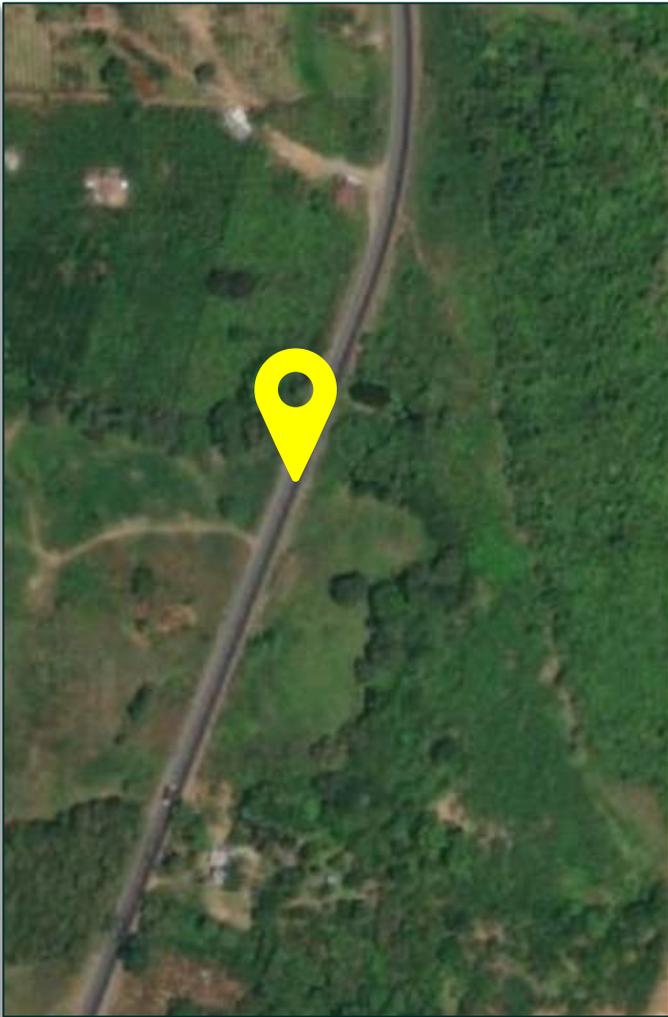
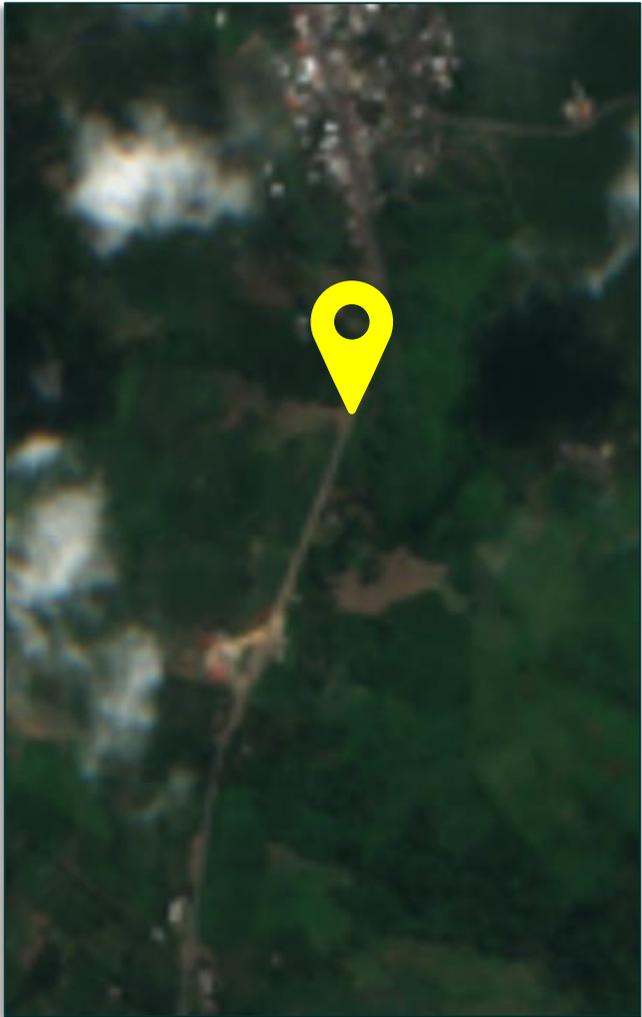
and seen on a
lower-resolution
satellite image

(Sentinel 2 –20 m)



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Example: A geo-tagged maize field sample



Good enough?



