# Overview of the PROVNA project

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WOAH Sub-Regional Representation for North Africa

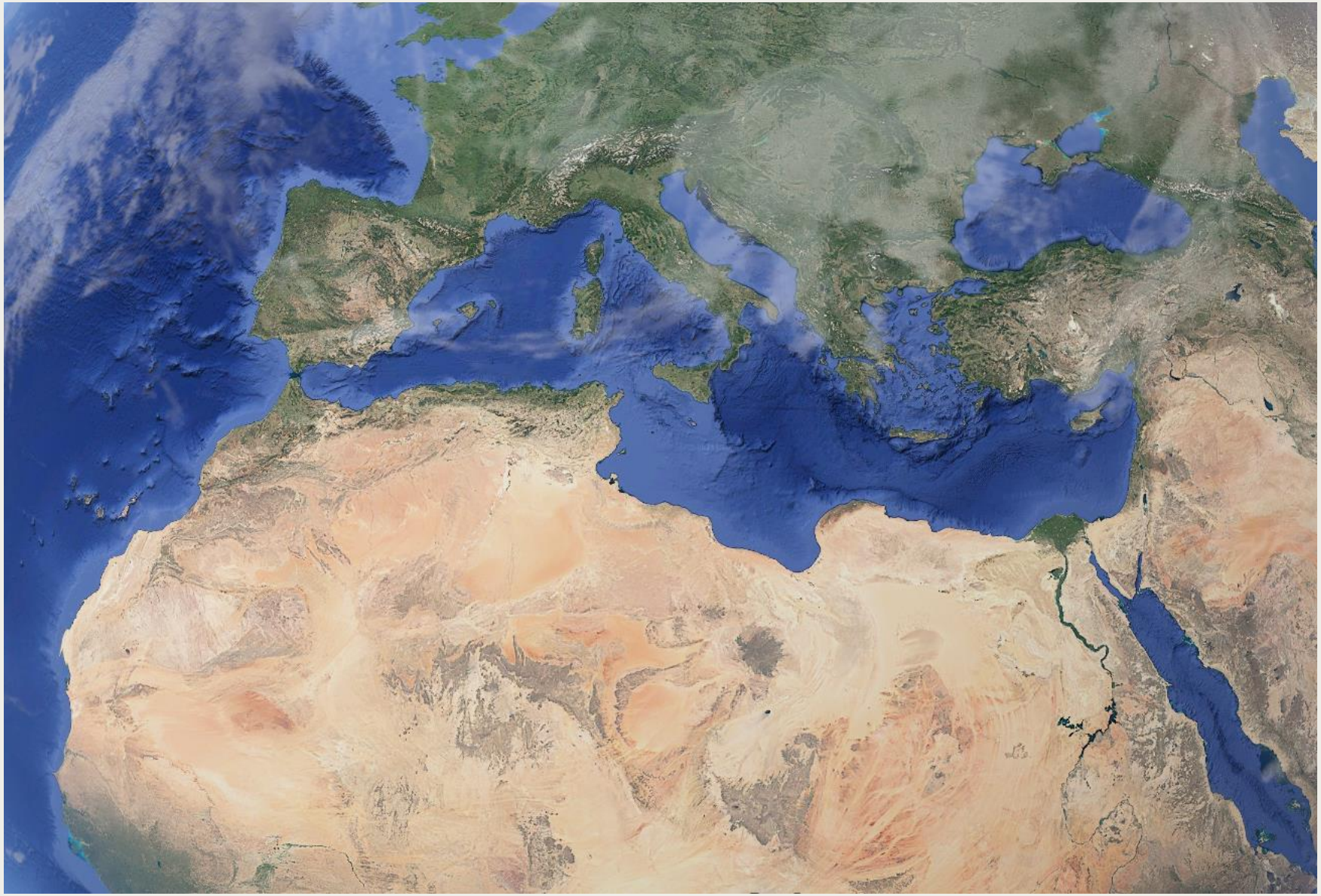
WOAH Webinar on the new PROVNA Platform
"*Ecoregionalisation to support the surveillance and control of Vector Borne Diseases in North Africa, and beyond*"
10 December 2025, online

