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ROUND TABLE ON ONE HEALTH SURVEILLANCE AND CONTROL OF VBDS IN NORTH AFRICA

Introduction to the Round Table discussion.
Outcomes of the "Closing Workshop Phase 2 PROVNA project"

Francesco Valentini, Annamaria Conte
IZS Teramo

Tunis, Tunisia
23-24 april 2026

INTRODUCTION TO THE ROUND TABLE DISCUSSION: BACKGROUND, OBJECTIVES AND METHODOLOGIES

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Round-table on OH surveillance and control of VBDs in North Africa

APRIL 23-24, 2026 TUNIS, TUNISIA

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PROVNA Phase 2 Closing Workshop (21–22 April)

Objective

Formal closure of PROVNA Phase 2: reflection on achievements, consolidation of results, and planning of next steps.

Participants

PROVNA member countries, WOAH, IZS Teramo.

1.Review of Phase II activities

- Presentations by WOAH, IZS Teramo and countries on project implementation and national VBD surveillance.

2.SWOT analysis

- Country working groups to assess strengths, weaknesses, opportunities and threats during implementation.

3.Review of national action plans

- Identification of activities not implemented in 2025 and renewed commitment for the 2026 vector season.

4.Future perspectives

- Discussion on needs and priorities for a potential next phase.

Round Table on One Health Surveillance and control of VBDs in North Africa (23–24 April)

Objective

Align **countries' priorities** with **support provided by partners and donors**.

Participants

North African countries, WOAH, IZS Teramo, technical partners and donors.

Day 1 – Countries & Partners Dialogue

- Countries present **priorities and needs** for VBD surveillance and control (One Health approach)
- Partners present **projects, tools and activities** supporting VBD control
- **Plenary discussion** to match needs and available support

Day 2 – Partner Coordination Meeting

- Donors present **priorities and funding perspectives**
- Partners discuss **follow-up actions and coordination mechanisms**
- Development of a **joint roadmap for collaboration in North Africa**

THE ECOREGIONALISATION APPROACH

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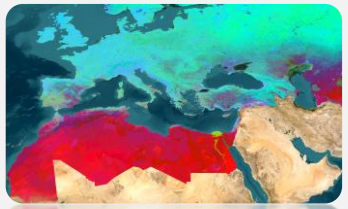
PROVNA1 2022

Identification of ecoregions in NA

PROVNA2 2024

In field activity for validation

PROVBAC 2025



Identification of ecoregions in Balkans +NA

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Ecoregions

Main objective: To define the "**ecoregions**" of the North African territory (Mauritania, Morocco, Algeria, Tunisia, Libya, and Egypt), each one **characterized by distinct environmental and climatic factors.**

Climate and environment strongly influence the presence and distribution of vectors responsible for VBDs

Given the presence of susceptible hosts and competent vectors it can be assumed that areas with similar climatic and environmental conditions (in space and/or time) are *potentially* exposed to similar diseases

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Why Ecoregions?

Identifying **similar** areas does not aim to establish an association between specific vectors and specific environmental conditions, but it seeks to highlight areas **sharing** similar characteristics, in order to *a priori* identify regions where vectors may establish and where vector-borne diseases (VBDs) could potentially spread.

However, ecoregion maps (alone)

- are NOT a risk model
- are NOT an early detection tool
- are NOT specific for a disease

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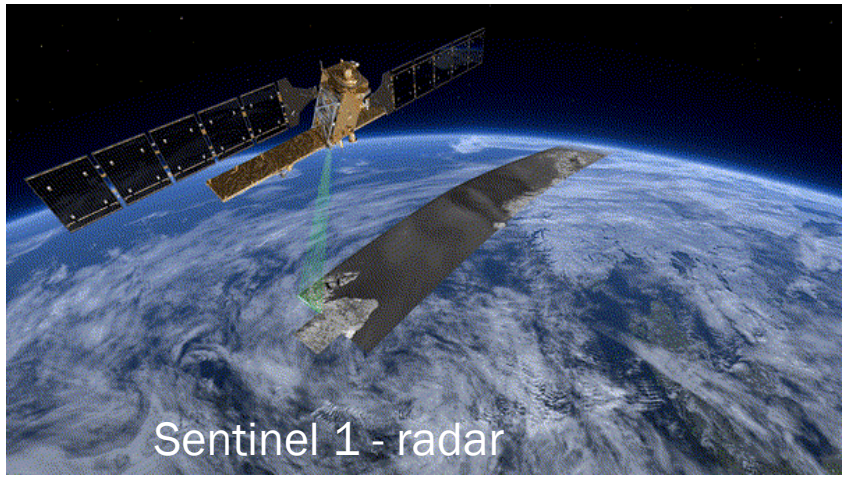
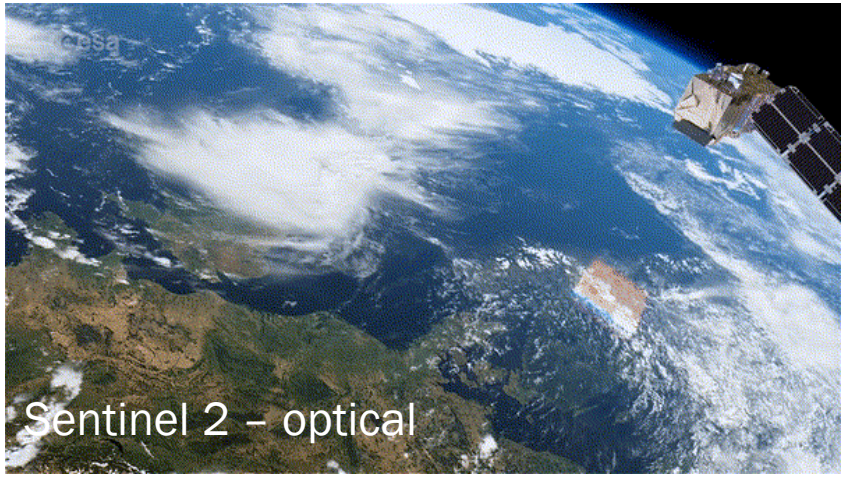
Earth Observation





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 conditions;
- **repeated** coverage to enable detection of changes in features and/or their condition.

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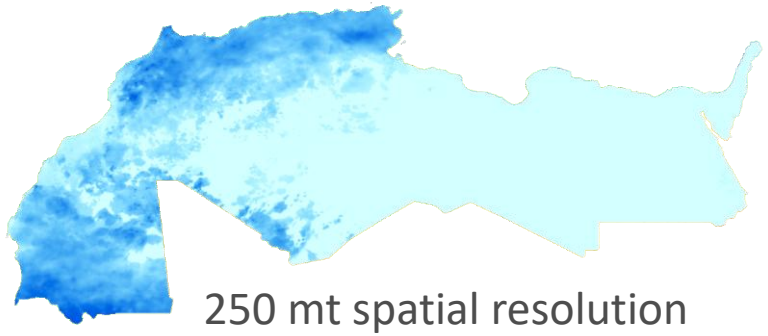
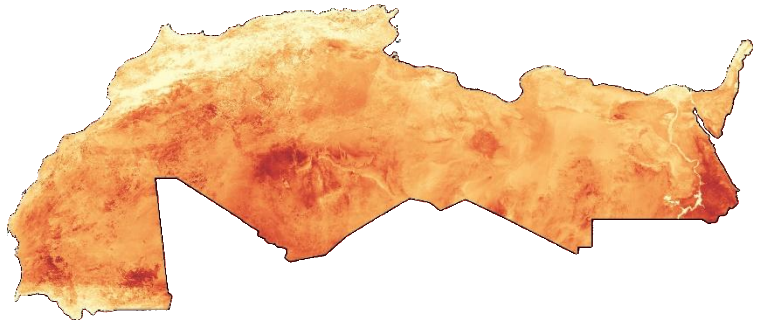
ECOREGIONS IN NORTH AFRICA

