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# EOCap4Africa

## 1 How to conduct a Remote Sensing case study

### b) Selecting data for a Remote Sensing case study



**INES Ruhengeri**  
Institute of Applied Sciences



# Learning objectives



- 1) Understand why data selection is crucial for remote sensing studies
- 2) Differentiate between primary satellite data and ancillary data
- 3) Identify key sources for obtaining ancillary data



# Why data selection matters

A case study is only as good as the data behind it!

## Selecting the right datasets impacts

- Accuracy – Poor-quality or missing data weakens results
- Interpretability – More context = better understanding
- Comparability – Allows for multi-source validation

## For Example:

- A Sentinel-2 NDVI map alone shows vegetation health.
- Adding land-use data reveals whether changes are due to agriculture, deforestation, or urban expansion



# Primary vs. Ancillary data

## Primary data (Satellite imagery)

- The main remote sensing dataset (e.g., Sentinel-2, Landsat)
- Provides **spectral and spatial** information
- Useful for vegetation analysis, land cover change, and water monitoring

## Ancillary data (Supporting data)

- Additional data **improving context and accuracy**
- Often **vector data (points, lines, polygons)** but can also include tabular or raster data
- Helps answer the **why** behind observed patterns

# Example using primary and ancillary data

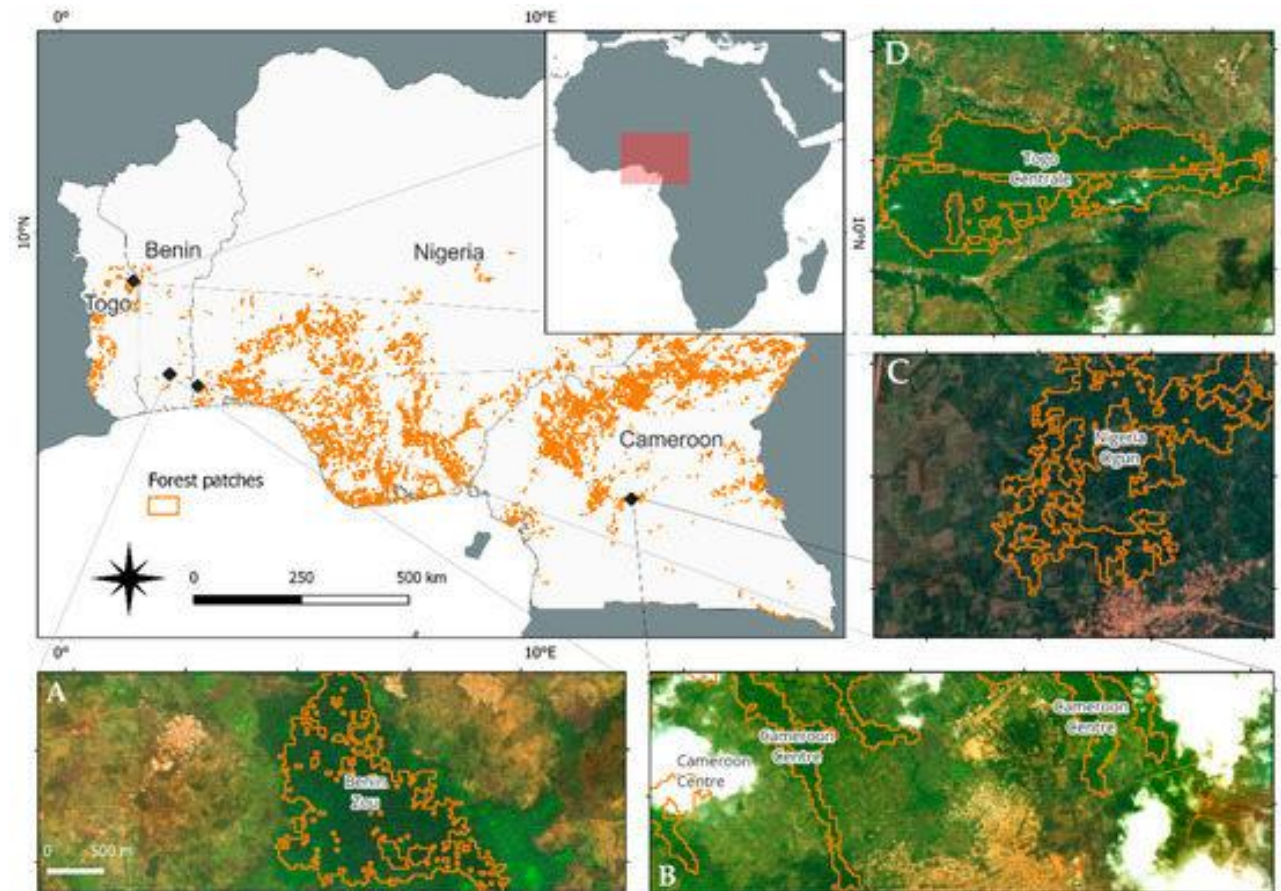


## Primary data (Satellite imagery)

- Provides the background of the image
- Visualises the study area (forest/no forest)

## Ancillary data (Supporting data)

- Vector Data
- Highlights where forest patches are located
- Used for comprehensiveness



(Wingate et al. 2022)



# Key types of ancillary data

## 1) Administrative boundaries

- Used to define study areas and analyze changes at national, regional, or local scales
- **Sources:** OpenStreetMap, GADM, UN datasets, <https://data.humdata.org/>

## 2) Land use & land cover (LULC) data

- Helps differentiate natural vegetation vs. agricultural fields vs. urban areas
- **Sources:** ESA WorldCover, Copernicus Land Monitoring, MODIS LULC



# Key types of ancillary data

## 3) Infrastructure data (roads, buildings, etc.)

- Essential for understanding urbanisation, accessibility, and human impact
- **Sources:** OpenStreetMap, Global Roads Inventory Project

## 4) Field & *In situ* data

- Ground-based measurements help validate satellite results
- Examples: GPS-based vegetation surveys, soil samples
- **Sources:** Locally collected field data, scientific research initiatives



# Key challenges of ancillary data

## 1) Data quality & resolution issues

- Low-resolution land cover maps may not align with high-resolution satellite data