World Organisation for Animal Health
Founded as OIE

Organisation mondiale de la santé animale
Fondée en tant qu'OIE

Organización Mundial de Sanidad Animal
Fundada como OIE

# The Mediterranean Basin



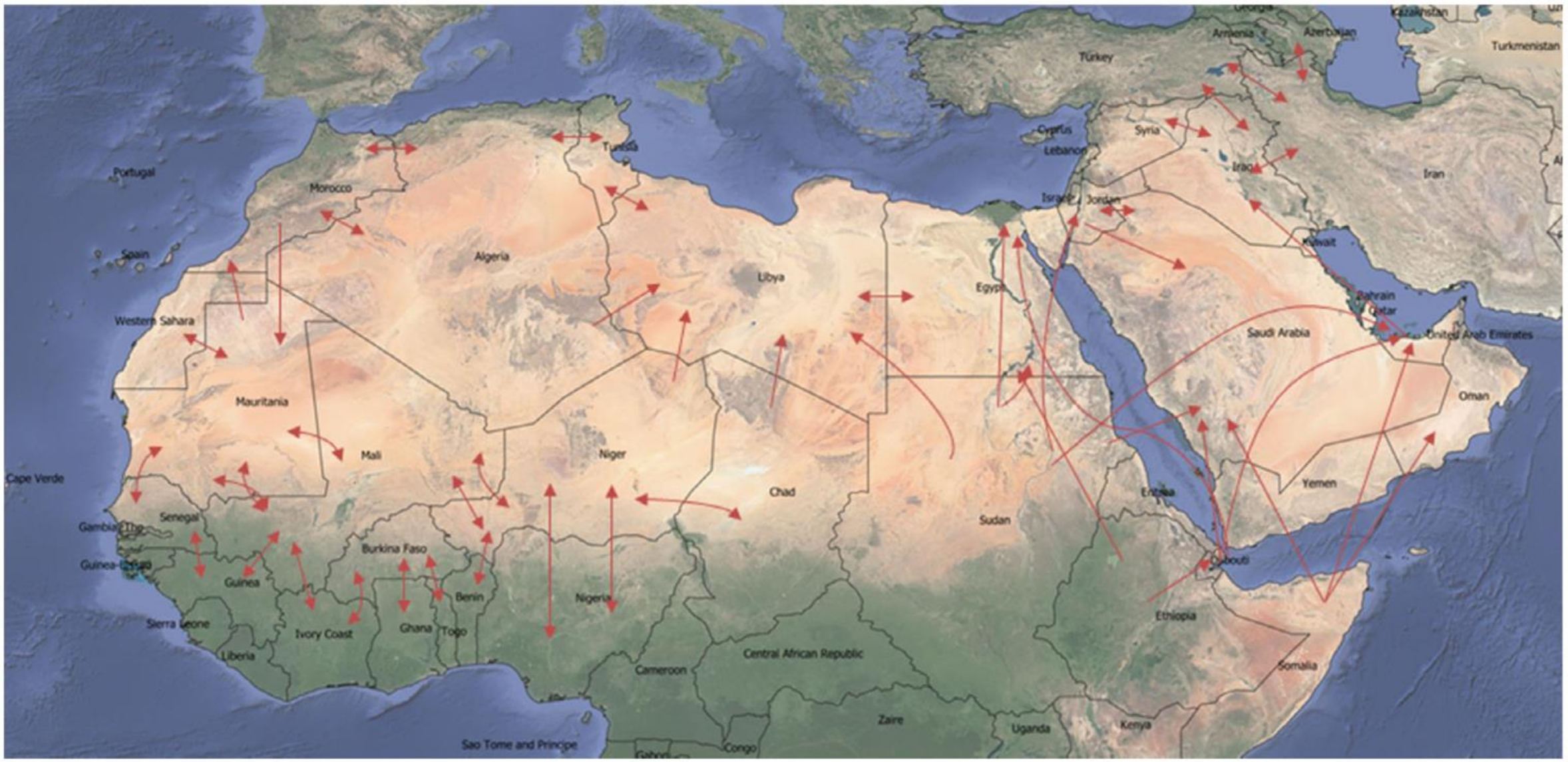
*… is a unique ecosystem*

*… is a strategic political and economic corridor*

*… no longer represents an effective barrier against the introduction of diseases*

# Challenges: Animal Movement






**Principal movement pathways of live ruminants across North African and Middle East countries.**

Adapted from information reported by Bouslikhane (2015), Di Nardo et al., (2011), Bouguedour and Ripani (2016), Jenet et al. (2016)

*Rift Valley Fever–epidemiological update and risk of introduction into Europe.* ***EFSA Journal 2020****;18(3):e06041, 80 pp. https://doi.org/10.2903/j.efsa.2020.6041*

# Challenges: Climate change

The Mediterranean basin is warming faster

than the whole planet

(Annual average temperature compared to pre-industrial temperatures)

*The first-ever study synthesizing risks posed by climate and environmental changes in the Mediterranean*