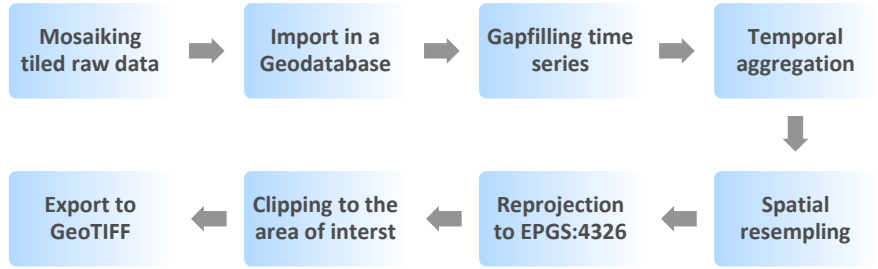
rainfall



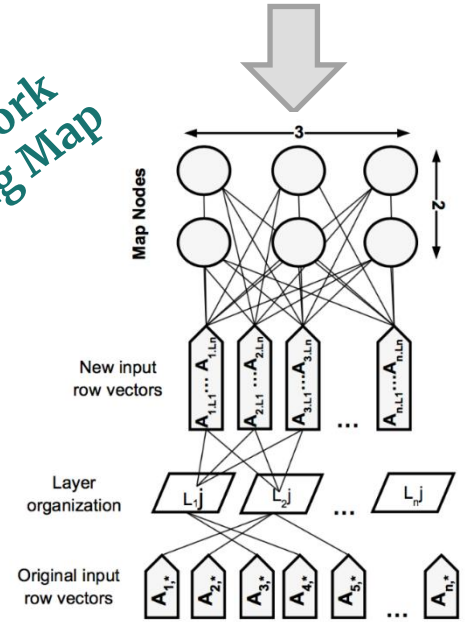
250 mt spatial resolution



16 days temporal resolution



Artificial Neural Network
Super Self-Organising Map



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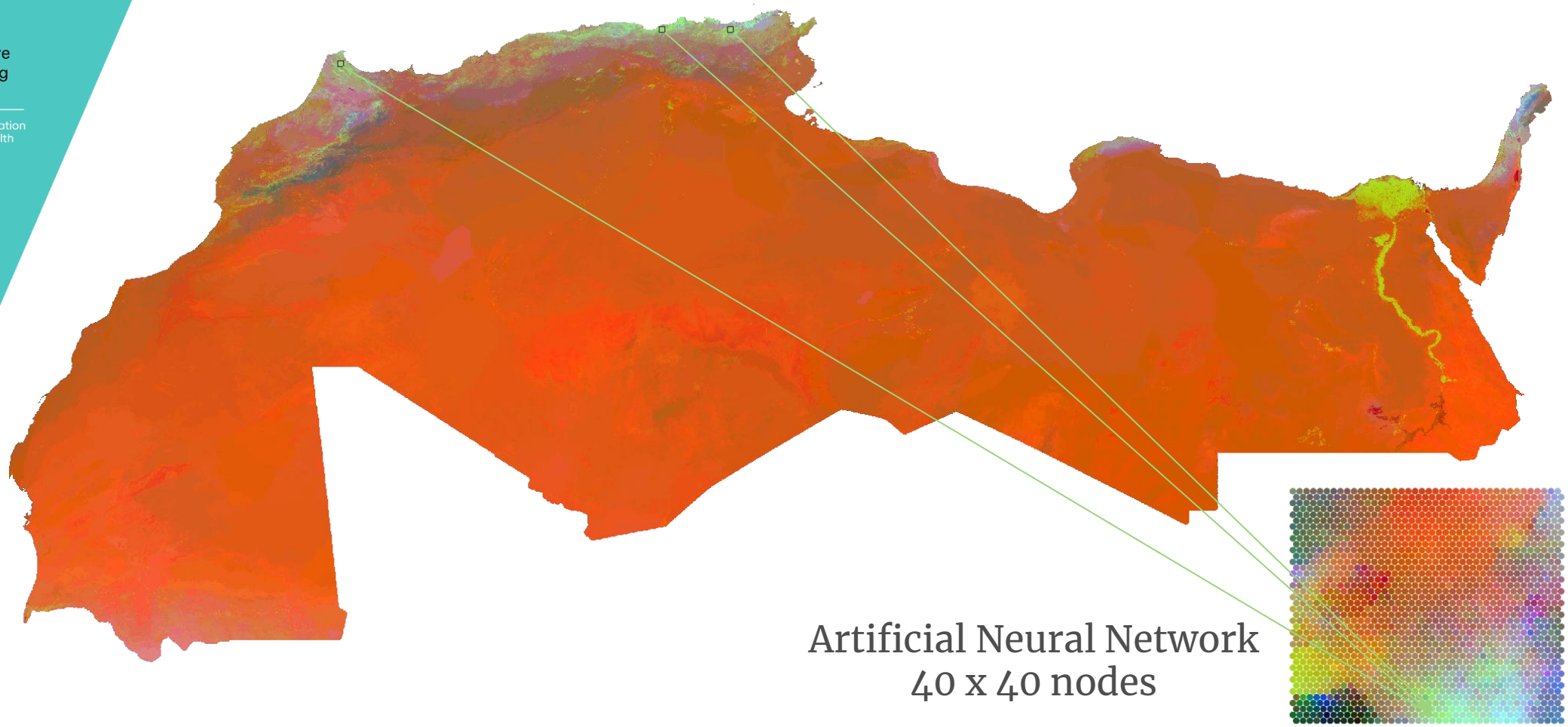
ECOREGIONALIZATION in North Africa
1600 nodes



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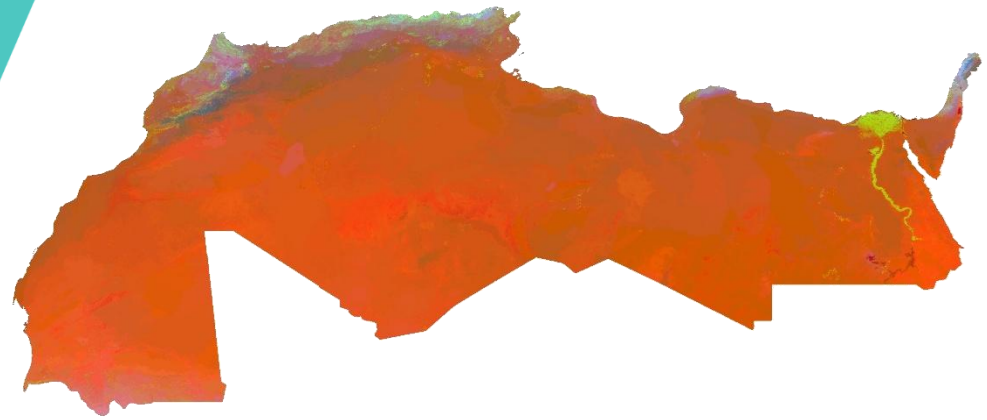
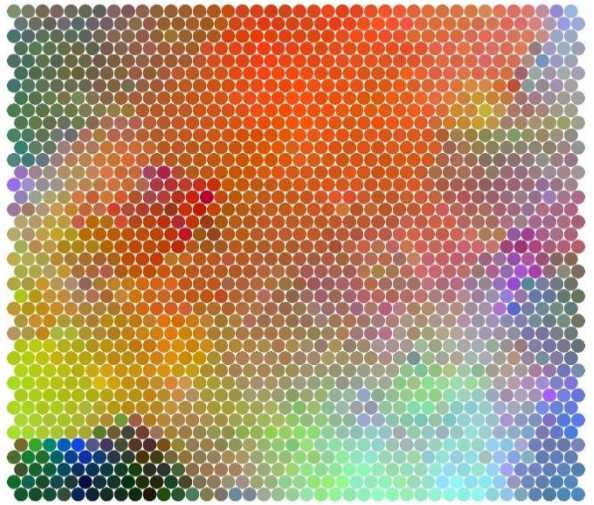
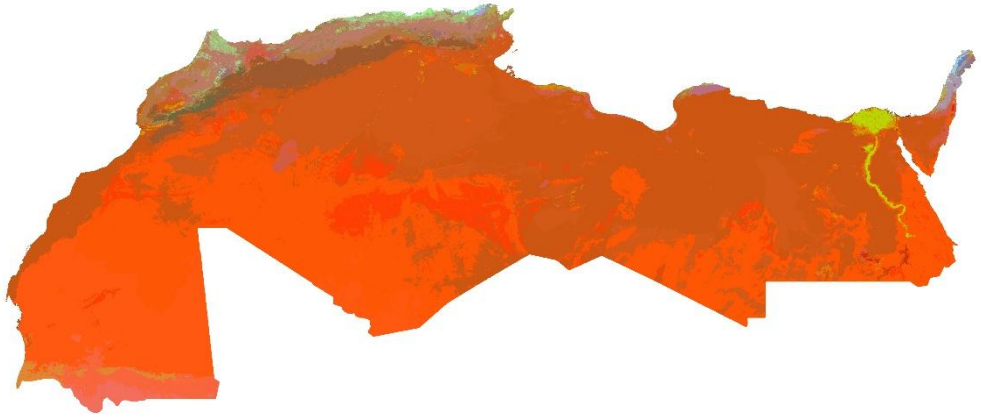
1600 ecoregions

