



# Earth Observation data in emergency preparedness

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**3-5 April 2023**

Maison de la Chimie, Paris, France



December 24, 1968

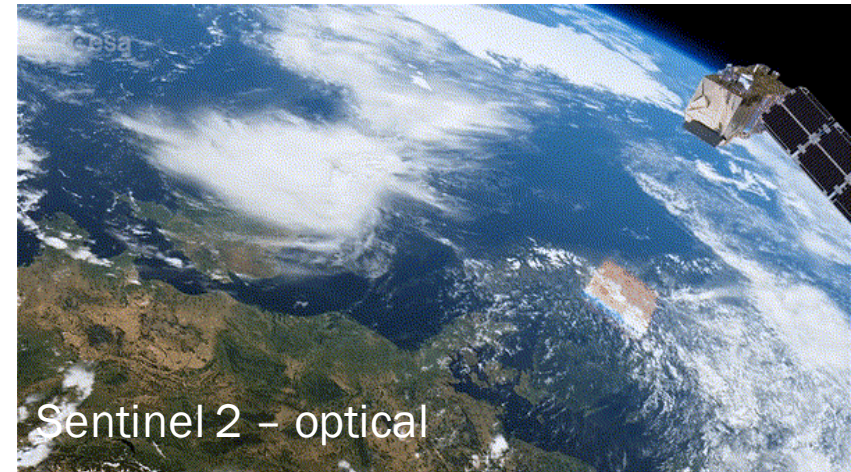
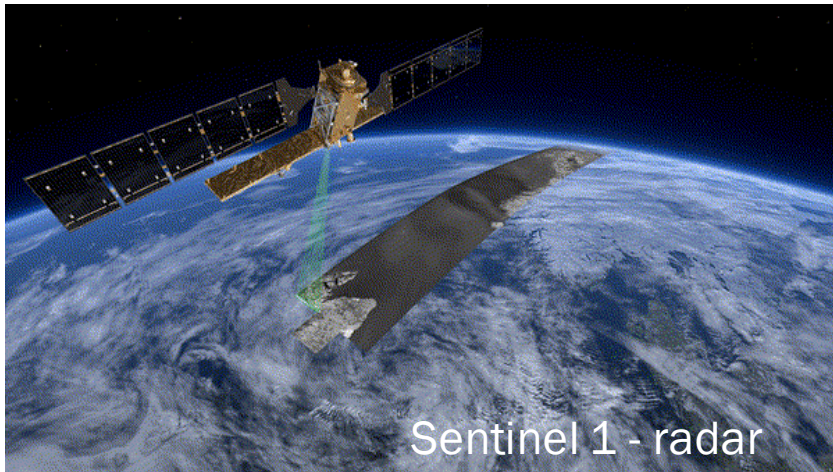


Number of these still active in space:  
about **5,000**

*Credits: NASA's Scientific Visualization Studio*

# What Earth Observation is

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## EO provides:

- **accurate** geo-locations for contiguous target areas;
- **objective**, consistent measurements of physical properties of the Earth and its atmosphere that can be interpreted to define its features and condition;
- **repeated** coverage to enable detection of changes in features and/or their condition.