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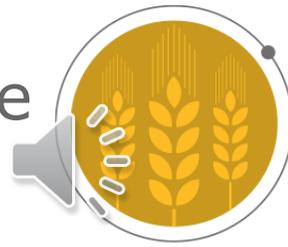


Example: A geo-tagged maize field sample

But **which side of the road** is it showing?



Also: Unknown date



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Example: A geo-tagged maize field sample

Some hints help
figuring out the
exact location

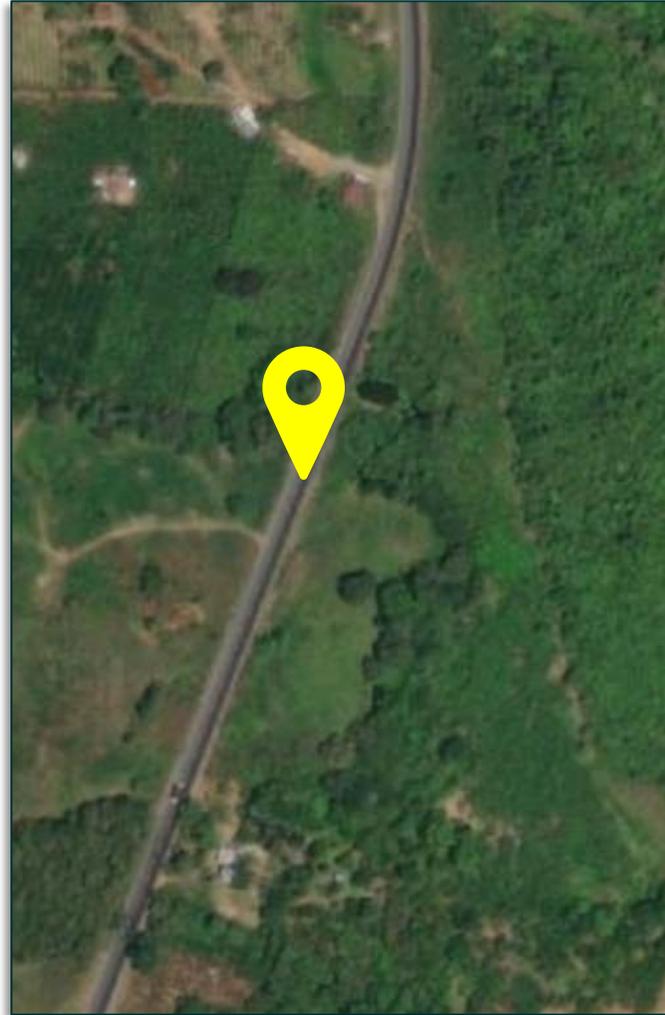


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Example: A geo-tagged maize field sample

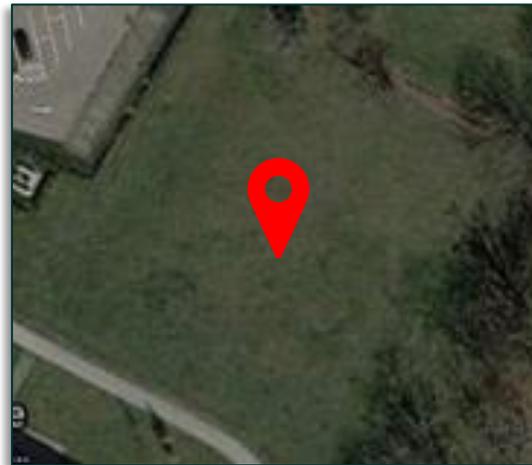
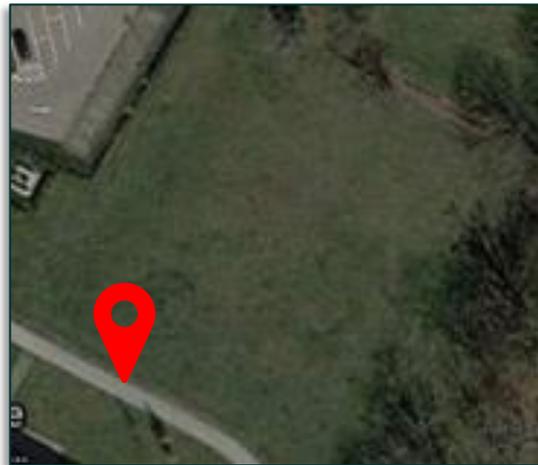
But...

with thousands of samples, it becomes very difficult to guess for each one!