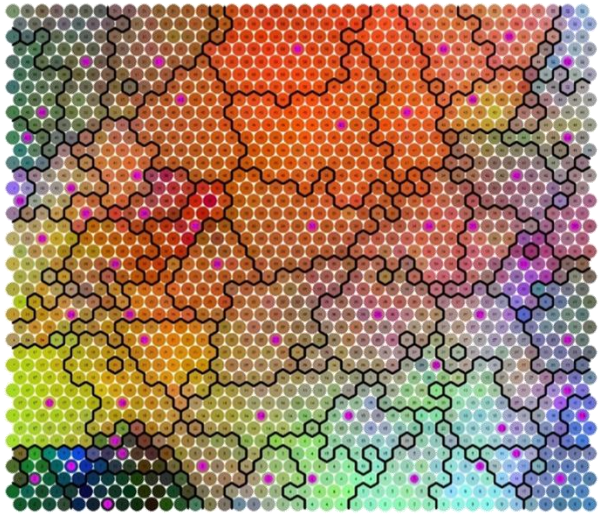




Cluster : Affinity propagation

55 ecoregions





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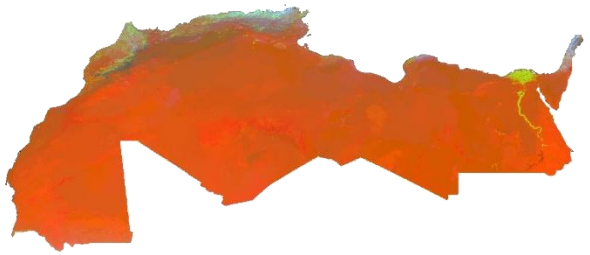
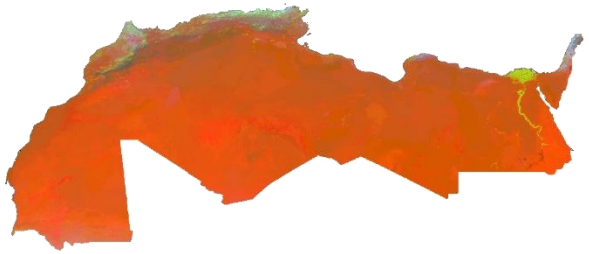
ECORGIONALIZATION in North Africa
One map every year

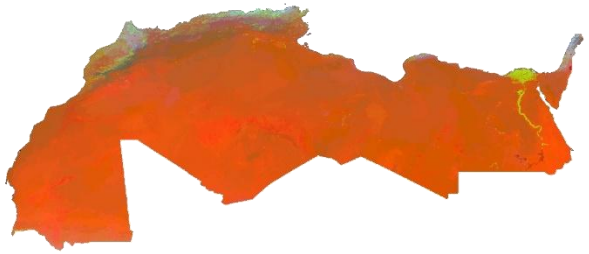
2019



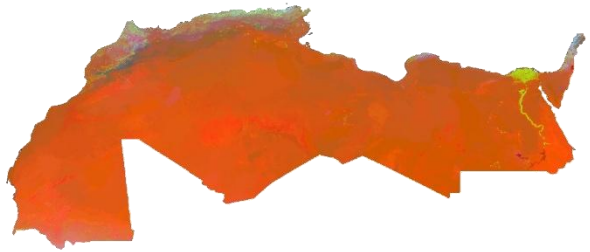
2020



2021



2022



2023

2024

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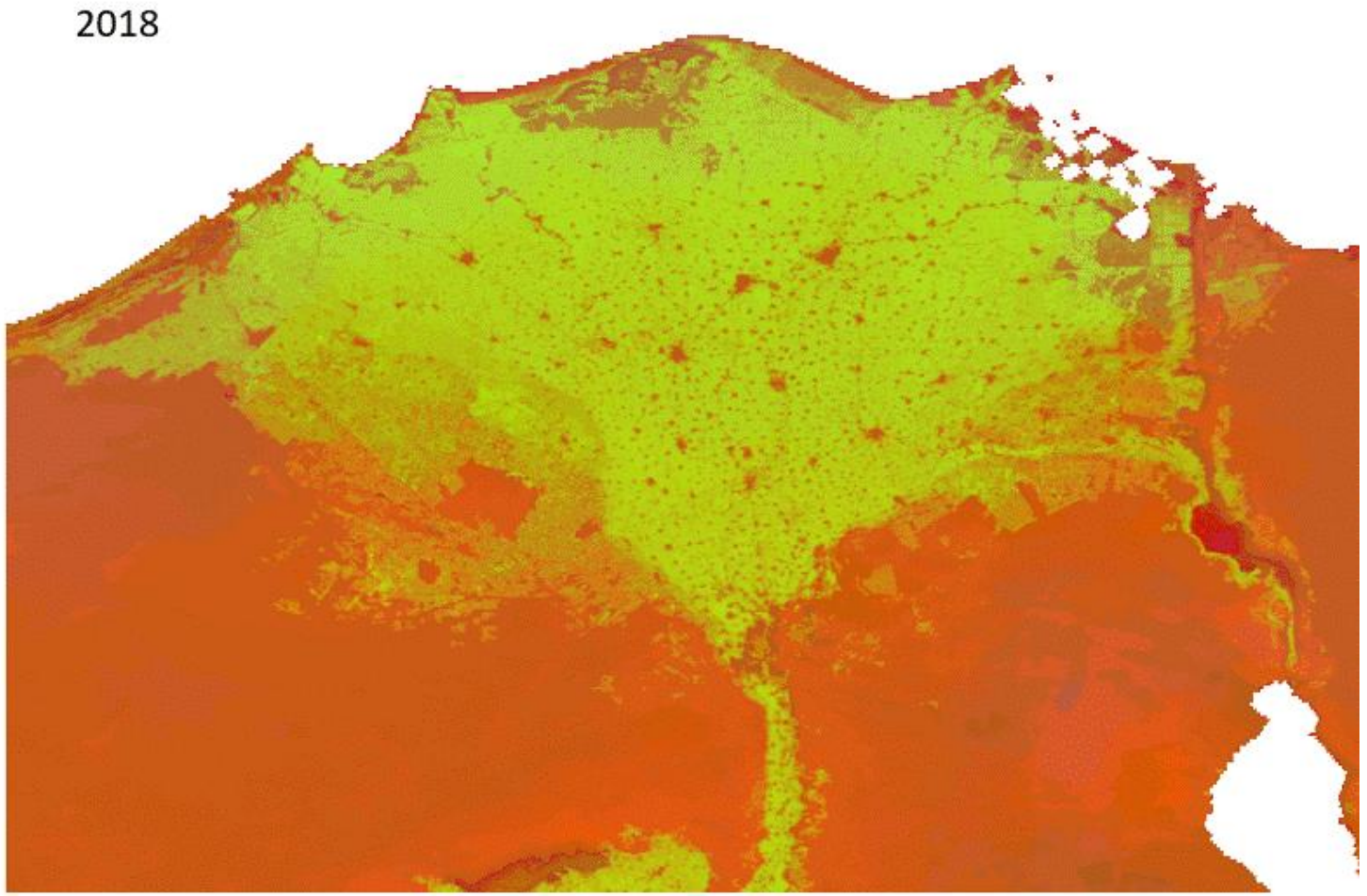
ECORGIONALIZATION in North Africa



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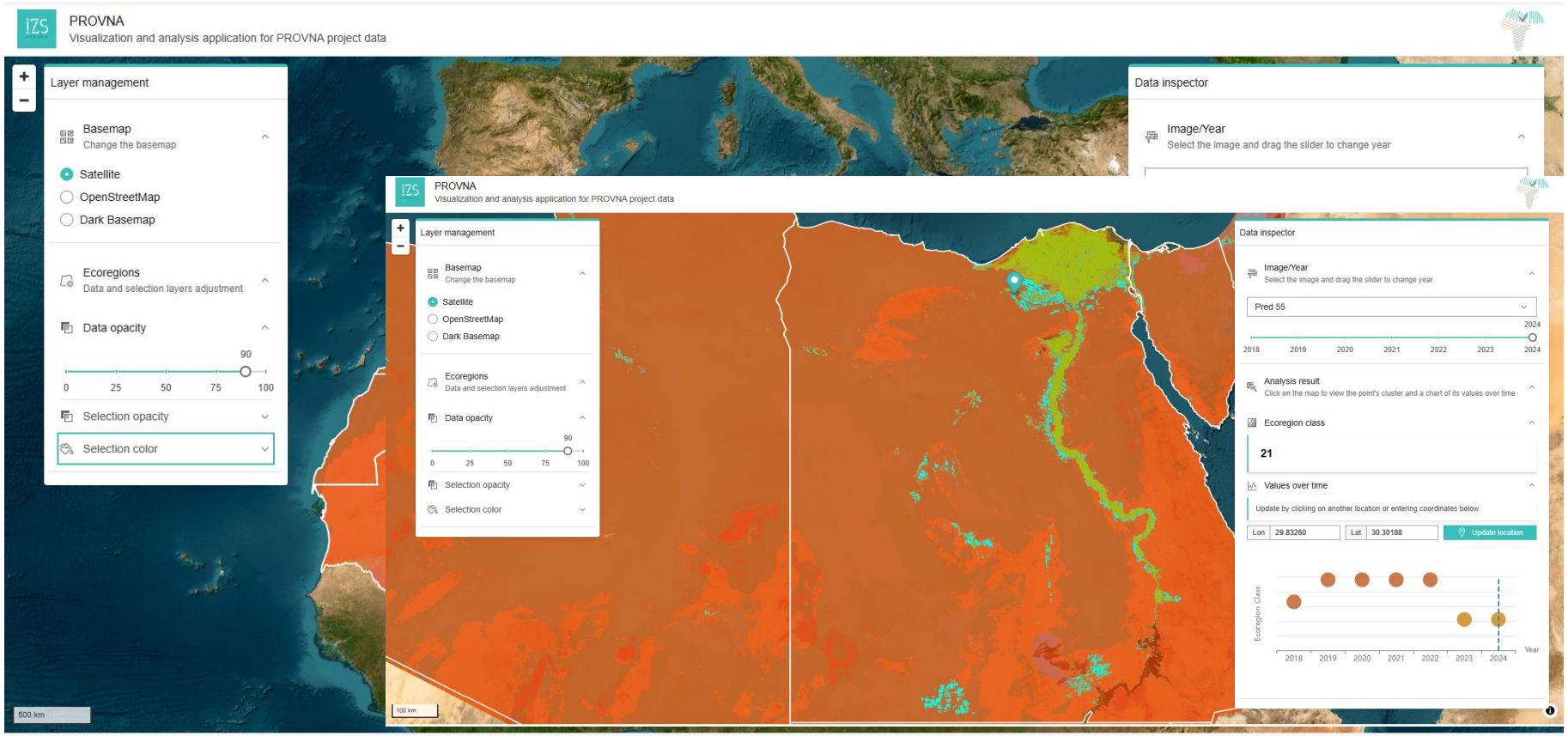
ECOREGIONALIZATION in North Africa