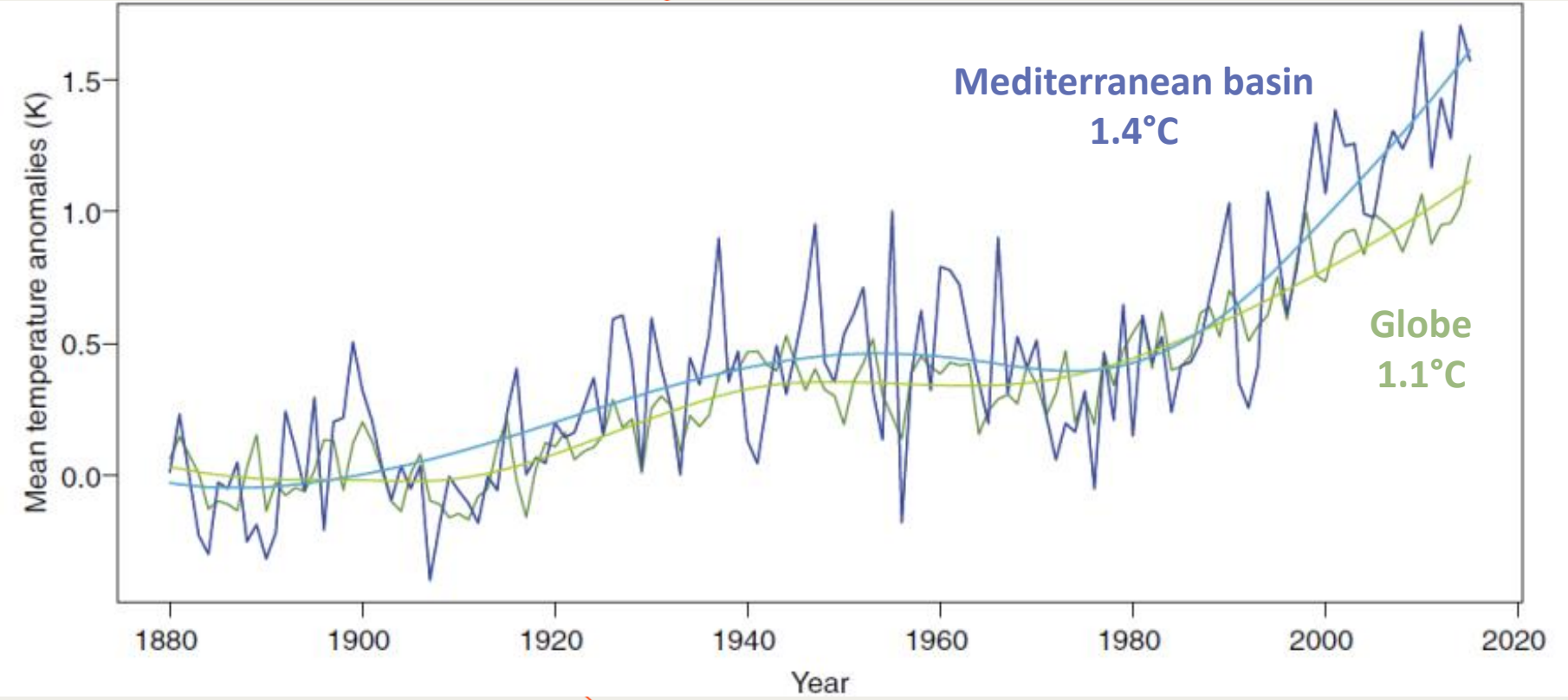
REVIEW ARTICLE
https://doi.org/10.1038/s41558-018-0299-2

nature climate change

NATURE CLIMATE CHANGE | VOL 8 | NOVEMBER 2018 | 972–980 | www.nature.com/natureclimatechange

## Climate change and interconnected risks to sustainable development in the Mediterranean

Wolfgang Cramer[1*], Joël Guiot[2], Marianela Fader[3], Joaquim Garrabou[4,5], Jean-Pierre Gattuso[6,7], Ana Iglesias[8], Manfred A. Lange[9], Piero Lionello[10,11], Maria Carmen Llasat[12], Shlomit Paz[13], Josep Peñuelas[14,15], Maria Snoussi[16], Andrea Toreti[17], Michael N. Tsimplis[18] and Elena Xoplaki[19]