# Landsat programme



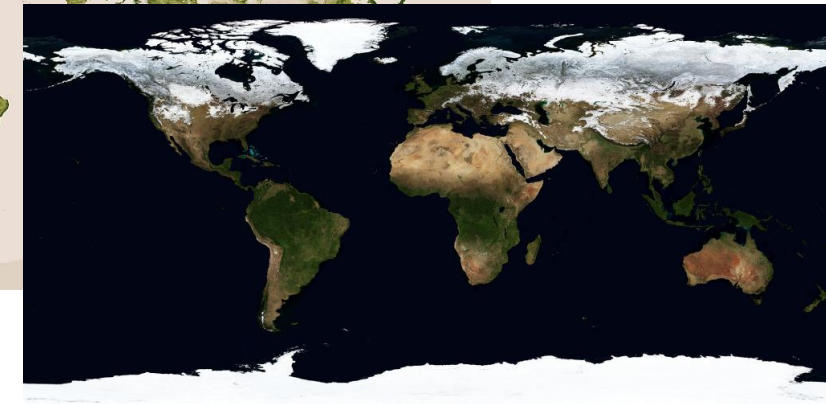
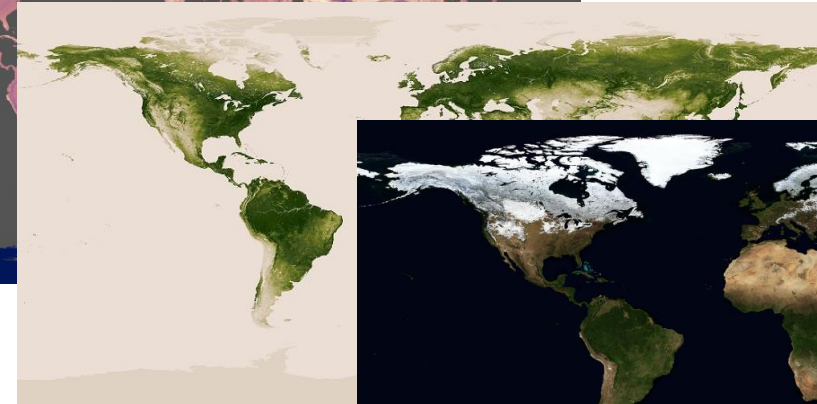
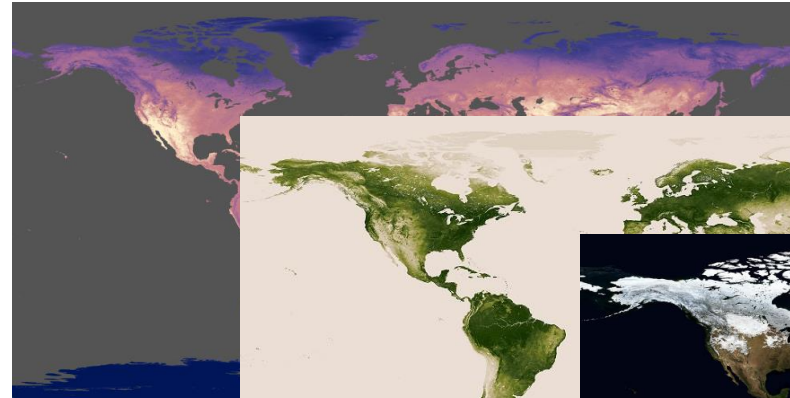
- Landsat (1972 -): spatial resolution: 15-100m
- temporal resolution: 16 days



