

From research to product:
converting scientific knowledge into user friendly software

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AVIA

Emerging Infectious diseases

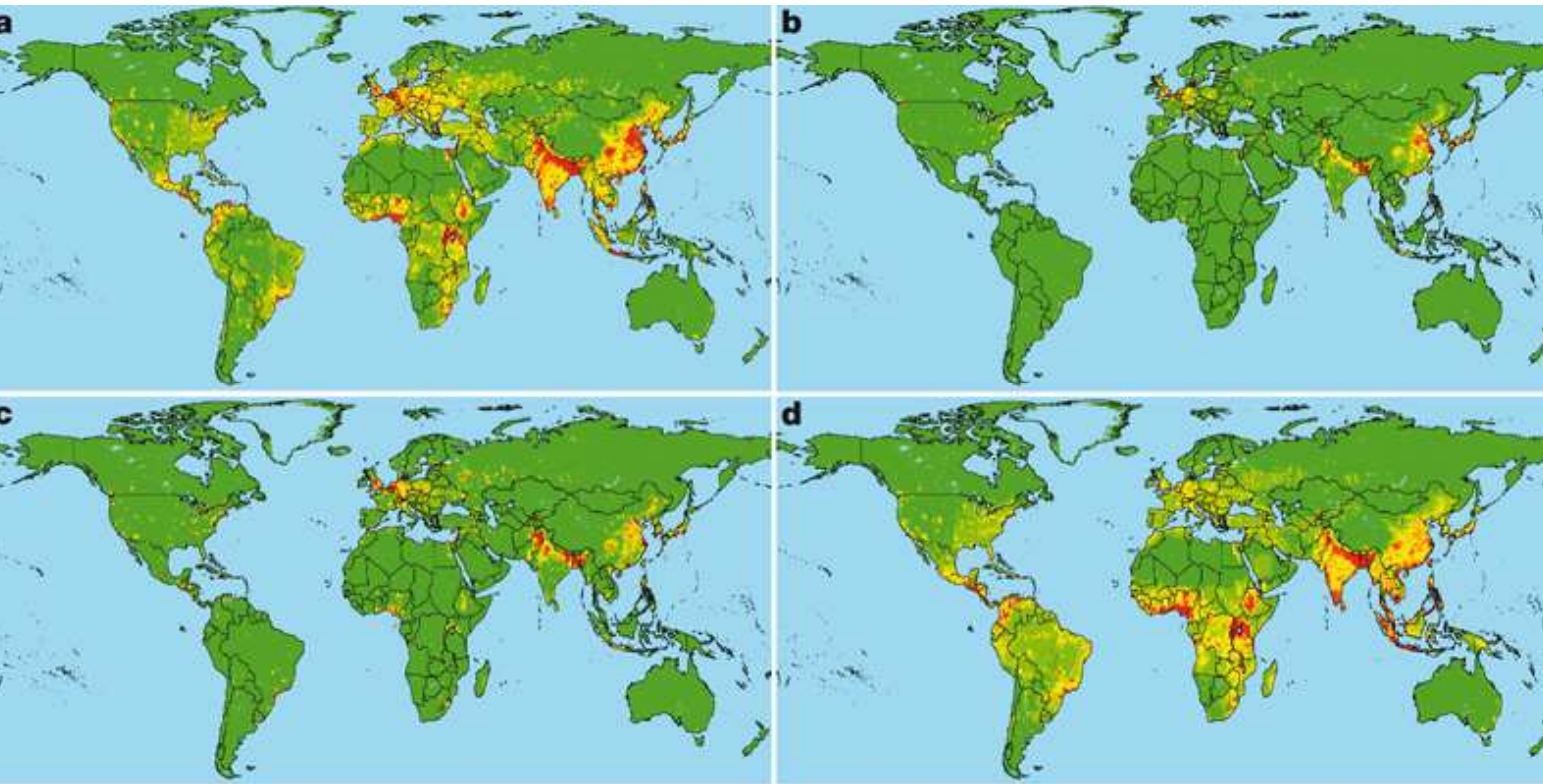


FIGURE AND MODIFIED LEGEND FROM JONES ET AL., 2008 (FIGURE 3). GLOBAL DISTRIBUTION OF RELATIVE RISK OF AN EID EVENT. MAPS ARE DERIVED FOR EID EVENTS CAUSED BY:

- (A) ZOONOTIC PATHOGENS FROM WILDLIFE,
- (B) ZOONOTIC PATHOGENS FROM NON-WILDLIFE,
- (C) DRUG-RESISTANT PATHOGENS, AND

(D) VECTOR-BORNE PATHOGENS

Drivers of change:

GLOBAL

- Increased traffic of people and goods
- Climate change

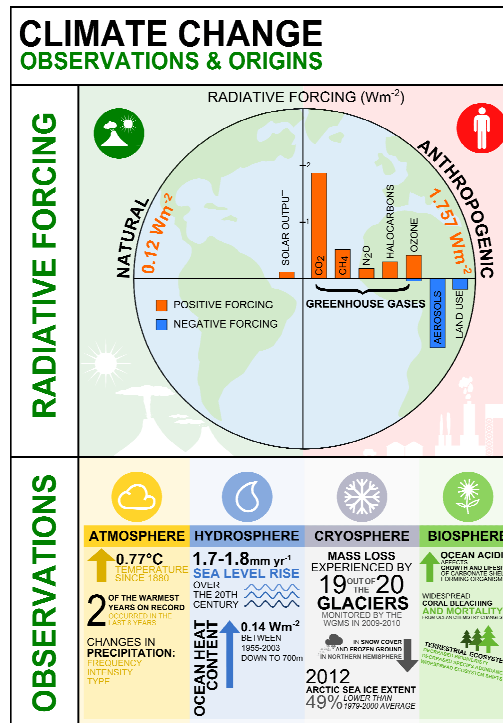
LOCAL

- LU/LC changes
- Societal changes
- Environmental awareness

Drivers of global change



Pests are travelling the world in containers



Climate impacts on:
distribution limits, survival,
#generations, ...



Pathogens are travelling the world in hosts



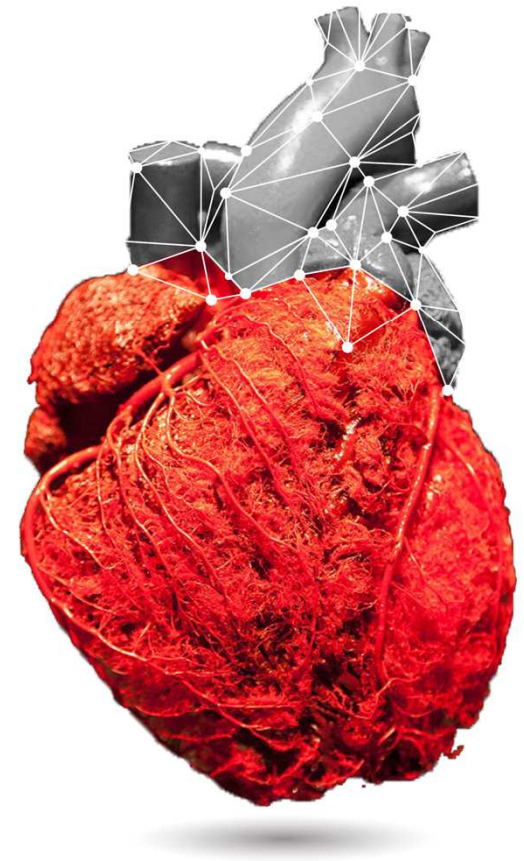
Bridging the gap between research and decision making

Our Vision is: to bring spatial tools at the heart of decision making

Our Mission is: to develop user-friendly spatial decision support systems that convert data into information

Our Products:

- Generate high quality data
- Save time and reduce costs



What do we offer?



Consulting

Contract
Research



Products

Who are we?