*Data from [http://berkeleyearth.org/](http://berkeleyearth.org/)*

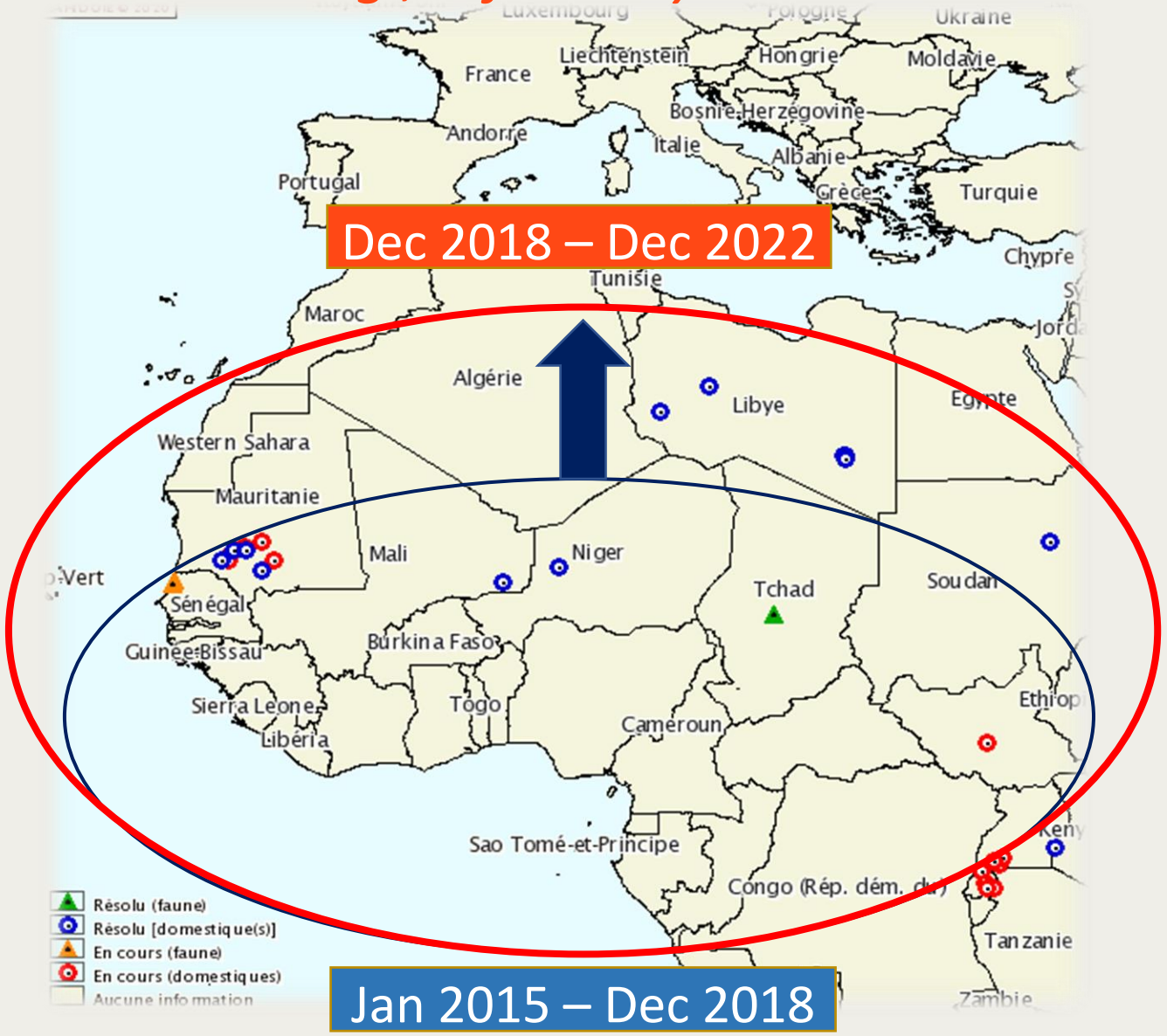
The paper classifies the risks posed by these changes in five major interconnected domains, namely:

i. Water resources,
ii. Natural and managed ecosystems,
iii. Food safety and security,
iv. Human health (climate change **may** influence the emergence of **VBDs**)
v. Human security (extreme events and societal conflict)