https://mapserver.izs.it/gis_provna_viewer/



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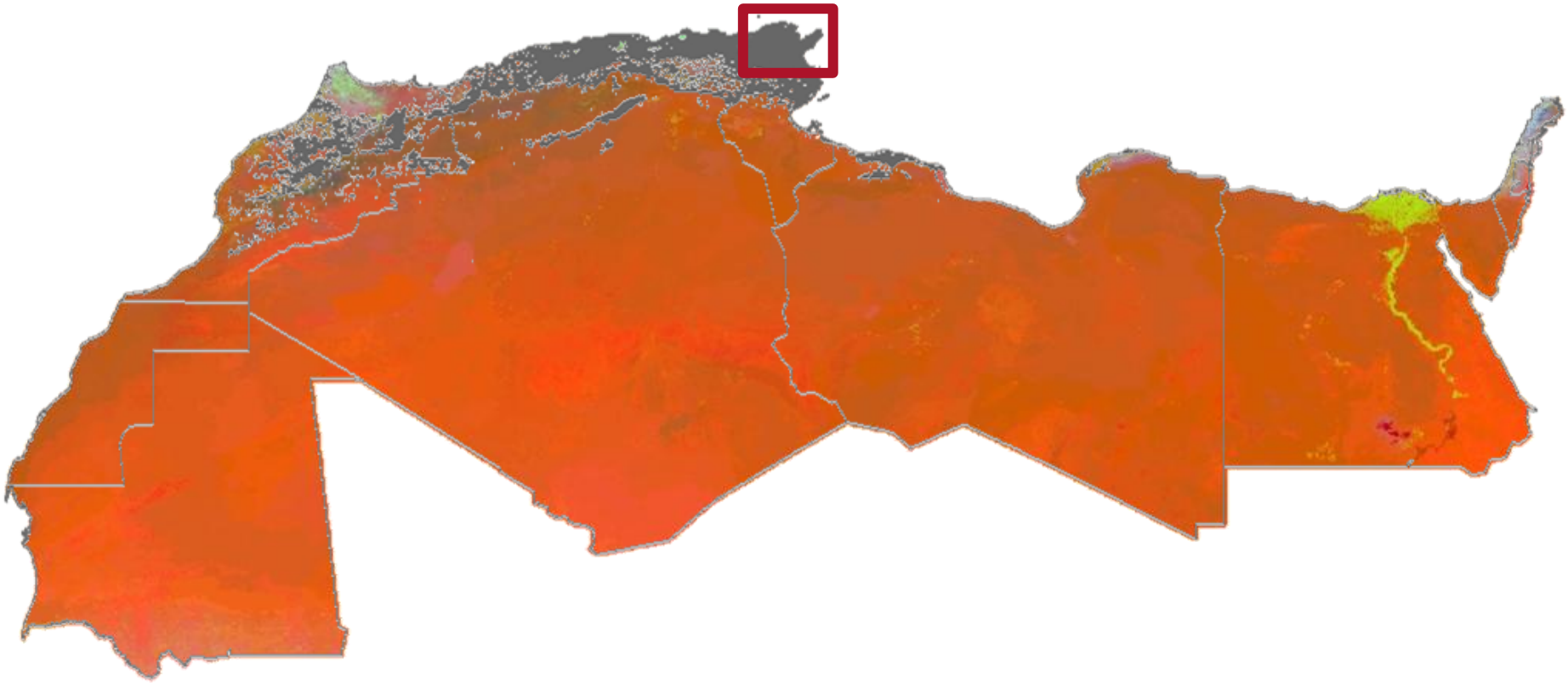
Smilar ecoregions in a defined area



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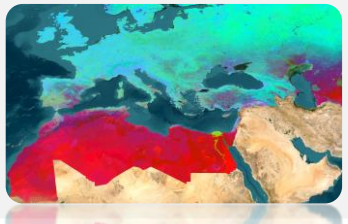

Identification of ecoregions in Balkans +NA

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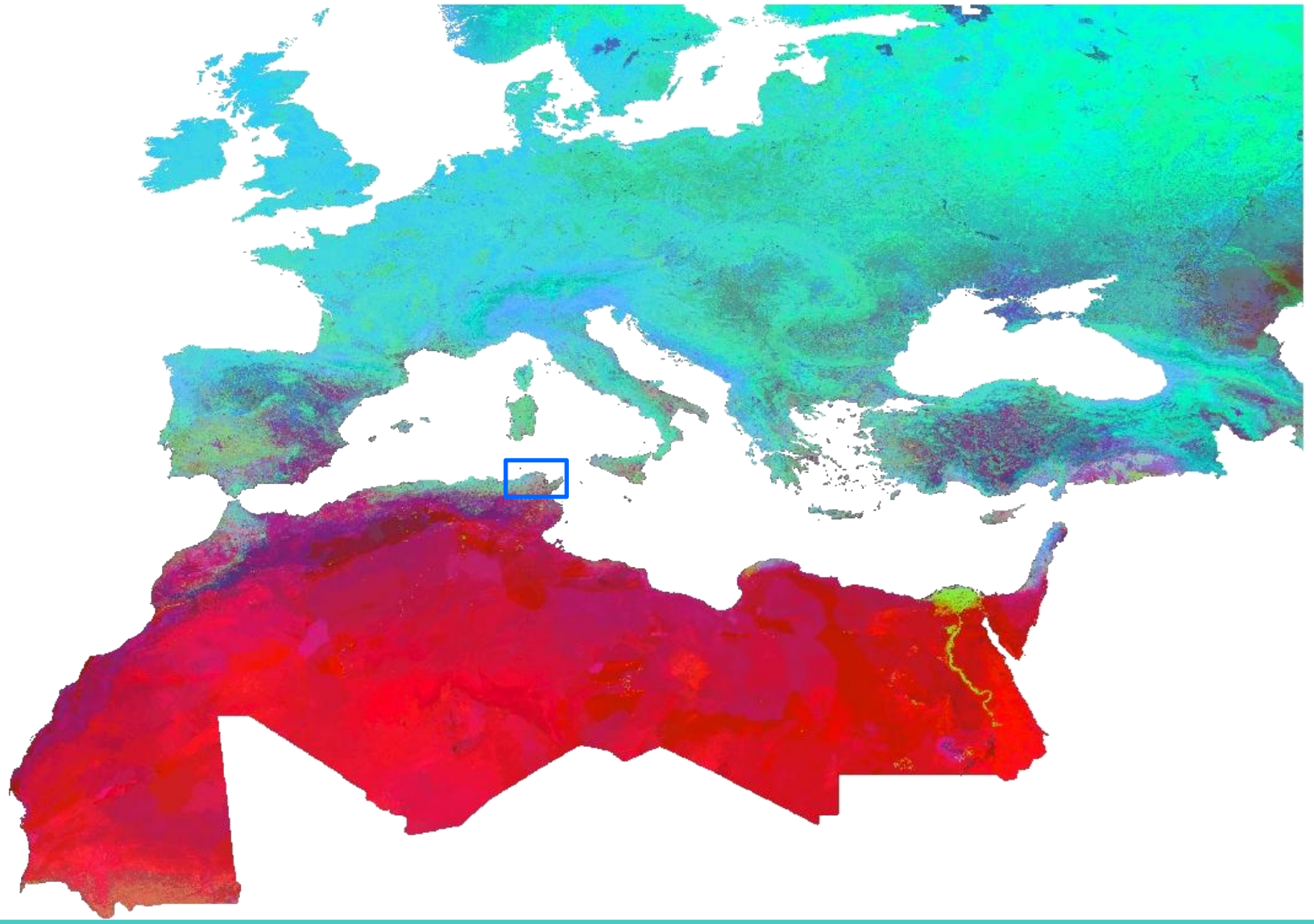
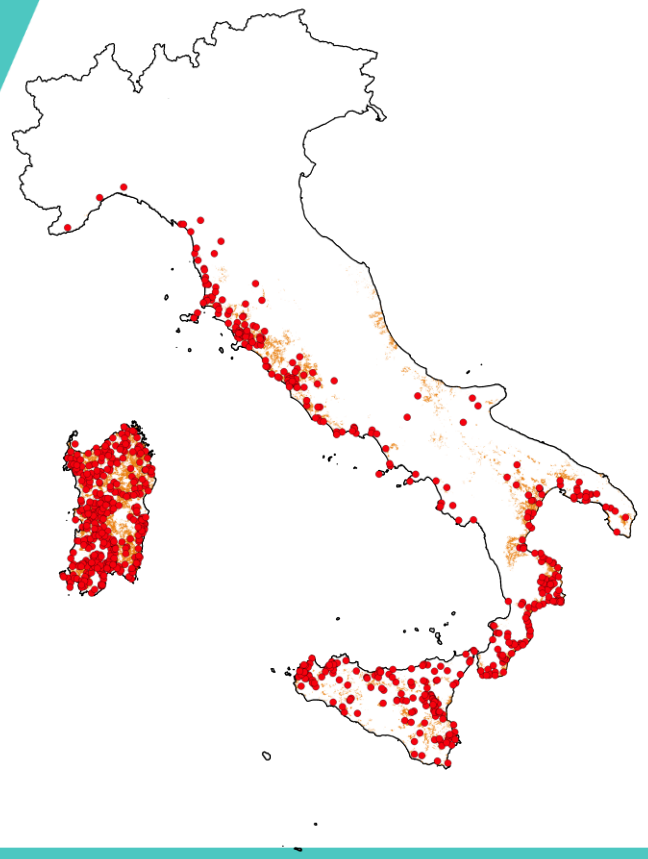
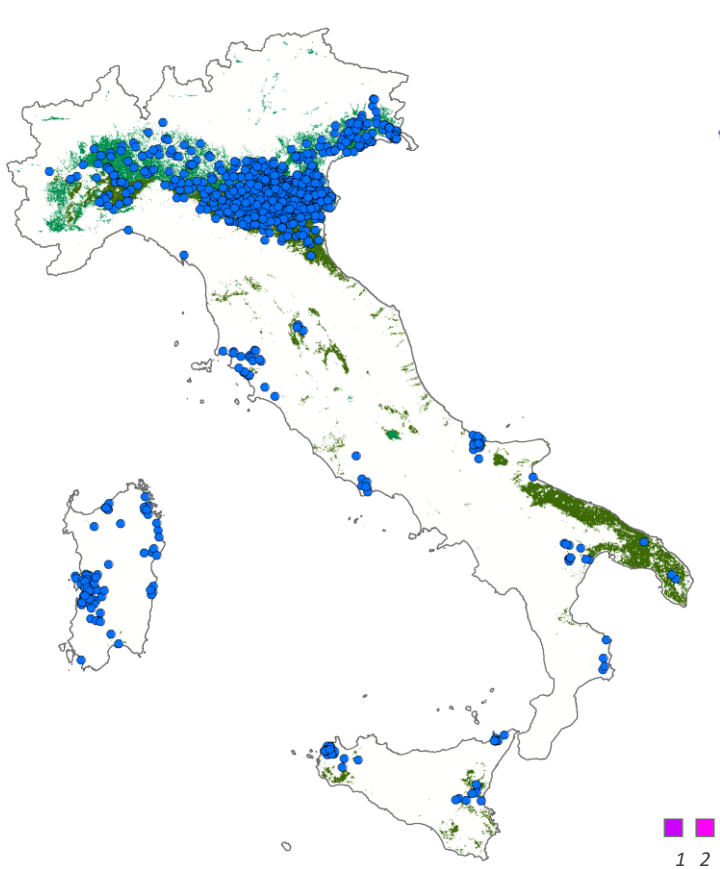