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- Sample inside the desired land use or parcel, whenever possible in the center of the field



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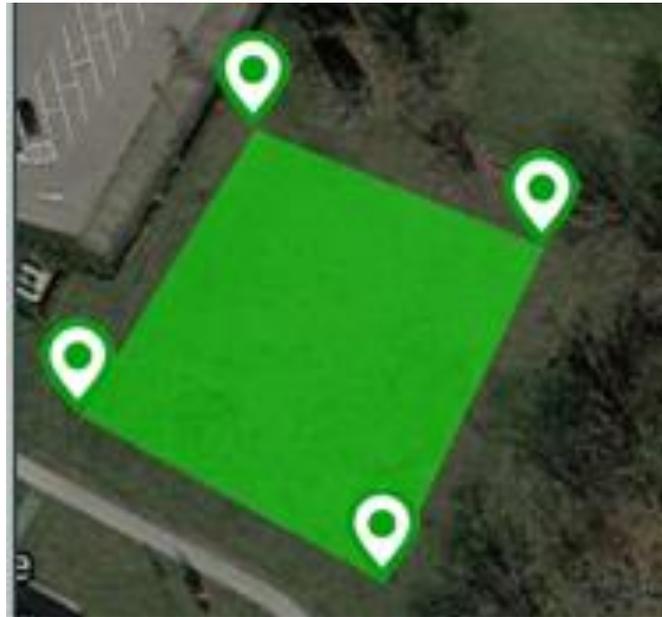
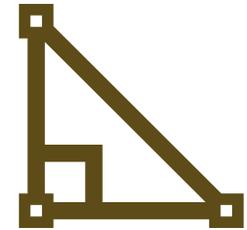
- Use full decimals on coordinates taken, preferably, use a device with enough geo-precision
- If possible, include pictures on different angles and directions
- Include exact date

0,0000000



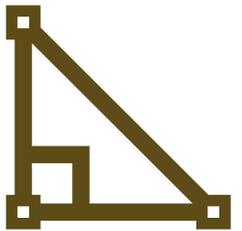
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- Preferably, create not only a point, but a polygon (perimeter of/inside the parcel)



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- But beware of only including homogeneous crop fields



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GPS device – analog (paper + pen)

Phone – pictures with location

Mobile apps

Virtual in situ data collection



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GPS / Analogue system

- High precision – allows precise delineation of borders
- Employed for cadastral work (high precision GPS)
- May require analogue annotations (depending on device)
- Needs some (basic) familiarization
- High(er) cost



Credit: ©2010CIAT/NeilPalmer



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Phone pictures with location

- Low(er) precision
- Easy to use – enable location for pictures
- Low(est) cost
- Usually does not indicate direction or angle of tilt, but it can be obtained
- No easy polygon delineation



Credit: ©Juan Carlos Laso Bayas



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Mobile applications

- Installed on phones or tablets
- For experts and non experts
- Easy to use – custom survey
- Allow polygon delineation
- Low(er) cost
- Some exploit device gyroscope (angle/tilt)
- Low(er) precision