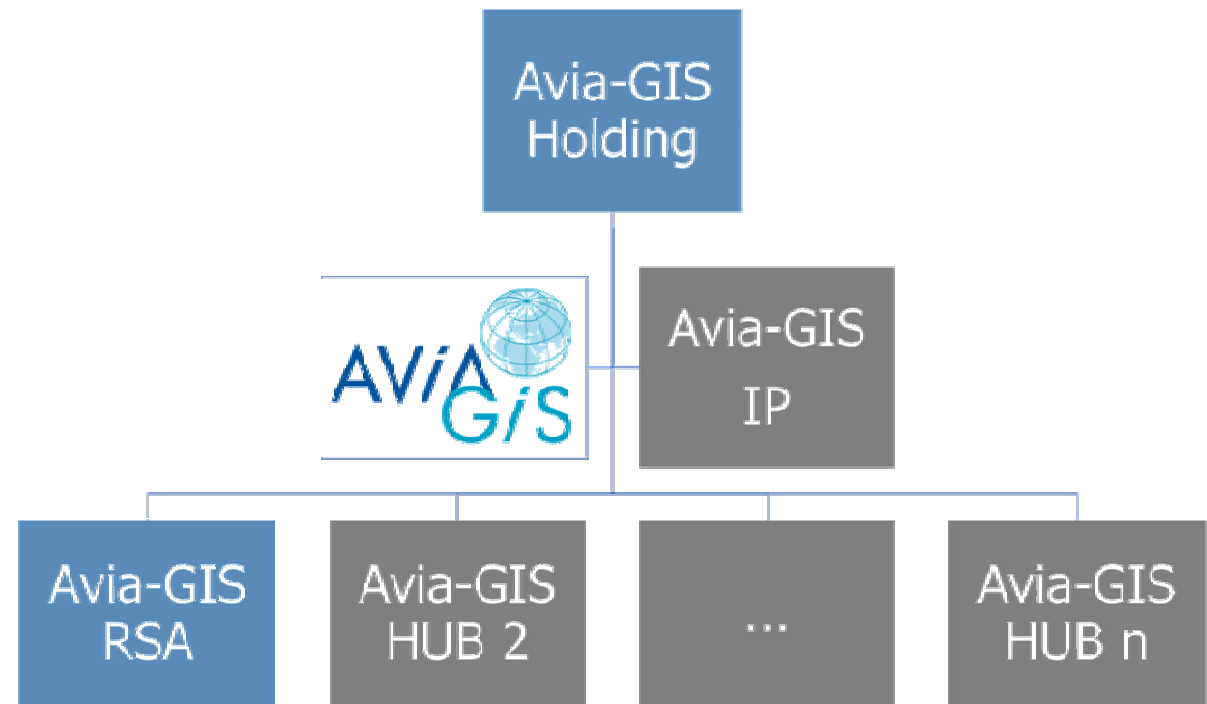
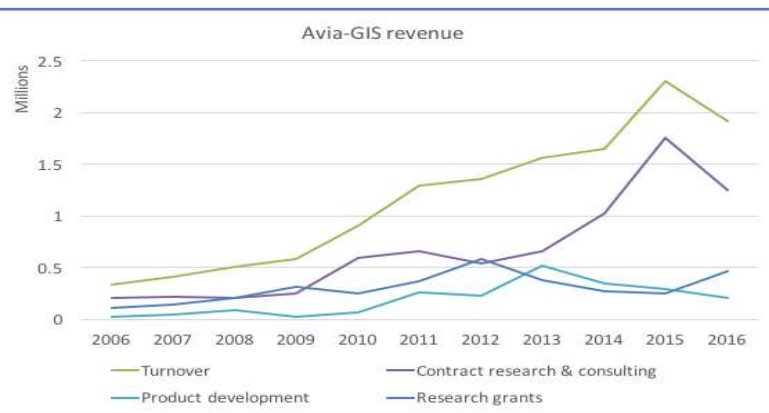
Established in 2001