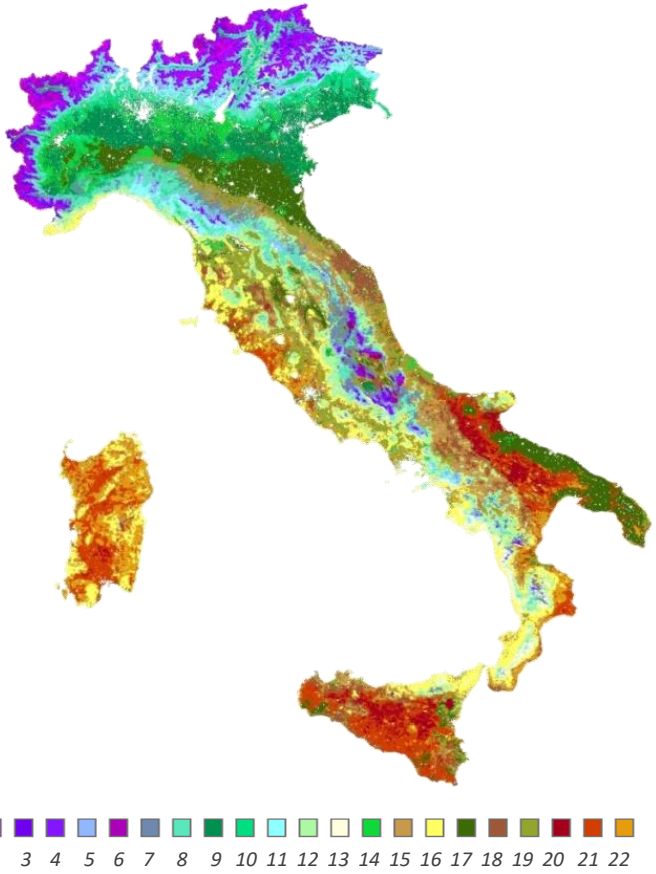
ECOREGIONALIZATION and vector-borne disease

C. imicola



WND cases





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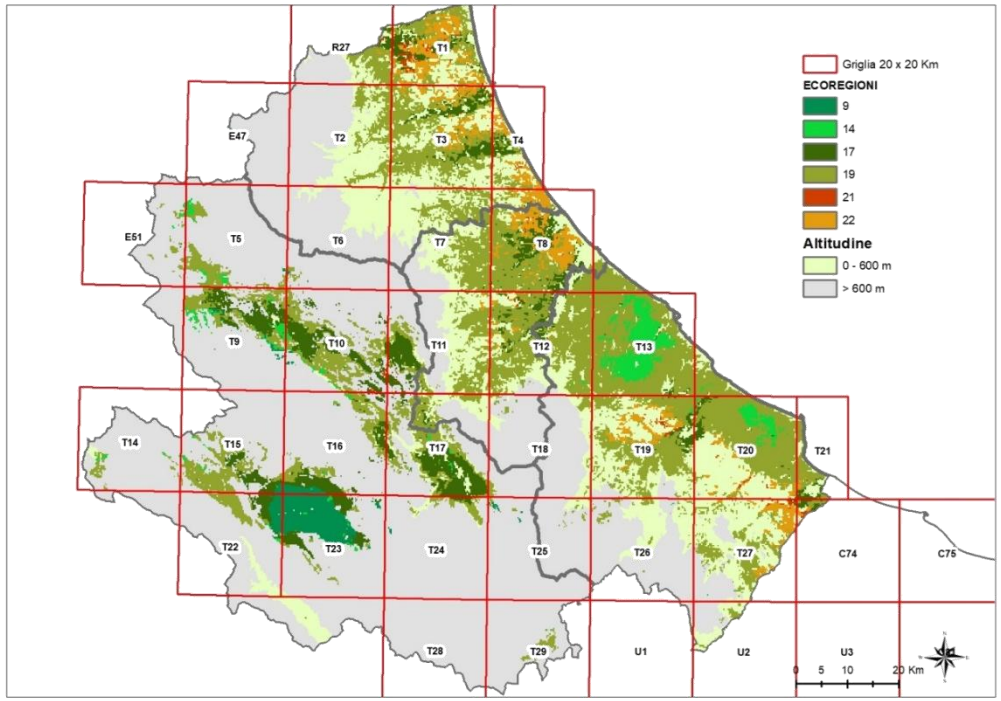
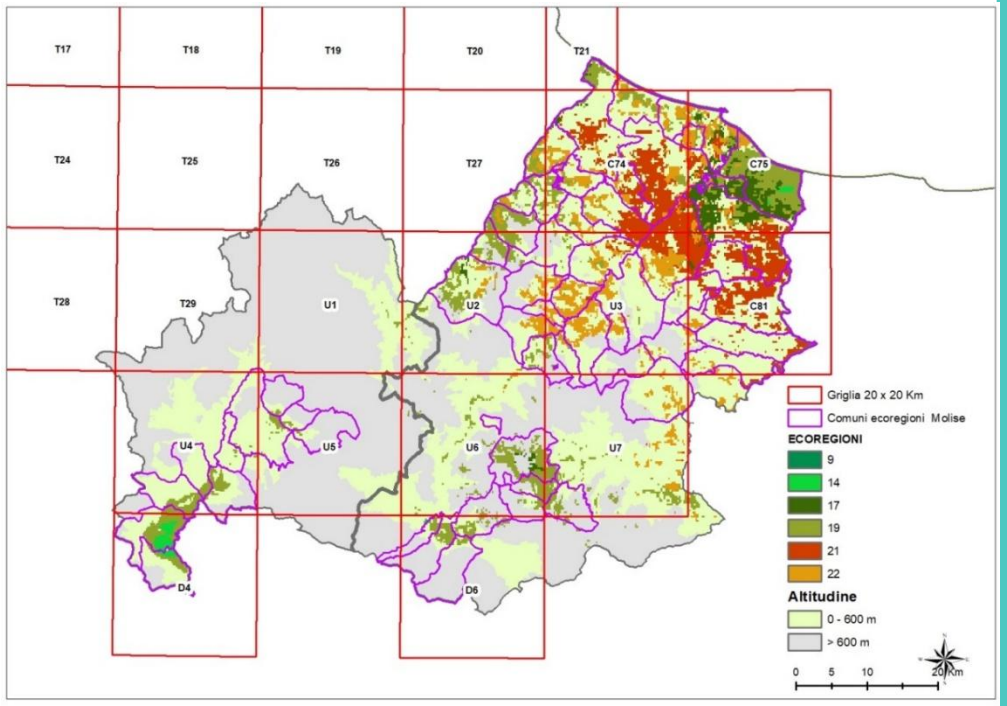
Ecoregions in the Entomological surveillance in the National Vet Surveillance plan