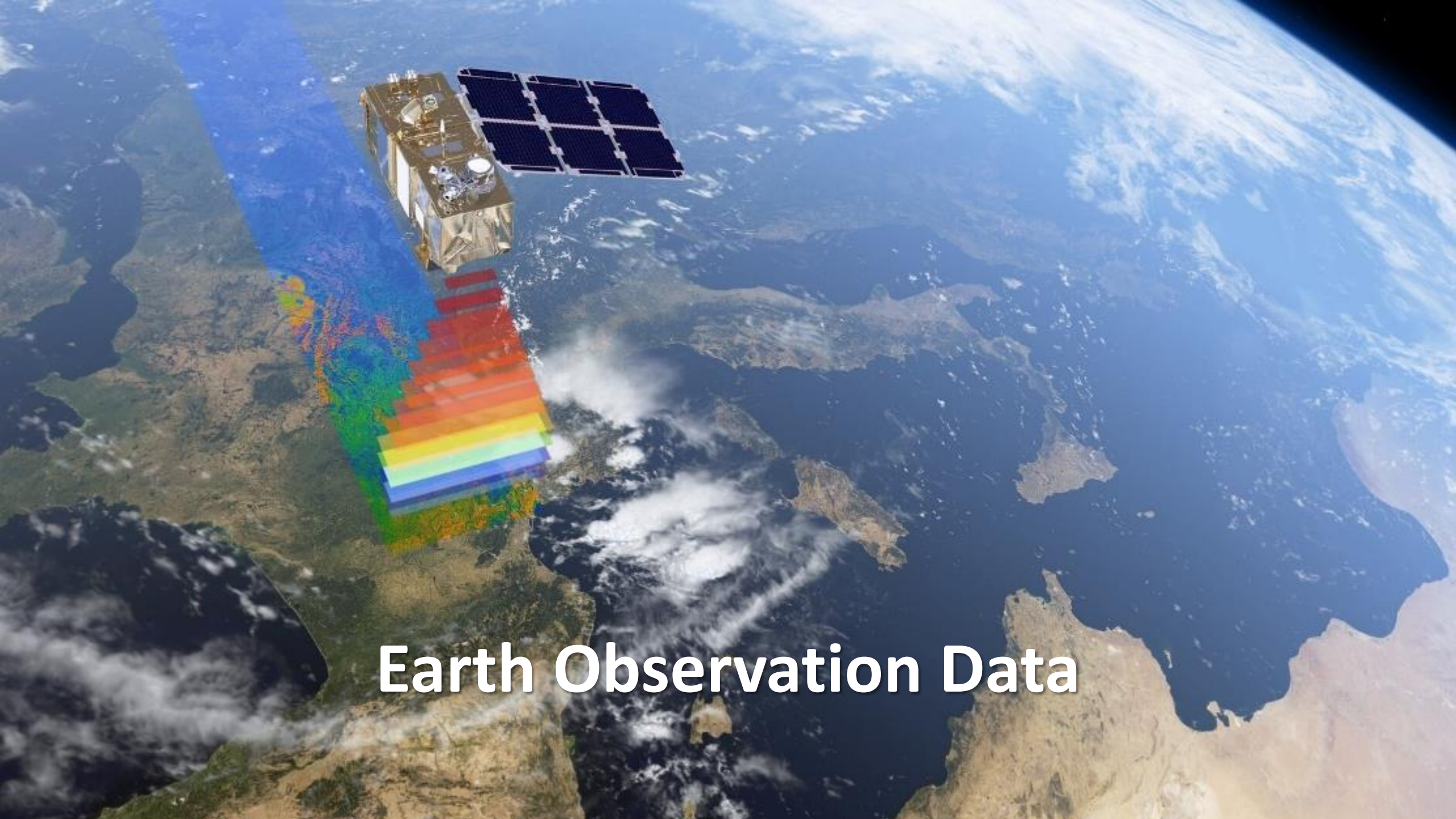
# Change in disease distribution



## *e.g., Rift Valley Fever*



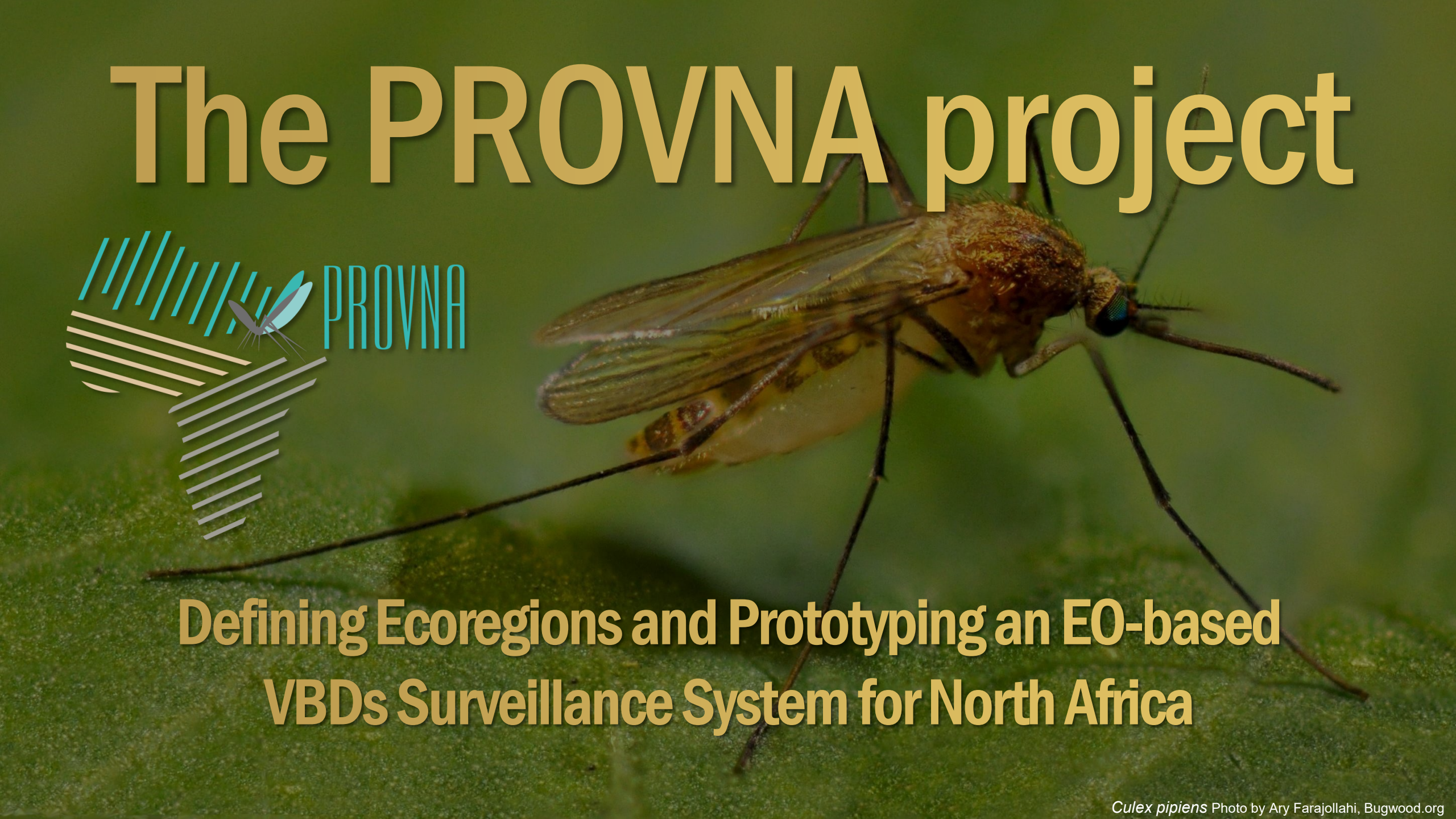

## *e.g., Lumpy Skin disease*


Earth Observation Data

# The PROVNA project

PROVNA

## Defining Ecoregions and Prototyping an EO-based VBDs Surveillance System for North Africa



*Culex pipiens* Photo by Ary Farajollahi, Bugwood.org

# Overview – “phase 1”



World Organisation for Animal Health
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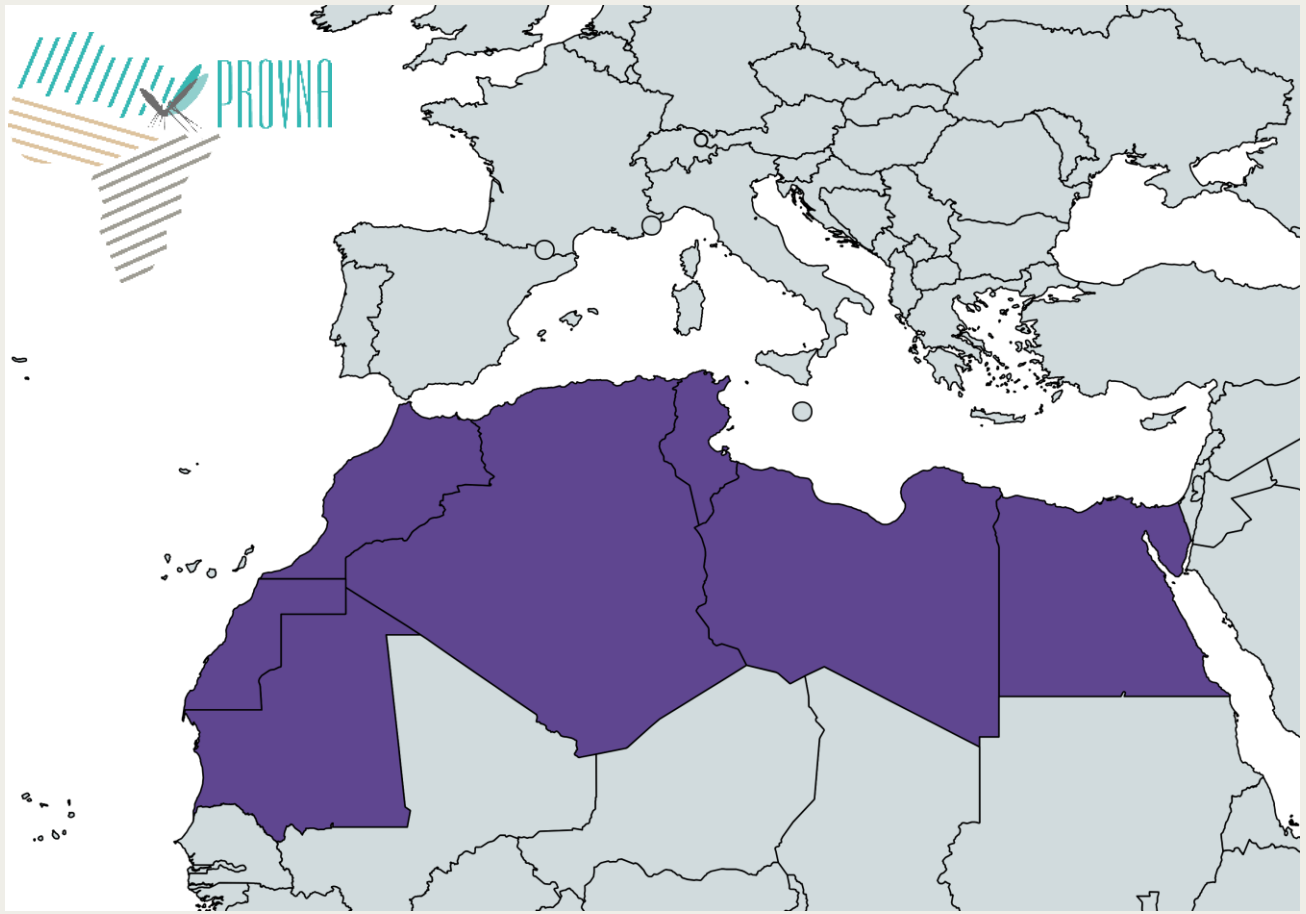
IZS TERAMO
ISTITUTO ZOOPROFILATTICO SPERIMENTALE DELL'ABRUZZO E DEL MOLISE "G. CAPORALE"

THE UNIVERSITY OF TENNESSEE KNOXVILLE




| |
|---|
| START: 26/04/2022 (proposal 17/02/2022) |
| END: 31/10/2023 – 18 months |
| No cost extension: 30/06/2024 |
| Total budget: ≈ 160.000 € |

PC-TAD

Federal Ministry for Economic Cooperation and Development
BMZ

# Objectives – “phase 1”



**General objective:**
Supporting the local competent authorities in North Africa for the identification of specific areas on which to carry out entomological/serological surveillance for vector-borne diseases.

2 Specific objectives:

→ To define the “ecoregions” of the North African territory, characterized by distinct environmental and climatic factors

→ To build a customised prototype application to identify areas at risk for VBDs in North Africa region.