75% Europe – 25% Overseas

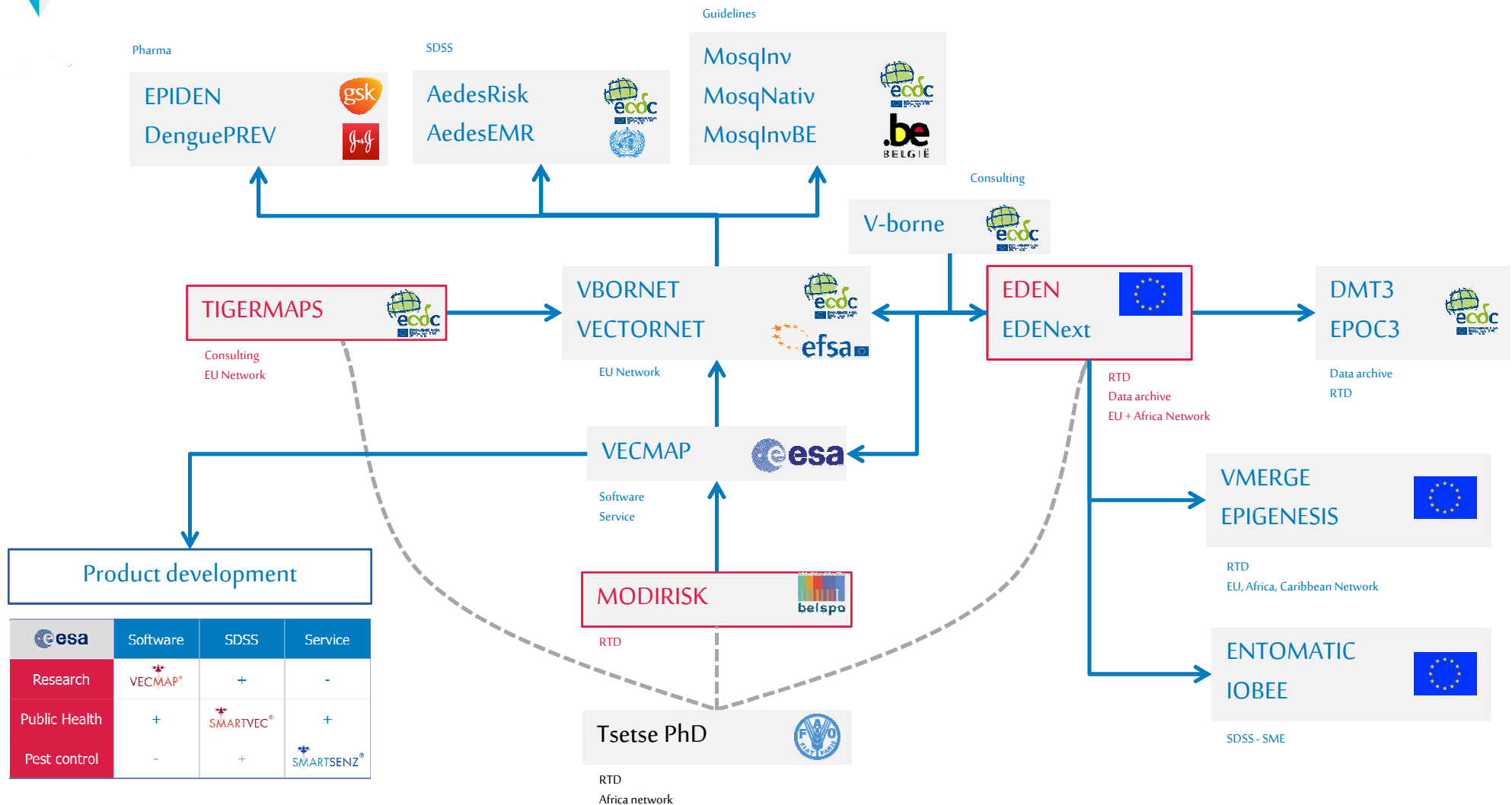
14 collaborators, 8 nationalities

Focus on vector-borne diseases

International networks



How did we develop?

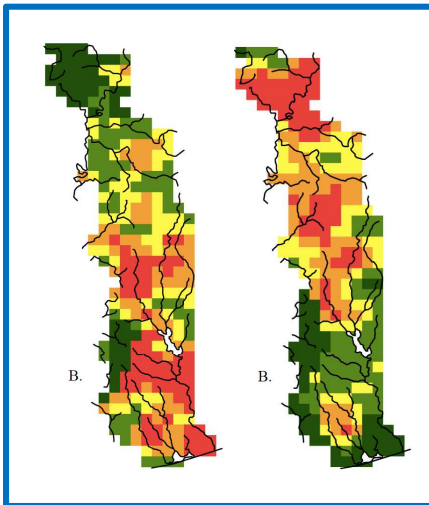


Mapping vectors, pathogens and hosts

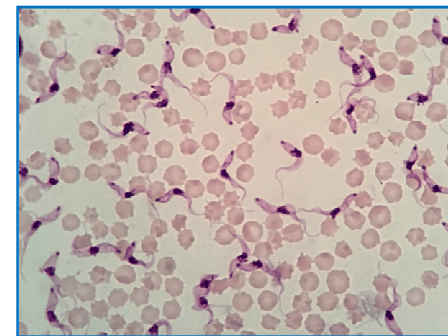
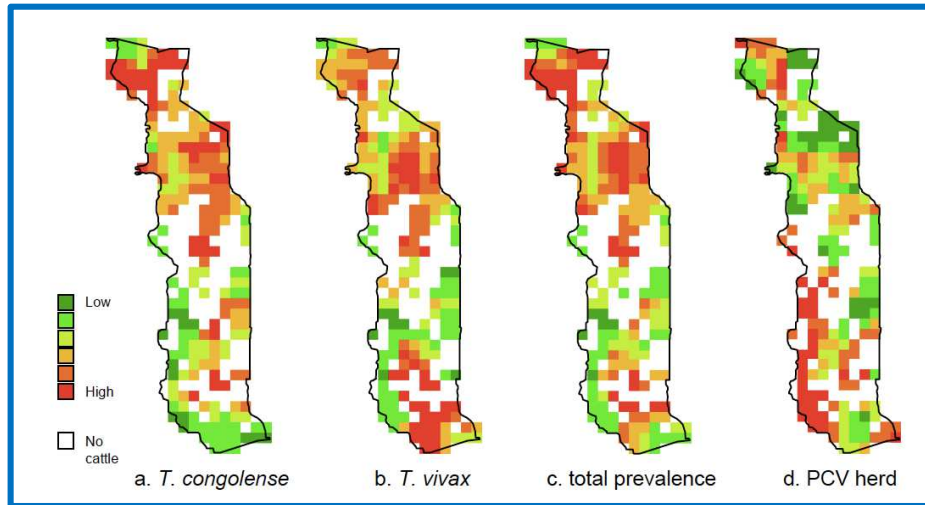
Tsetse transmitted trypanosomiasis in Togo