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Overview and objectives – "phase 2"

START: September 2024
END: May 2026
Total budget: ≈ 400.000 USD

General objective:

To establish a risk-based surveillance system across North Africa, using the eco-regionalization method, to monitor the emergence and spread of key animal and zoonotic diseases transmitted by mosquitoes.

RVF

Specific objectives:

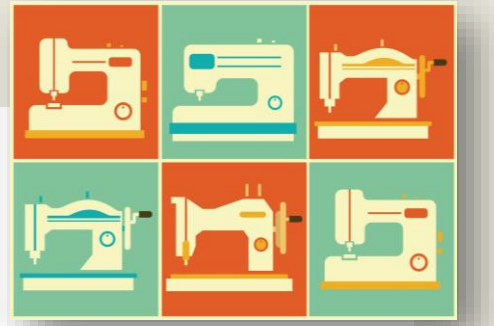
- To strengthen the capacity of National Veterinary Authorities in North Africa for monitoring mosquito-borne diseases.
- To develop standardised protocols for the diagnosis and surveillance at national level of mosquito-borne diseases in North African countries.
- To promote the use of a risk-based approach in the surveillance of mosquito-borne diseases in North Africa.
- To provide the National Veterinary Authorities of North African countries with decision-support tools capable of integrating satellite data characterising the various eco-regions with data collected through in- field surveillance activities.

Project activities will be carried out by 6 work packages :

- WP0 - Coordination, networking, dissemination
- WP1 - Gap analysis and needs assessment
- WP2 - Definition of surveillance protocols
- WP3 - Capacity building activities
- WP4 - In-field monitoring
- WP5 - Modelling

➢ Country-specific on-field surveillance activities

- Entomological/Serological
- Disease present/absent



PROVNA 2

Libya

Draft 1

Surveillance programme and diagnostic protocols

Index

➢ Material

- Mosquito traps ✅
- Laboratory reagents
- Samples shipment

➢ SOPs (EN, FR, AR)

Vector collection and traps specifications

DESCRIPTION OF BG-PRO TRAP

This trap model can be used in two modalities (styles) according to the target:

BG-Sentinel Style: collection of host-seeking adult female mosquitoes, especially anthropophilic species such as *Aedes aegypti* or *Ae. albopictus*. The trap should be positioned on the ground or at maximum 50 cm from the ground.

CDC Style: collection of host-seeking adult female mosquitoes, especially nocturnal species such as *Culex sp.* or floodwater mosquitoes such as *Aedes vexans* or *Ae. caspius*. The trap should be positioned approximately 150 cm from the ground.

Please, for the trap assembling read the "Manual-BG-PRO-web.pdf", which is available at the following link:

https://eu.biogents.com/telechargements/?lang=fr

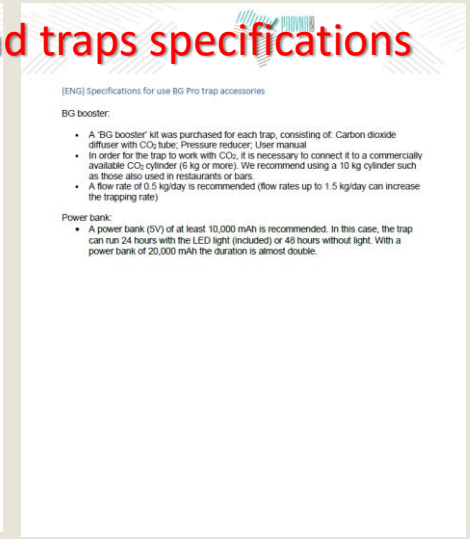
Carrying bag contents:

- The LED light
- The handle/hanger
- One funnel net and two catch bags.
- The trap body.
- The intake funnel
- The inner cylinder.
- Two cables: one for the power bank and the other for the standard battery
- Rainshield + screws
- Tripod

Contents

Additional accessories:

- Outdoor Power Supply
- BG mozzibait
- BG booster



[ENG] Specifications for use BG Pro trap accessories

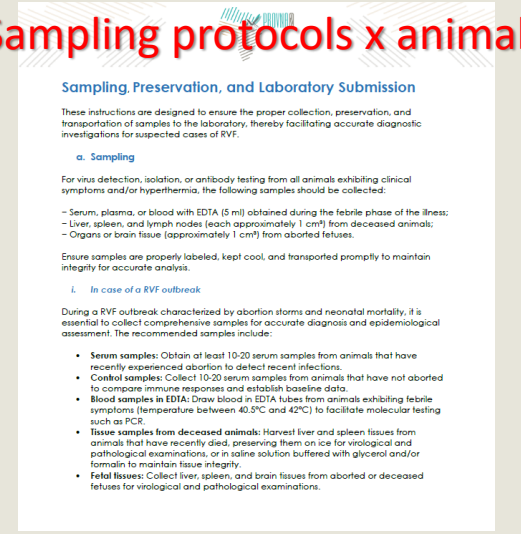
BG booster:

- A 'BG booster' kit was purchased for each trap, consisting of: Carbon dioxide diffuser with CO_2 tube; Pressure reducer; User manual
- In order for the trap to work with CO_2, it is necessary to connect it to a commercially available CO_2 cylinder (6 kg or more). We recommend using a 10 kg cylinder such as those also used in restaurants or bars.
- A flow rate of 0,5 kg/day is recommended (flow rates up to 1.5 kg/day can increase the trapping rate)

Power bank:

- A power bank (5V) of at least 10,000 mAh is recommended. In this case, the trap can run 24 hours with the LED light (included) or 48 hours without light. With a power bank of 20,000 mAh the duration is almost double.

Sampling protocols x animals



Sampling, Preservation, and Laboratory Submission

These instructions are designed to ensure the proper collection, preservation, and transportation of samples to the laboratory, thereby facilitating accurate diagnostic investigations for suspected cases of RVF.

a. Sampling

For virus detection, isolation, or antibody testing from all animals exhibiting clinical symptoms and/or hyperthermia, the following samples should be collected:

– Serum, plasma, or blood with EDTA (5 ml) obtained during the febrile phase of the illness;
– Liver, spleen, and lymph nodes (each approximately 1 cm³) from deceased animals;
– Organs or brain tissue (approximately 1 cm³) from aborted fetuses.

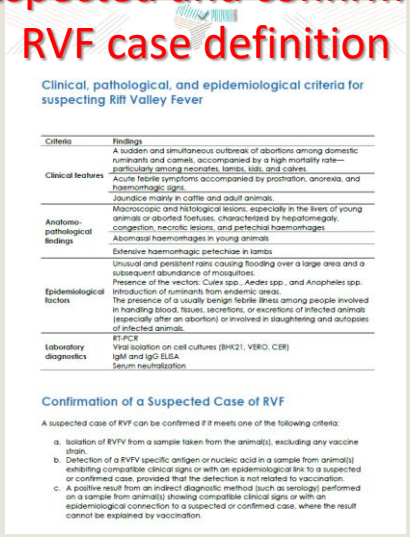
Ensure samples are properly labeled, kept cool, and transported promptly to maintain integrity for accurate analysis.

i. *In case of a RVF outbreak*

During a RVF outbreak characterized by abortion storms and neonatal mortality, it is essential to collect comprehensive samples for accurate diagnosis and epidemiological assessment. The recommended samples include:

- **Serum samples:** Obtain at least 10-20 serum samples from animals that have recently experienced abortion to detect recent infections.
- **Control samples:** Collect 10-20 serum samples from animals that have not aborted to compare immune responses and establish baseline data.
- **Blood samples in EDTA:** Draw blood in EDTA tubes from animals exhibiting febrile symptoms (temperature between 40.5°C and 42°C) to facilitate molecular testing such as PCR.
- **Tissue samples from deceased animals:** Harvest liver and spleen tissues from animals that have recently died, preserving them on ice for virological and pathological examinations, or in saline solution buffered with glycerol and/or formalin to maintain tissue integrity.
- **Fetal tissues:** Collect liver, spleen, and brain tissues from aborted or deceased fetuses for virological and pathological examinations.