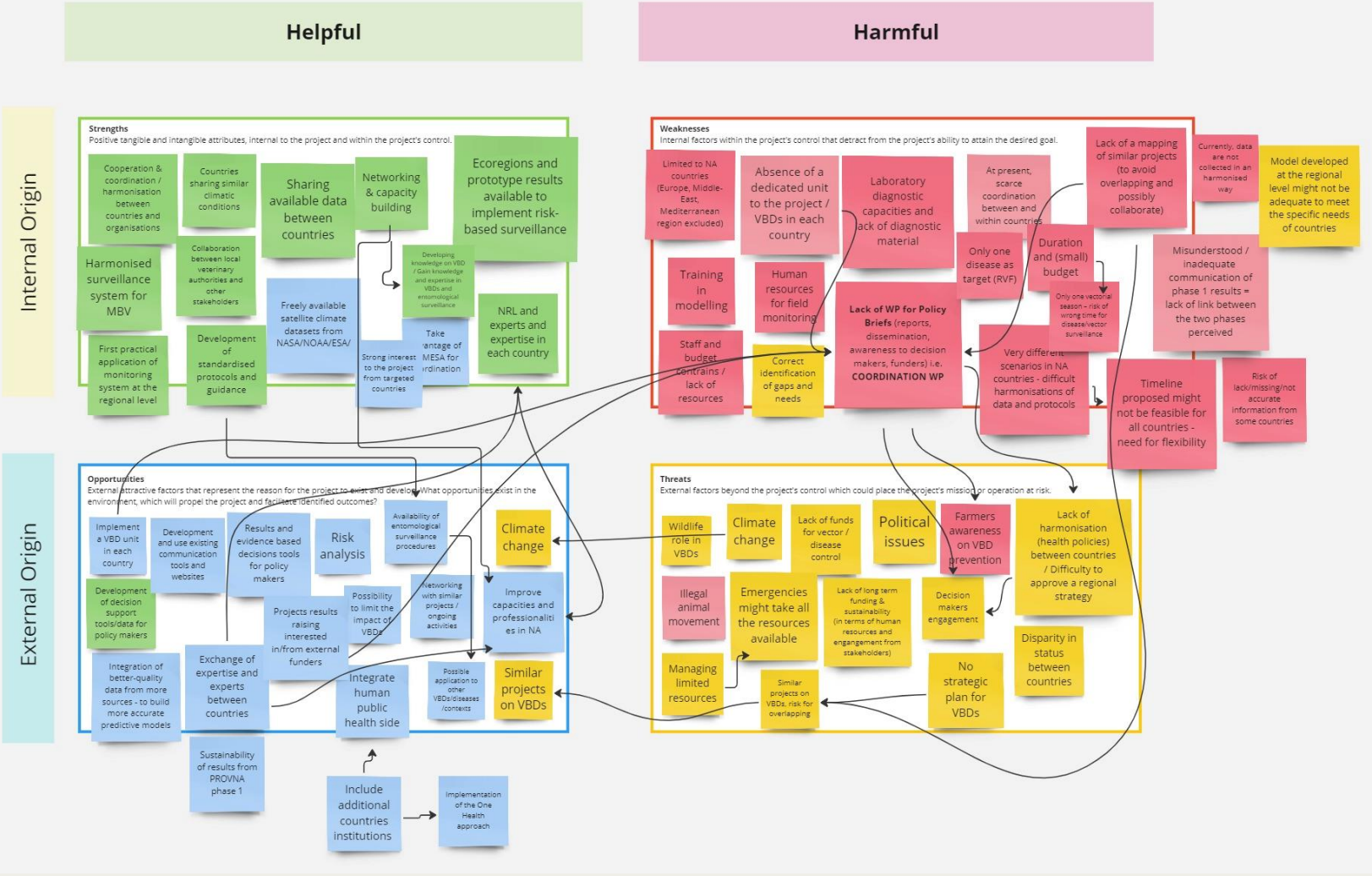
RVF

## Objective 1. Ecoregionalisation in North Africa

| Time | Topic | Speakers |
|---|---|---|
| 10:00am – 10:10am (CET) | Arrival of participants Opening Remarks | B. Soumare, *DDG*, WOAH HQ |
| 10:10am – 10:20am | “Ecoregionalisation” approach in VBDs | A. Conte, IZS Teramo |
| 10:20am-10:30am | Overview of the PROVNA project | F. Valentini, WOAH SRR-NA |
| 10:30am-10:50am | Overview of the PROVNA Platform and presentation of the new tool | |

# End of phase 1... moving towards phase 2



# models vs reality

*Sitting, standing or lying down?*

# Overview and objectives – “phase 2”



World Organisation for Animal Health
Founded as OIE

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

| |
|---|
| **START: September 2024** |
| **END: January-May 2026** |
| **Total budget: ≈ 400.000 USD** |