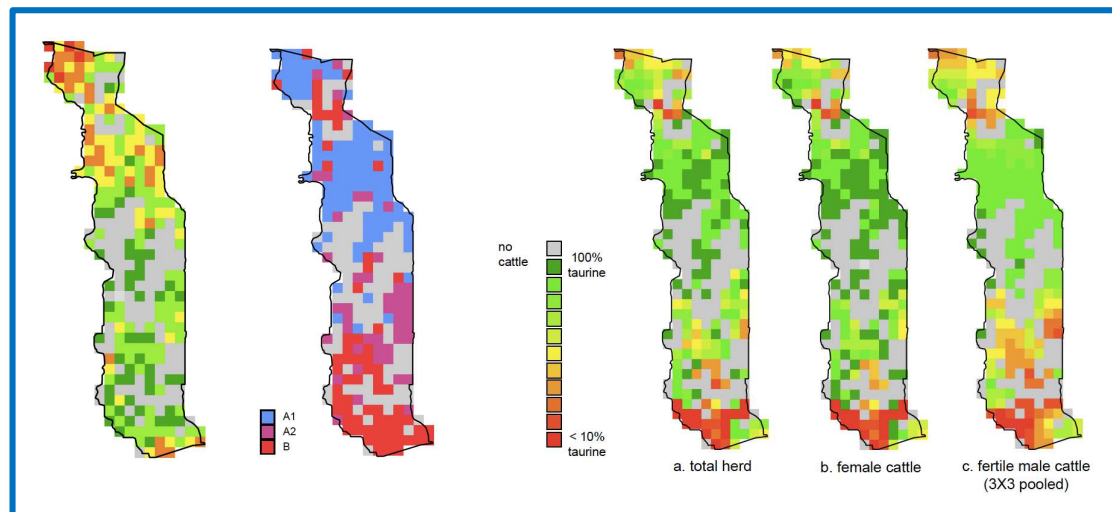
Vectors



Pathogens

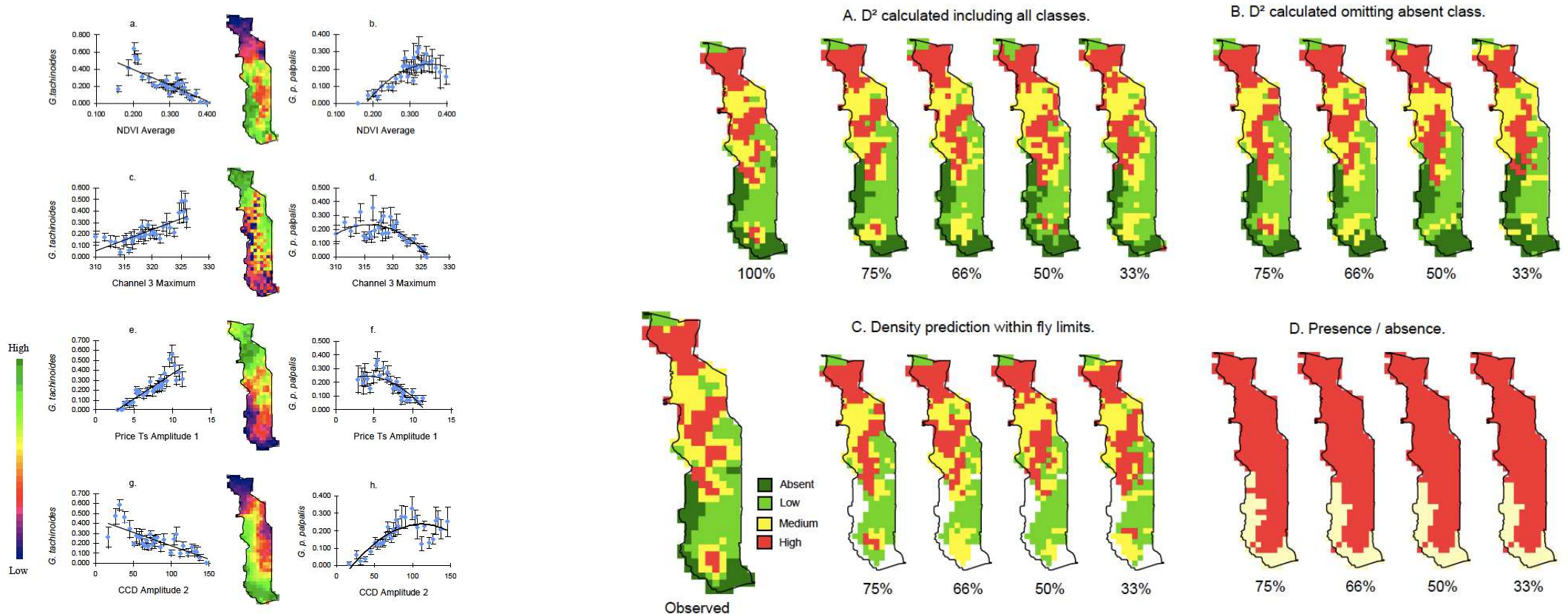


Hosts



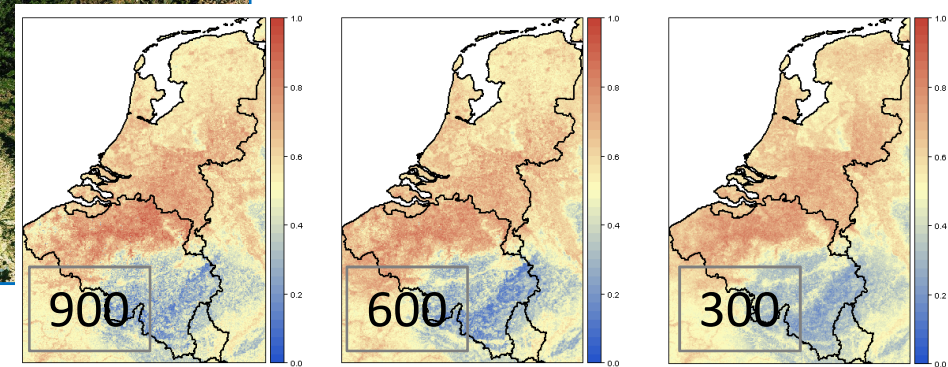