Suspected and confirmed RVF case definition



Clinical, pathological, and epidemiological criteria for suspecting Rift Valley Fever

Criteria	Findings
Clinical features	A sudden and simultaneous outbreak of abortions among domestic ruminants and camels, accompanied by a high mortality rate—particularly among neonates, lambs, kids, and calves.
	Acute febrile symptoms accompanied by prostration, anorexia, and haemorrhagic signs.
	Jaundice mainly in cattle and adult animals.
Anatomo-pathological findings	Macroscopic and histological lesions, especially in the livers of young animals or aborted foetuses, characterised by hepatomegaly, congestion, necrotic lesions, and petechial haemorrhages.
	Abomasal haemorrhages in young animals
	Extensive haemorrhagic petechiae in lambs
Epidemiological factors	Unusual and persistent rains causing flooding over a large area and a subsequent abundance of mosquitoes. Presence of the vectors: *Culex* spp., *Aedes* spp., and Anopheles spp. Introduction of ruminants from endemic areas. The presence of a usually benign febrile illness among people involved in handling blood, tissues, secretions, or excretions of infected animals (especially after an abortion) or involved in slaughtering and autopsies of infected animals.
Laboratory diagnostics	RT-PCR Viral isolation on cell cultures (BHK21, VERO, CER) IgM and IgG ELISA Serum neutralization

Confirmation of a Suspected Case of RVF

A suspected case of RVF can be confirmed if it meets one of the following criteria:

a. Isolation of RVFV from a sample taken from the animal(s), excluding any vaccine strain.
b. Detection of a RVFV specific antigen or nucleic acid in a sample from animal(s) exhibiting compatible clinical signs or with an epidemiological link to a suspected or confirmed case, provided that the detection is not related to vaccination.
c. A positive result from an indirect diagnostic method (such as serology) performed on a sample from animal(s) showing compatible clinical signs or with an epidemiological connection to a suspected or confirmed case, where the result cannot be explained by vaccination.

➢ Trainings

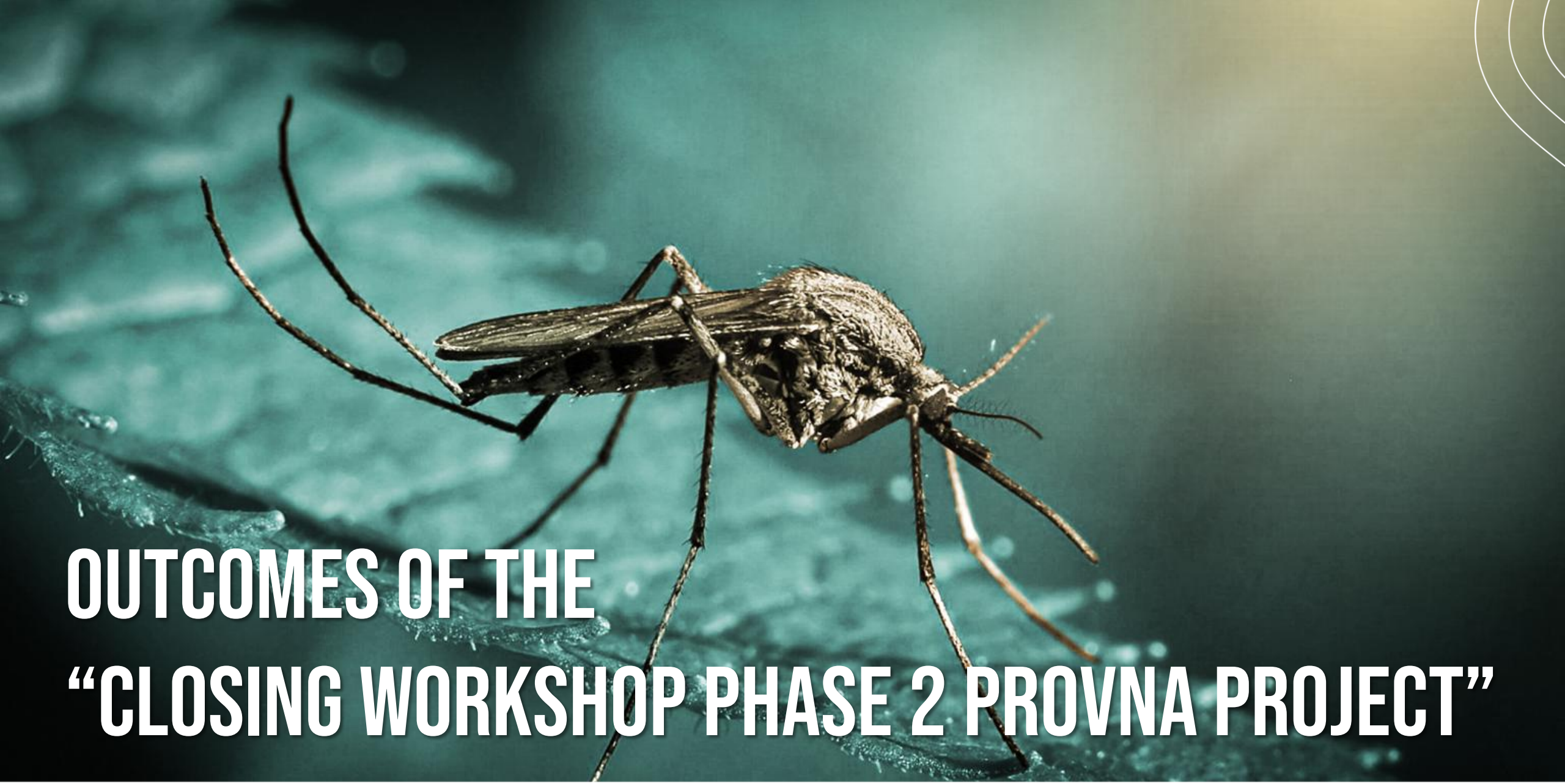
- Online
  1. Epidemiology: use of satellite data ✓
  2. Entomology: sampling/use of traps ✓
  3. Virology:
     - Sequencing ✓
     - Sampling/shipment
- In-person
  1. Epidemiology: GIS ✓
  2. Entomology: analysis of captures / vector identification ✓
  3. Virology: molecular biology on collected samples ✓

Webinars organised during phase 2:

- WOAH hosts first PROVNA 2 webinar on the use of Satellite Data - WOAH - Africa
- WOAH hosts the second PROVNA2 webinar on Entomology – Use of Mosquito traps - WOAH - Africa
- Strengthening genomic surveillance for vector-borne diseases: PROVNA2 hosts its 3rd webinar on Whole Genome Sequencing (WGS) - WOAH - Africa
- WOAH hosts webinar on the new PROVNA Platform - WOAH - Africa

Phase 2 **workshops**:

- Launch of PROVNA 2: Establishment of a Risk-Based Surveillance System for Mosquito-Borne Diseases in North Africa - WOAH - Africa
- Strengthening laboratory capacities for Vector-Borne Disease surveillance in North Africa: two rounds of PROVNA2 training completed in Teramo - WOAH – Africa
- Advancing risk-based surveillance in North Africa: PROVNA2 GIS and epidemiology training held in Teramo – WOAH - Africa



OUTCOMES OF THE "CLOSING WORKSHOP PHASE 2 PROVNA PROJECT"

World Organisation for Animal Health | Organisation mondiale de la santé animale | Organización Mundial de Sanidad Animal

PROVNA2

APHIS

USDA

IZS TERAMO — ISTITUTO ZOOPROFILATTICO SPERIMENTALE DELL'ABRUZZO E DEL MOLISE "G. CAPORALE"