# Terra – Aqua satellites



- Spatial resolution: 250 m, 500m, 1 km
- Temporal resolution: 1-2 days





# Copernicus programme

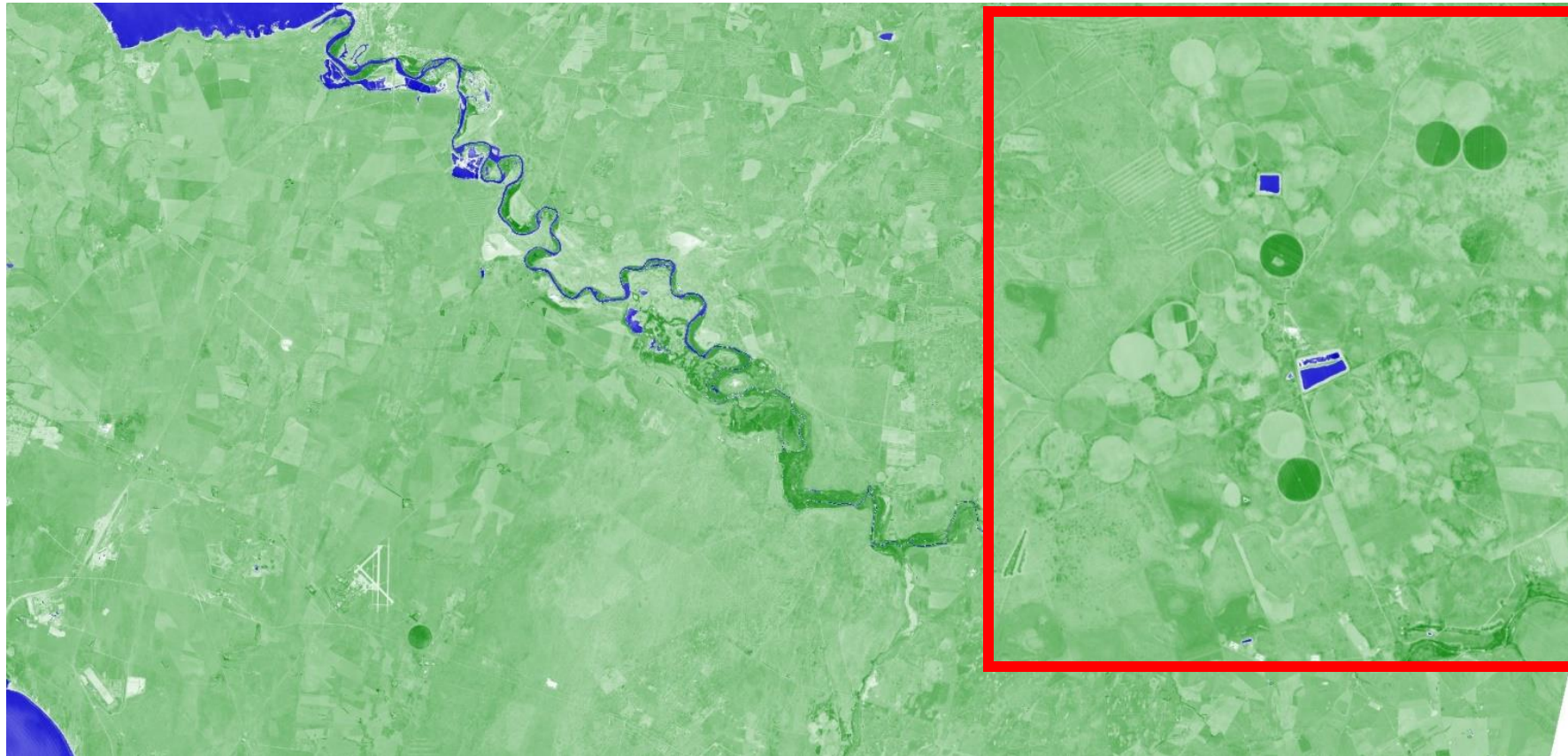


- **Spatial resolution: 10 m, 20m, 60m (S-2)**
- **Temporal resolution: 5 days**

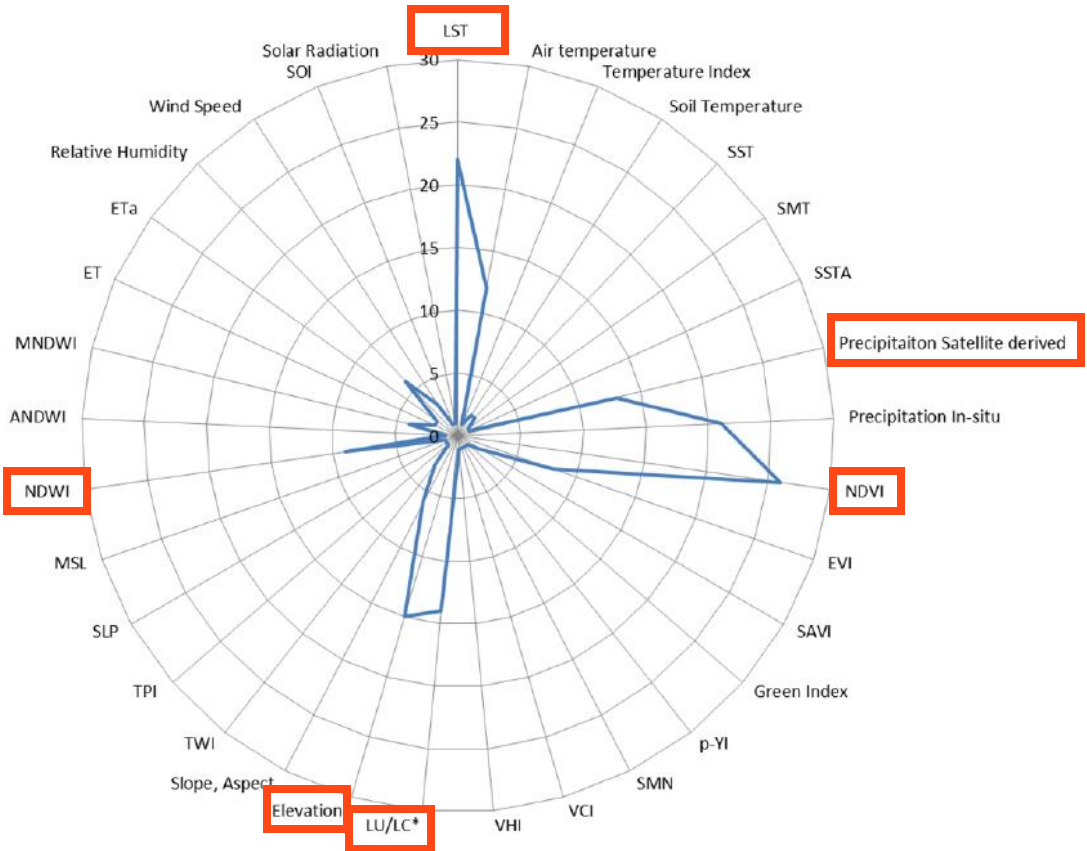
True color

Moisture index

NDWI



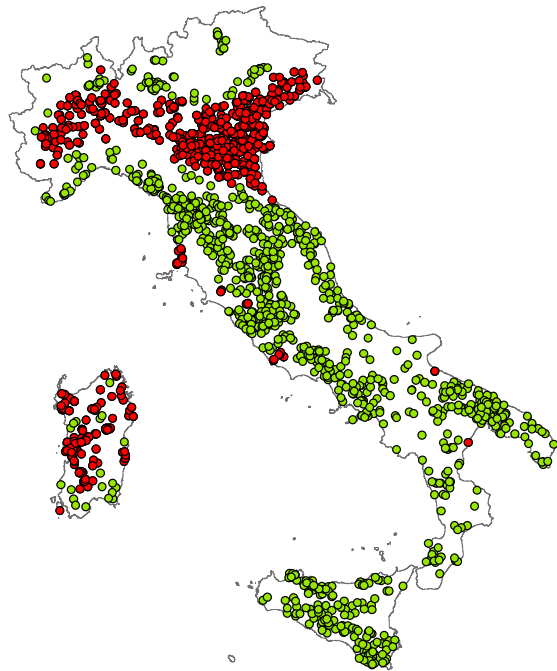
# Climatic and Environmental variables in vector-borne diseases



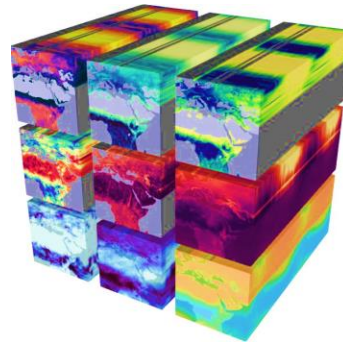
# West Nile virus circulation and EO data

## An Early Warning System

Ground truth  
WNV circulation  
(2017-2020)



Pseudo negative  
sites



- Land Surface Temperature Day (Modis)
- Land Surface Temperature Night (Modis)
- Normalised Difference Vegetation Index (Modis)
- Surface Soil Moisture (Copernicus)

features extraction from EO  
dataset



ML model  
(XGBoost)