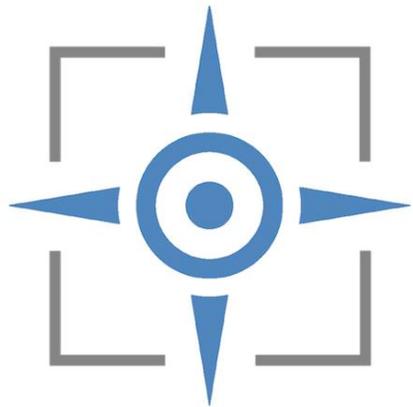


CropObserve

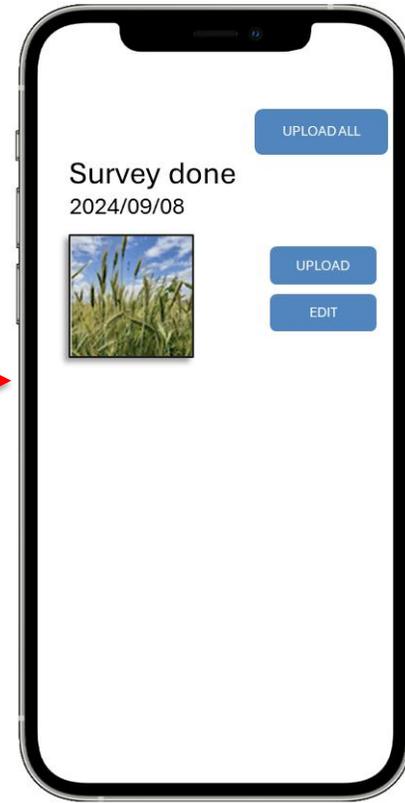
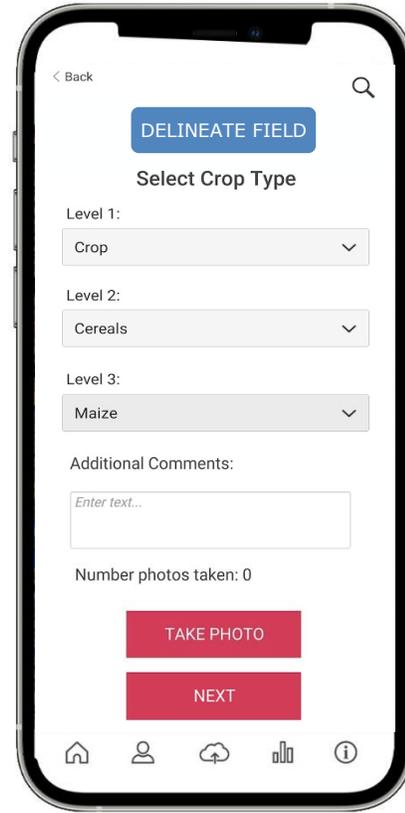
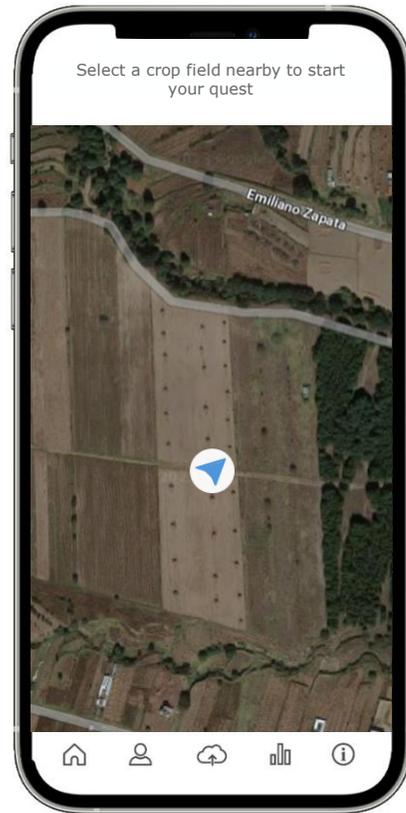
 **KoboToolbox**



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Geo-Quest Crop Capture



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Virtual field samples collection

- Easy to use
- Low cost
- Allows polygon delineation
- Requires some expertise, but training is provided
- Has some limitations (e.g., identification of some crop types)

The screenshot displays the WorldCereal validation interface. It features a satellite map with a red polygon delineating a field. A street view window shows a field of wheat. The validation form includes the following sections:

- STEP 1:** Please select the predominant tree loss driver visible inside the tree loss pixels in the blue box. Options include Subsistence agriculture, Commercial agriculture, Commercial oil palm or other palm plantations, Pasture, Managed forest/forestry, Roads/trails/buildings, Mining and crude oil extraction, Wildfire (disturbance), and Other natural disturbances/No tree-loss driver.
- STEP 2:** Please select all other tree loss drivers visible inside the tree loss pixels in the blue box. Options include Agriculture/Pasture, Managed forest/forestry, Roads/trails/buildings, Natural disturbances, and No other tree loss driver visible.
- STEP 3:** Can you see roads, trails or buildings in the blue box. Yes/No options.
- Validation Details:** Delineated Polygon: Yes, Panoramaid: PK7.JJAXB08CJAXyJh9Q, Street Image Date: 2020-07, Manual Image Date: 01/01/2020.
- Values To Submit:** Delineated Polygon: PK7.JJAXB08CJAXyJh9Q, Wheat Type Crop: Unknown, 2020-07.
- Submitted Validation Points:** Wheat Type Crop: 7791.