Session 4. Future Perspectives

Objective

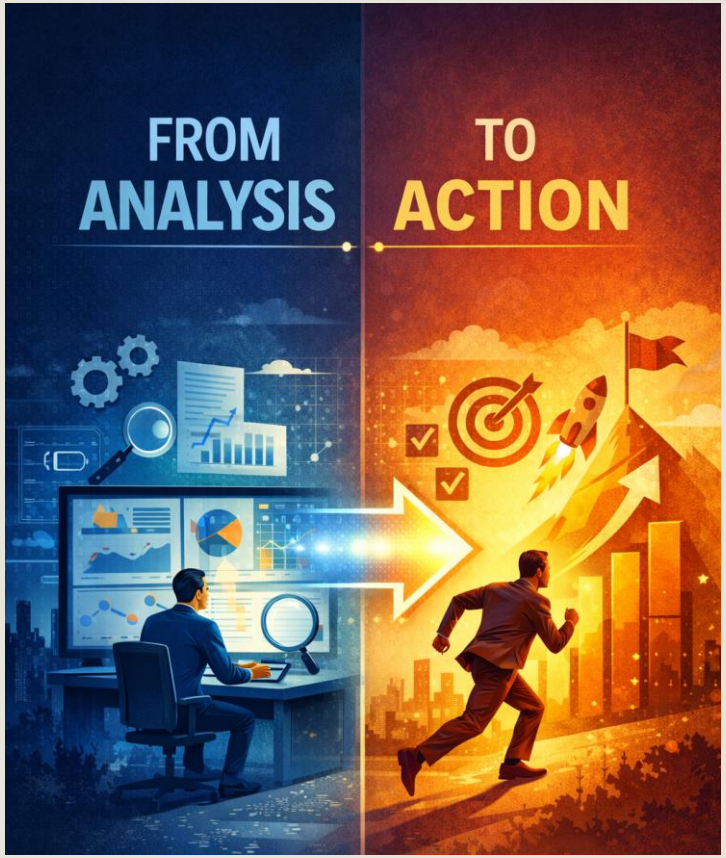
- Identify **priority needs** for a possible next phase
- Define **expected results**
- Agree on **strategic directions and way forward**

Where we came from

- Session 1 → Phase 2 implementation discussion
- Session 2 → SWOT analysis + prioritisation + recommendations
- Session 3 → Review of National Action Plans / “country cards"

👉 *This session built on these results*

Key question:
What should the next phase deliver, if resources are available?



👉 Key Message:

Phase 2 successfully built capacity and technical foundations

Strengths (Internal – Positive):

→ *What worked well? What enabled progress?*

- **Capacity building achieved**

Training in virology, entomology, GIS. Improved human capacities

- **Existing surveillance & control components**

Surveillance systems, Vector control, Quarantine systems

- **Diagnostic capacity**

PCR / serology, entomology

- **Existing lab infrastructure**

Labs already equipped

- **Regional collaboration & workshops**

Knowledge exchange, PROVNA platform

- **Project design & approach**

Clear vision, Innovative ecoregion concept, project's national teams

- **Material and accessories provision**

Entomological traps

👉 Key Message:
Capacity exists, but is not yet fully operationalised

Weaknesses (Internal – Negative)

→ *What challenges or limitations affected implementation?*

- **Gaps in technical skills and their application**
  Entomology, GIS / modelling (ecoregions data), Epidemiology, Sequencing, Gaps
- **Weak or absent entomological surveillance**
  No systems and/or No data
- **Data & mapping gaps**
  No georeferenced data for most VBDs
- **Operational constraints**
  Lack of consumables (CO_2 tanks, dry ice), Procurement delays, Limited field funding.
- **Weak coordination / One Health**
  Limited multi-sector involvement

Opportunities (External – Positive)

→ *What external factors could support or enhance future phases?*

- **Regional & international collaboration**

WOAH, FAO, WHO. Regional cooperation

- **Use of ecoregions & development of risk tools**

Risk mapping, Predictive modelling

- **Expansion to other diseases**

WND, LSD, BT and other VBDs (e.g., AHS, CCHF)

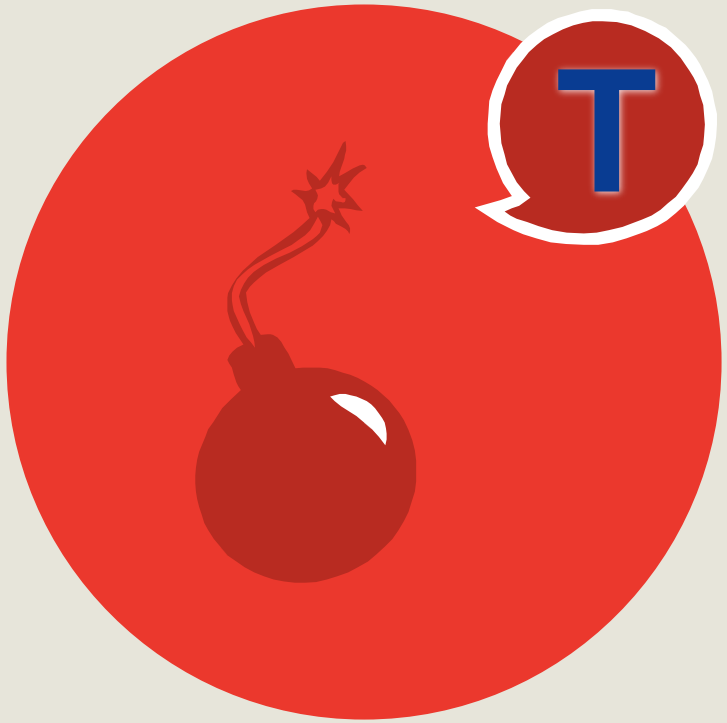
- **One Health momentum**

Favorable policy context

- **Training and research**
- **Mobilise national and international support to strengthen the existing infrastructures**

Periodic renewal and upgrading of equipment, tools, and facilities.

👉 Key Message:
Strong potential to scale up and integrate systems



Threats (External – Negative)

→ *What external risks could hinder progress?*

- **Sustainability & funding**

End of project, Limited funding, resource mobiisation x Phase 3

- **Institutional challenges**

Weak coordination, Administrative constraints

- **Human resources**

Demotivation, Loss of trained staff

👉 Key Message:
Without continuity, gains risk being lost

Recommendation n.1:

Action: …

Why: …

Responsible: …

Expected result: …

1. Capacity Building

- Multiple domains: entomology, GIS-modelling, sequencing-WGS, epidemiology, virology

2. Surveillance and Control Systems

- other VBDs (WND, LSD, BT, etc.). Build on what already exists and develop what is missing

3. Equipment & Operational Capacity

- Equipment, consumables – accessories. Laboratory staff. Research

4. Sustainability & Funding

- Field activities, resource mobilization strategies

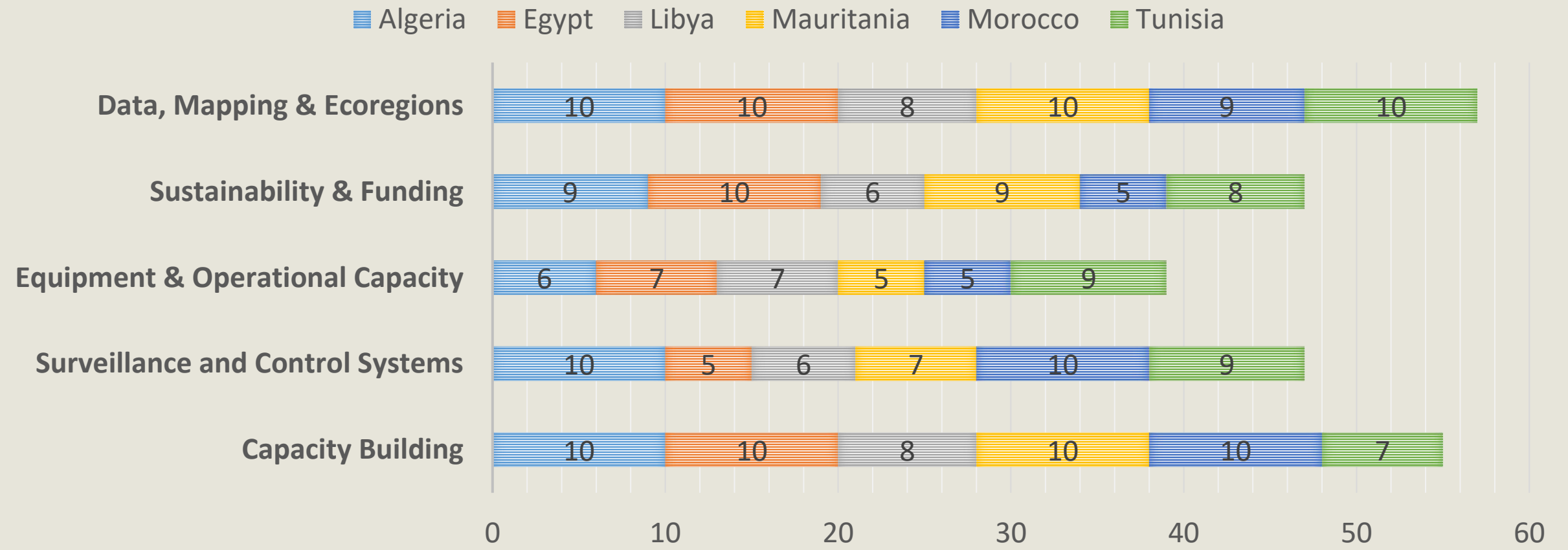
5. Data, Mapping & Ecoregions

- Development of tools integrating ecoregions data. Early warning

6. One Health & Coordination

- Multi-sectoral collaboration – avoid working in silos

CONSOLIDATED RECOMMENDATIONS



all the above-mentioned recommendations should be implemented with a **One Health approach**

Thank you

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Merci beaucoup

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