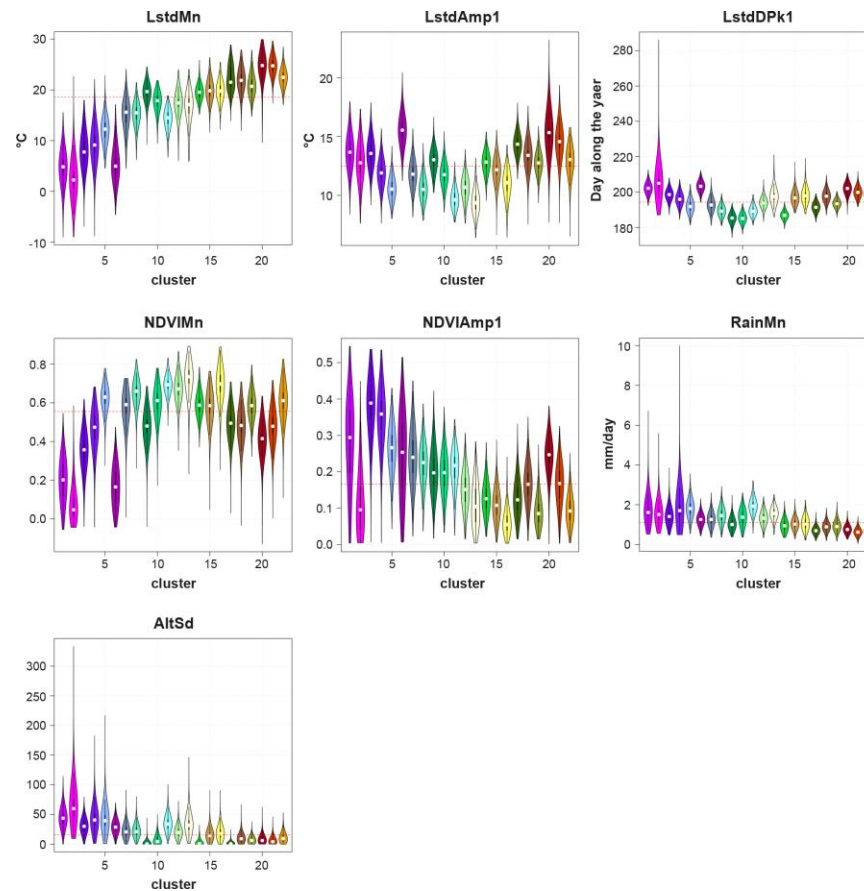
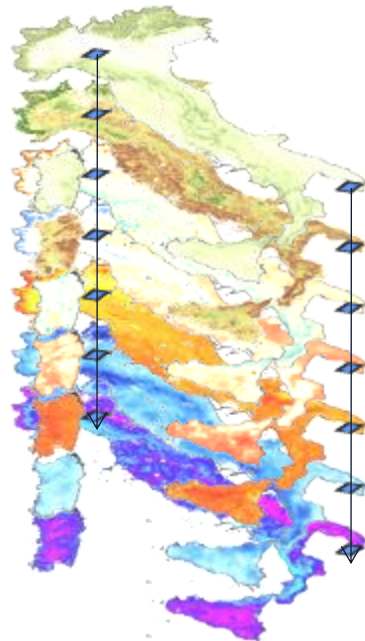
23 - from December 18 to December 31



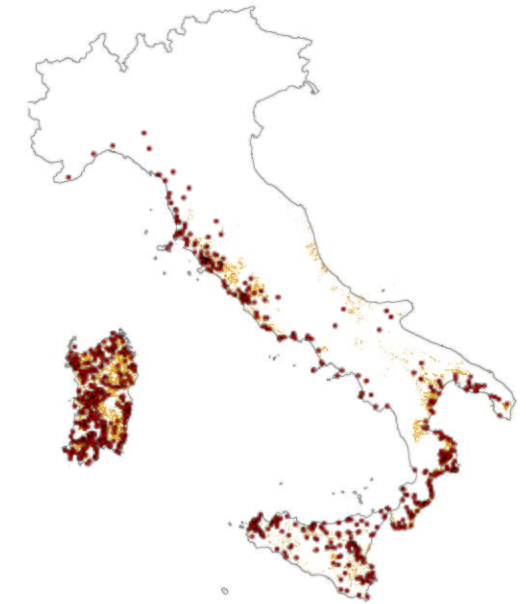


# ECOREGIONALIZATION and vector-borne disease

Is the process through which a territory is classified into similar areas according to specific environmental and climatic factors (e.g., elevation, vegetation, rainfall, temperature)