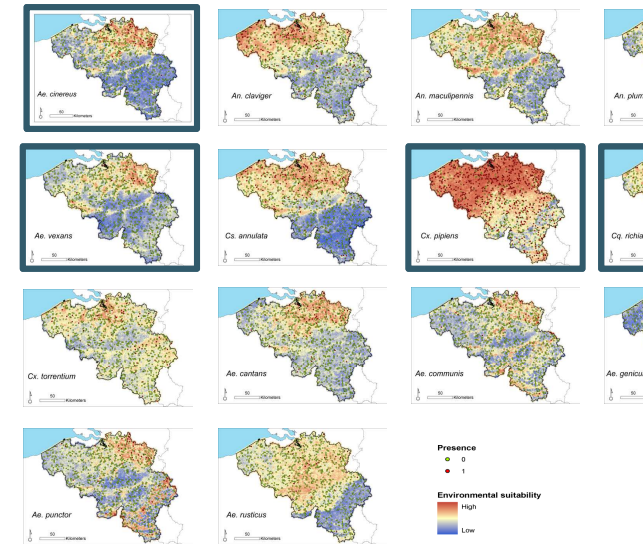
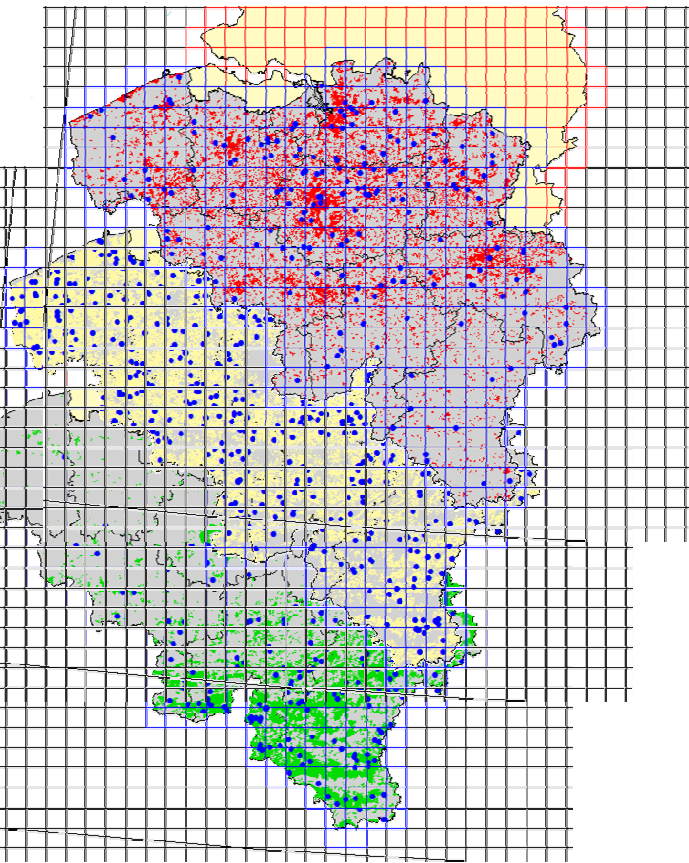
Modeling vectors, pathogens and hosts