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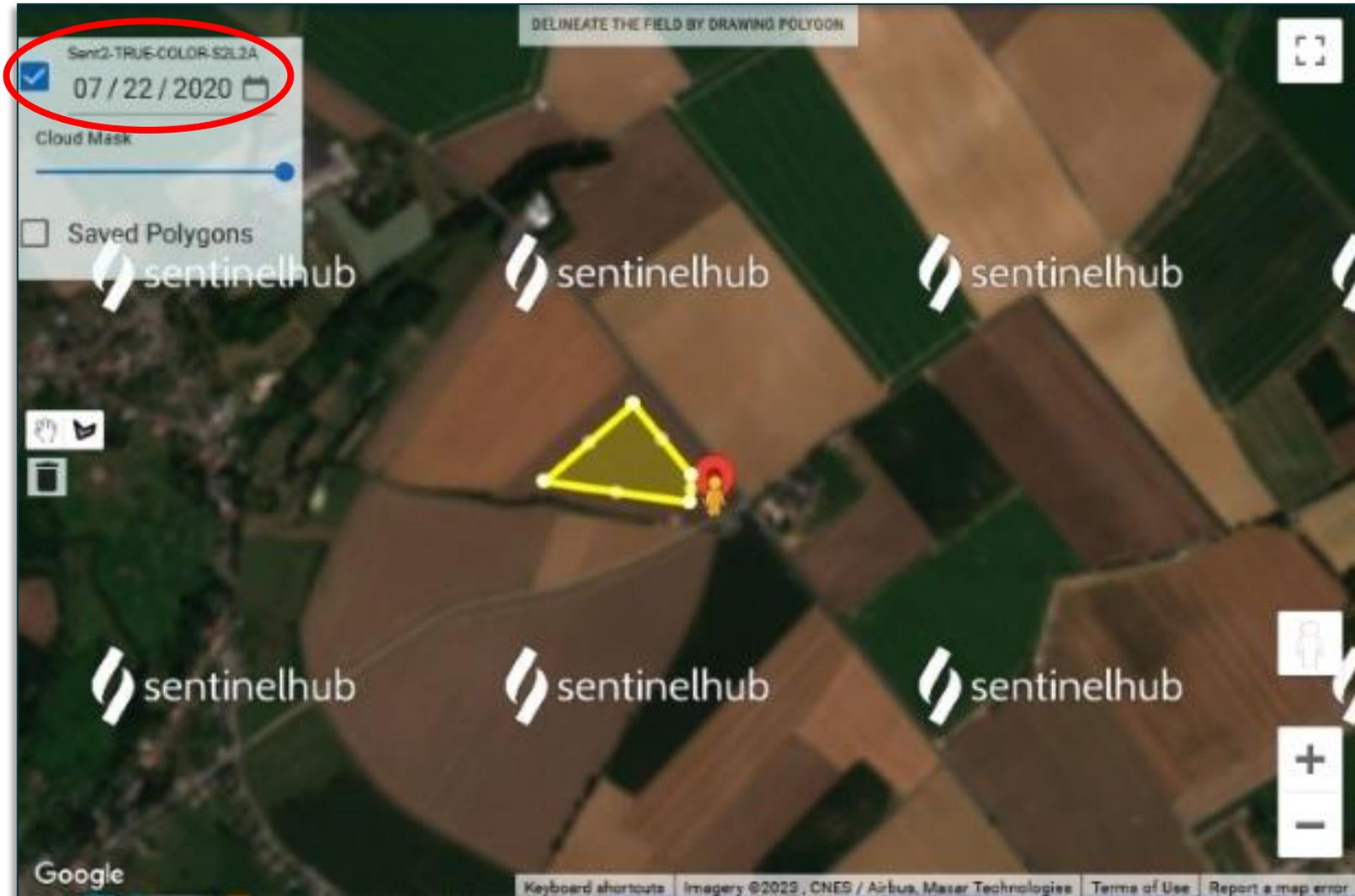
Tools to facilitate reference data collection

<https://svweb.cloud.geo-wiki.org/>



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Tools to facilitate reference data collection



Take home messages:

- Sample inside the desired land use or parcel
- Use a system/device with enough geo-precision and that facilitates recording surveys
- Include pictures on different angles and directions
- Include exact date
- Log not only a point, but a polygon (perimeter or / inside the parcel)

Record details but optimize time spent: Use tools!



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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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