USDA APHIS

**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.

# Activity Plan – “phase 2”




**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

Ad-hoc online meetings + field missions

PROVNA 2

Libya

*Draft 1*

Surveillance programme and diagnostic protocols

Index



## ➢ Material

- Mosquito traps ✅
- Laboratory reagents
- Samples shipment

# Activity Plan – “phase 2”



## ➢ 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

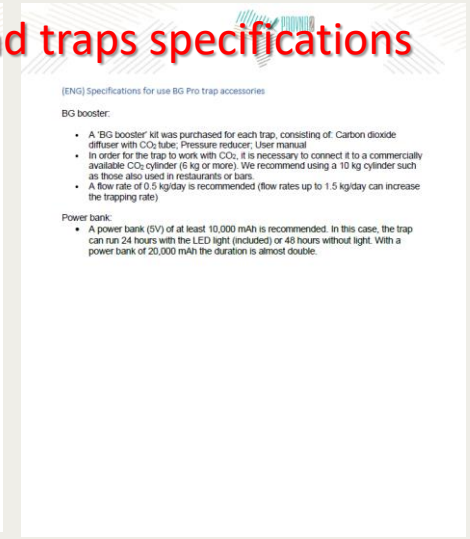
**Carrying bag contents:**

- 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

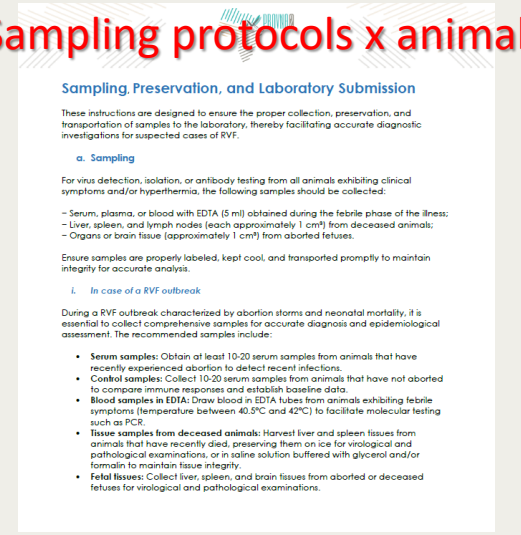
BG booster:

- 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 $cm^3$) from deceased animals;
– Organs or brain tissue (approximately 1 $cm^3$) from aborted fetuses.

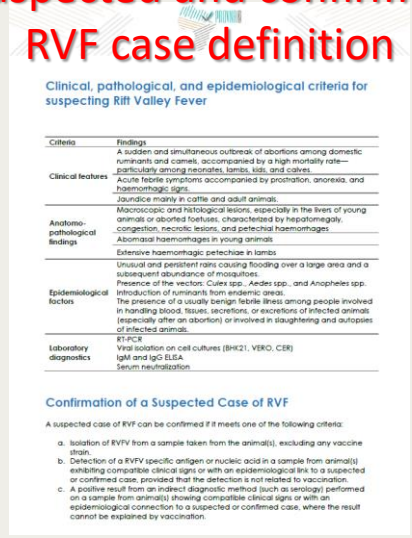
Ensure samples are properly labeled, kept cool, and transported promptly to maintain integrity for accurate analysis.

*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, characterized 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.<br>Presence of the vectors: *Culex* spp., *Aedes* spp., and Anopheles spp.<br>Introduction of ruminants from endemic areas.<br>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<br>Viral isolation on cell cultures (BHK21, VERO, CER)<br>IgM and IgG ELISA<br>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 → 9-13 February
  2. Entomology: analysis of captures / vector identification ✓
  3. Virology: molecular biology on collected samples ✓

Possible developments of the project include:

- its application to any other disease with a strong environmental and climatic component,
- its use in other regions (e.g., PROVBAC)
- the planning of field activities under a One Health approach.

# Future perspectives?

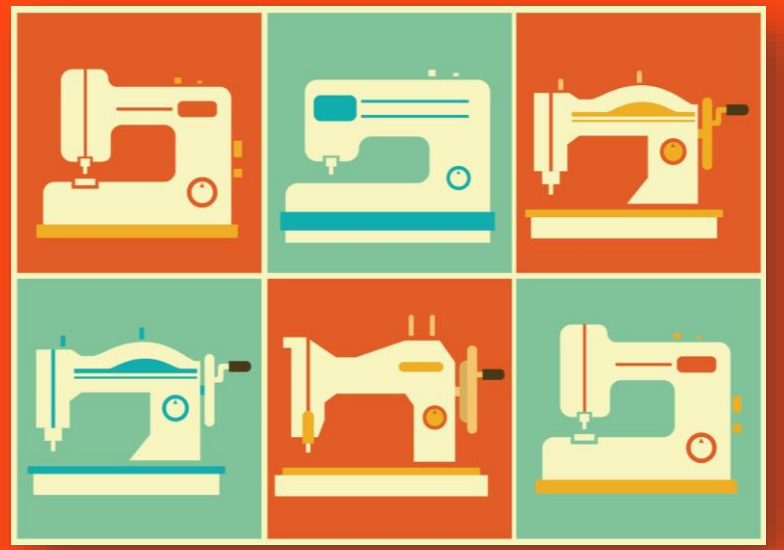
Caspar David Friedrich
Wanderer Above the Sea of Fog

# Conclusions

i. Evidence-based risk management requires tailored surveillance plans (region/sub-region)

ii. Modern technologies should be used to complement classical tools

iii. PROVNA supports National Veterinary Services in strengthening risk-based surveillance of VBDs, optimizing human and financial resources through strategic planning



# Thank you
# شكرا
# Merci beaucoup

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