## 2) Inconsistent or outdated data

- Administrative boundaries and infrastructure change over time.

## 3) Projection & format compatibility

- Data often comes in different coordinate systems (WGS84 vs. UTM)

## 4) Ethical and privacy concerns

- Some datasets require permissions, payments or are only accessible for government bodies





# Best practices for integrating ancillary data

## **Always check metadata**

- Understand resolution, date, and projection

## **Align spatial projections**

- Ensure all layers use the same coordinate system.

## **Cross-check multiple sources**

- Avoid relying on a single dataset

## **Use authoritative data providers**

- Prefer official datasets over crowd-sourced data (when possible)

## **Document data sources**

- Helps ensure reproducibility in case studies



# How can ancillary data enhance our case study?

Case study from last session: Monitoring vegetation in east Africa

## Ancillary data

- Sentinel-2 NDVI maps show vegetation loss
- Adding land cover data differentiates natural forests from plantations
- Road network data helps identify areas of illegal logging
- Administrative boundaries allow impact assessment at national or district levels
- In situ field data validates accuracy of NDVI-based deforestation estimates



# How can ancillary data enhance your case study?

Think of examples of ancillary data that you can use to enhance your remote sensing case study idea from the last session!

## Let's get started:

- Within the next 20 minutes, **find at least two different ancillary dataset** that you will integrate in your case study!
- Start by defining **key words** for your search



# How can ancillary data enhance your case study?

Think of examples of ancillary data that you can use to enhance your remote sensing case study idea from the last session!

**Please present your ancillary datasets that you will use within your remote sensing case study on 1-3 slides in powerpoint.**



# Summary & key takeaways

Remote sensing case studies require **more than just satellite data!**

Ancillary data (especially vector data) **enhances analysis, validation, and interpretation**

**Land-use, roads, elevation, and in situ data** provide critical context

**Data quality, resolution, and compatibility** are key challenges to address

Using **multiple data sources** improves reliability and insights

# Sources



Wingate, V. R., Akinyemi, F. O., Iheaturu, C. J., & Speranza, C. I. (2022). *A remote sensing-based inventory of West Africa tropical forest patches: A basis for enhancing their conservation and sustainable use. Remote Sensing*, 14(24), 6251. <https://doi.org/10.3390/rs14246251>

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# Thank you for your attention!

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