*C. imicola*

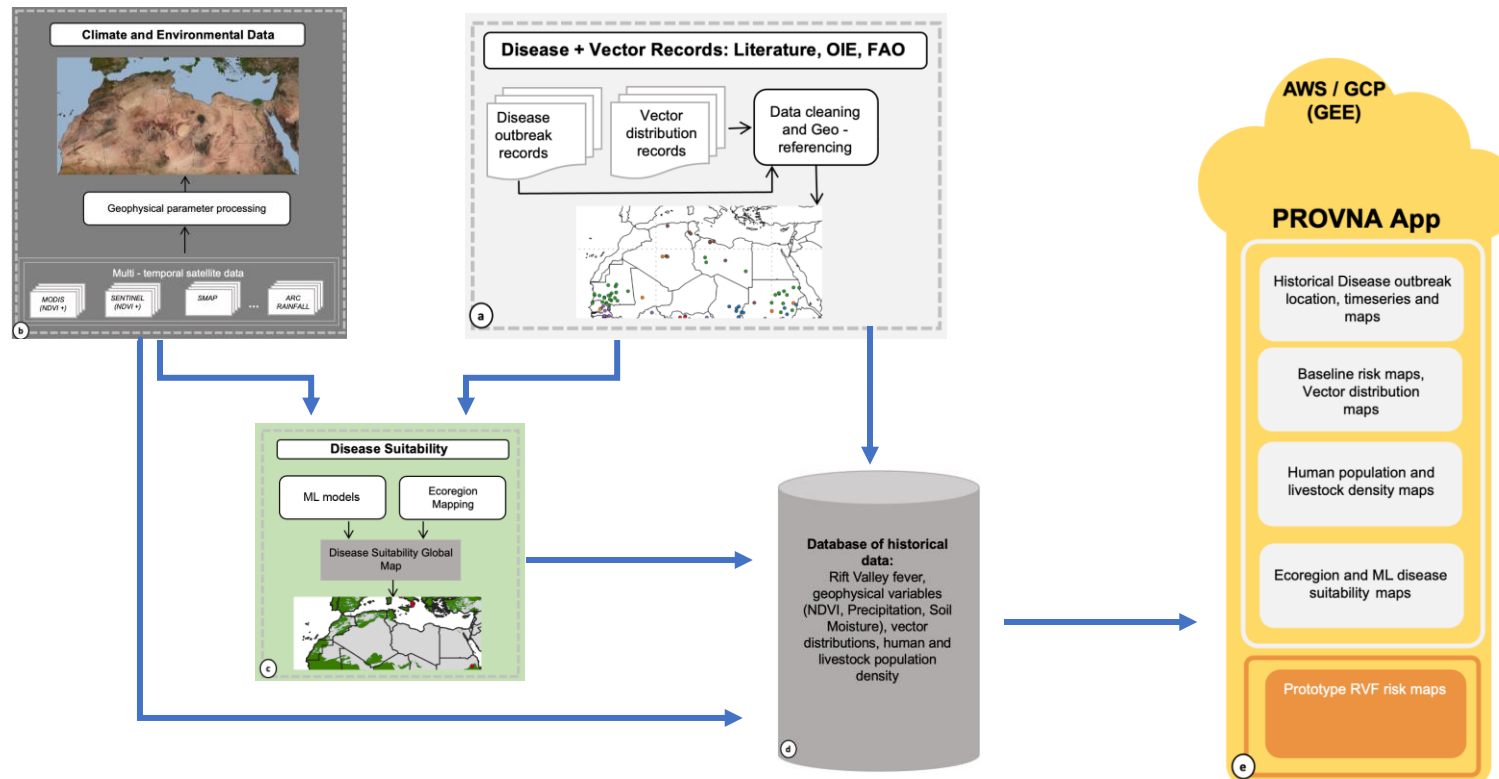




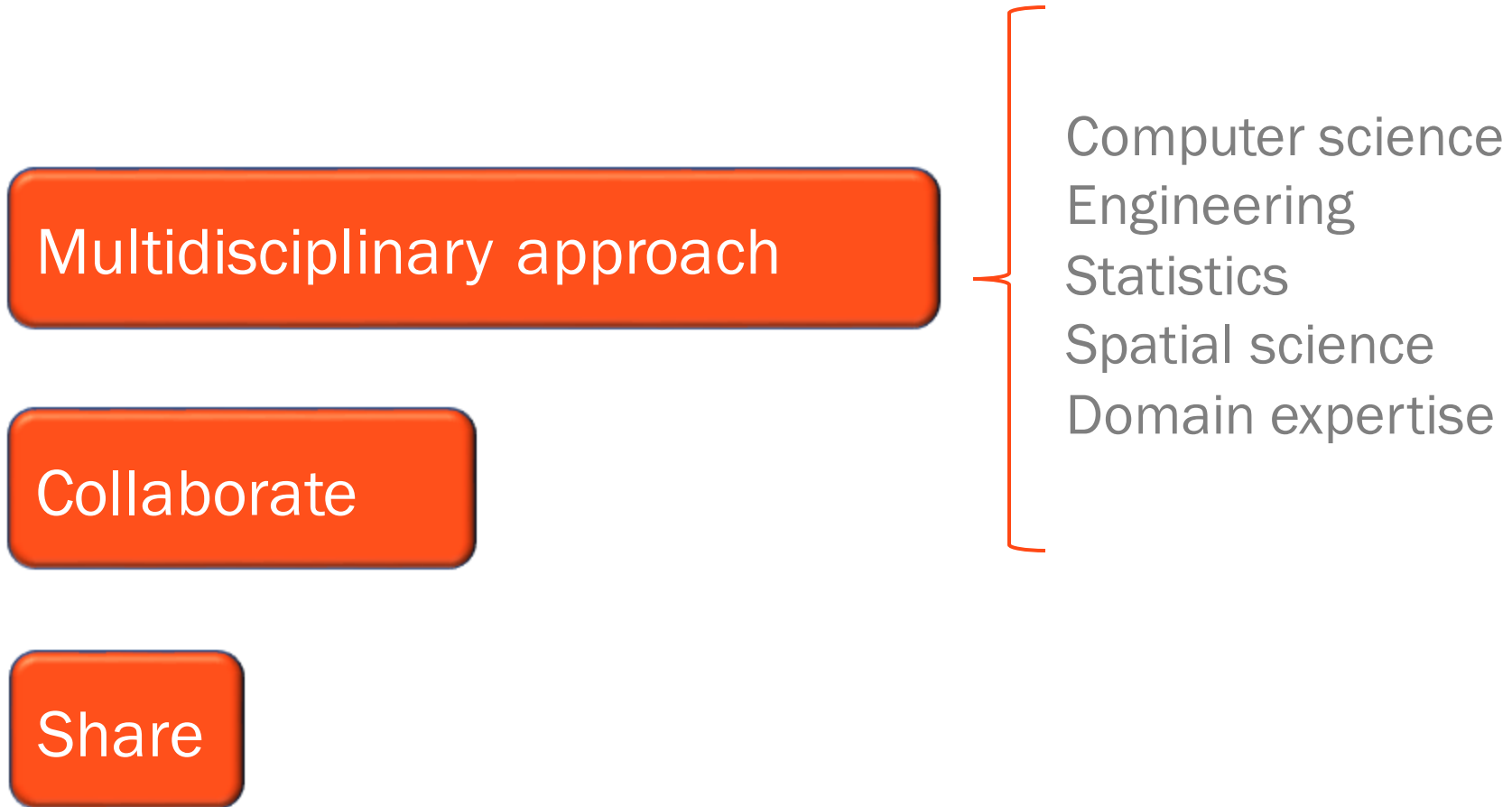
# Defining Ecoregions and Prototyping on EO-based Vector-borne Disease Surveillance System for North Africa - PROVNA project WOAH

Supporting the local competent authorities in North Africa (Mauritania, Morocco, Algeria, Tunisia, Libya and Egypt) in the identification of specific areas on which to carry out entomological/serological surveillance for vector-borne diseases. The disease selected for the first application is Rift Valley Fever.

1. Define ecoregions: similar areas with similar climatic and environmental characteristics
2. To build a customised prototype application (PROVNA) to show areas at risk for RVF in North Africa through a Machine Learning algorithm



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# Thank you

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**This event is supported by funding from:**



Canada 