e.g. *Glossina tachinoides*



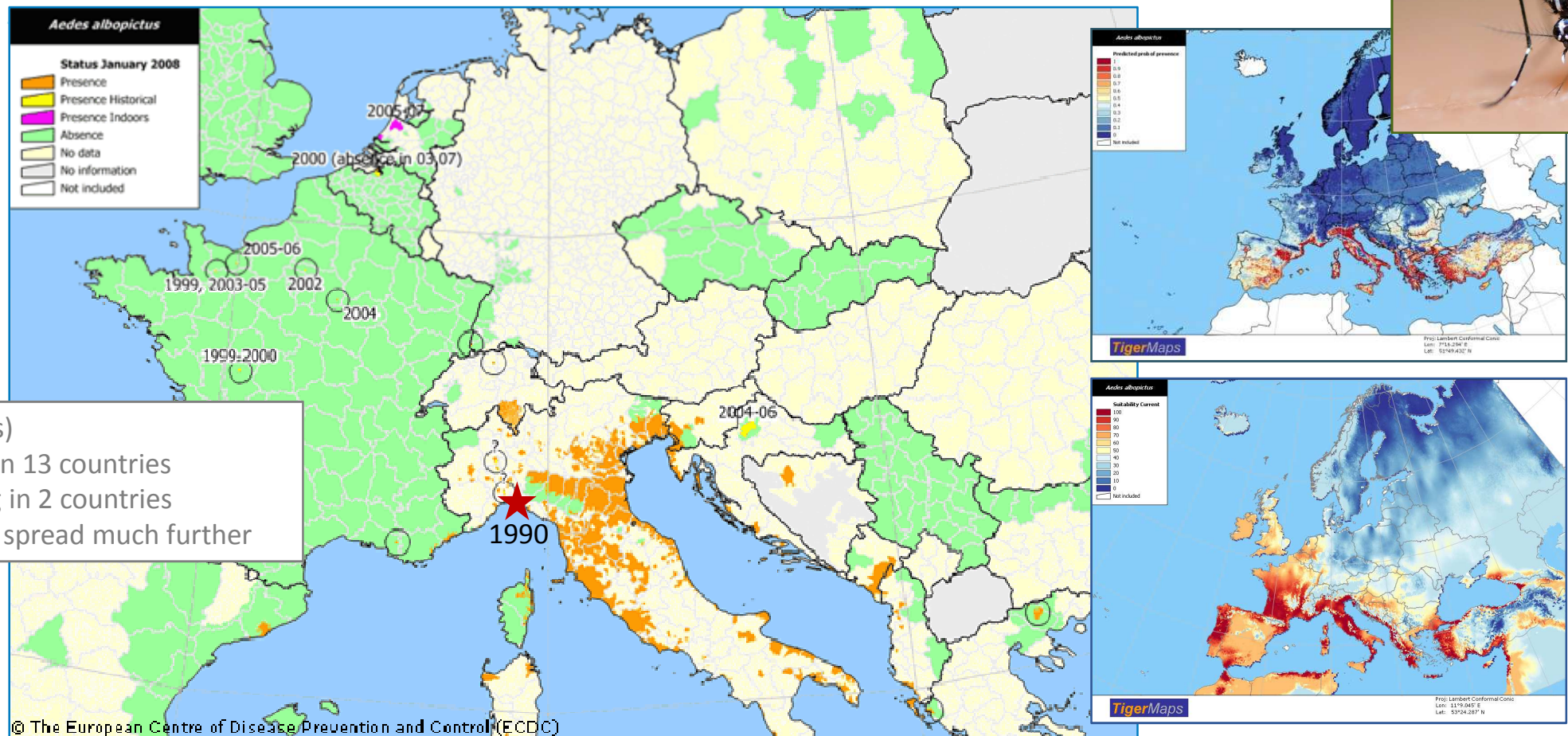
Applying this to Belgium

MODIRISK – mapping mosquito diversity



The invasion of the Tiger

Invasion and predicted spread

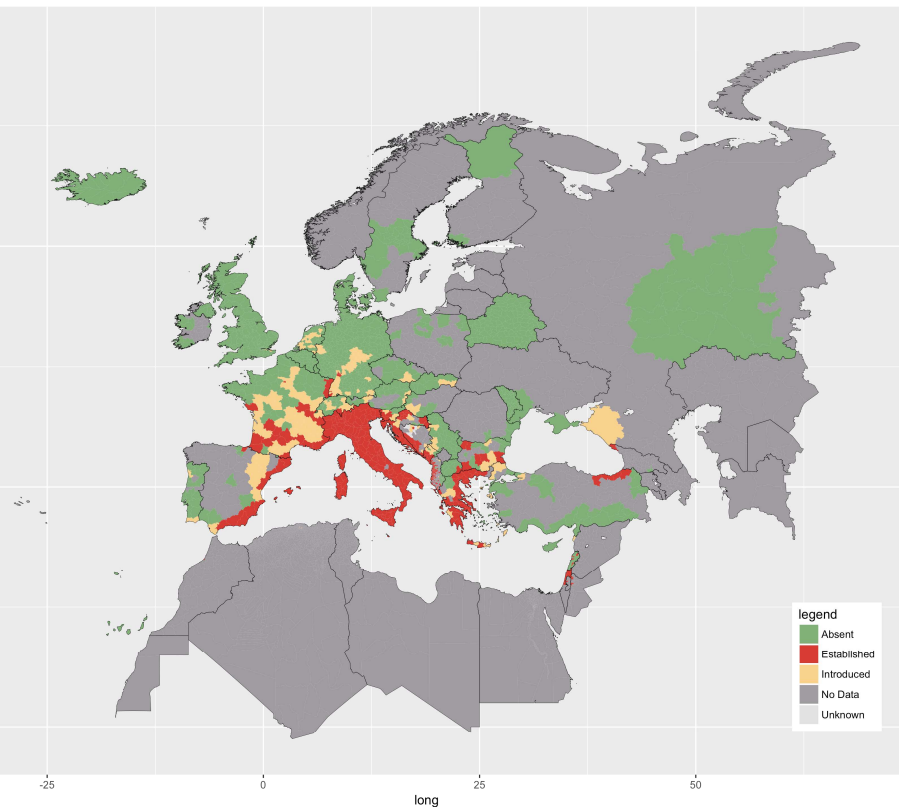


TigerMaps)
established in 13 countries
first sighting in 2 countries
predicted to spread much further

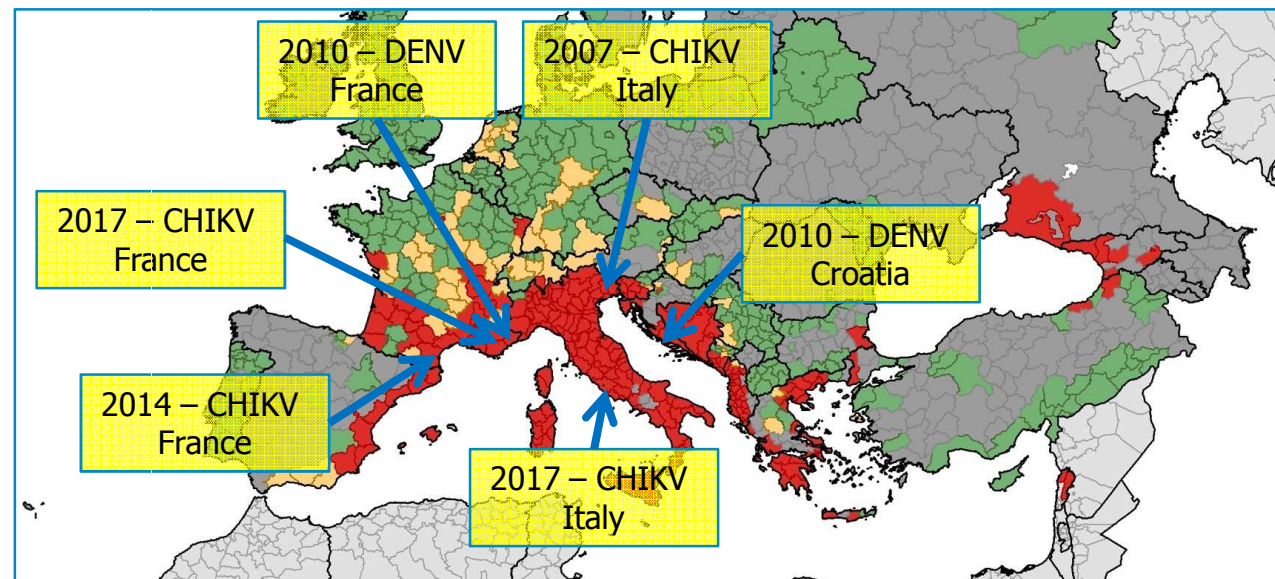
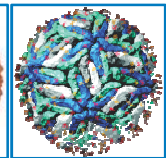
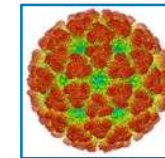
The invasion of the Tiger

Disease outbreaks

2018-01-29



Current disease outbreak situation





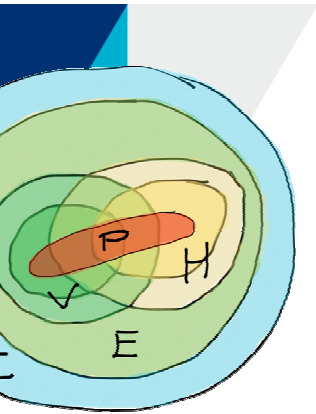
Defining the problem

There is a need for precise information on distribution, abundance and spread of disease vectors and the diseases they transmit

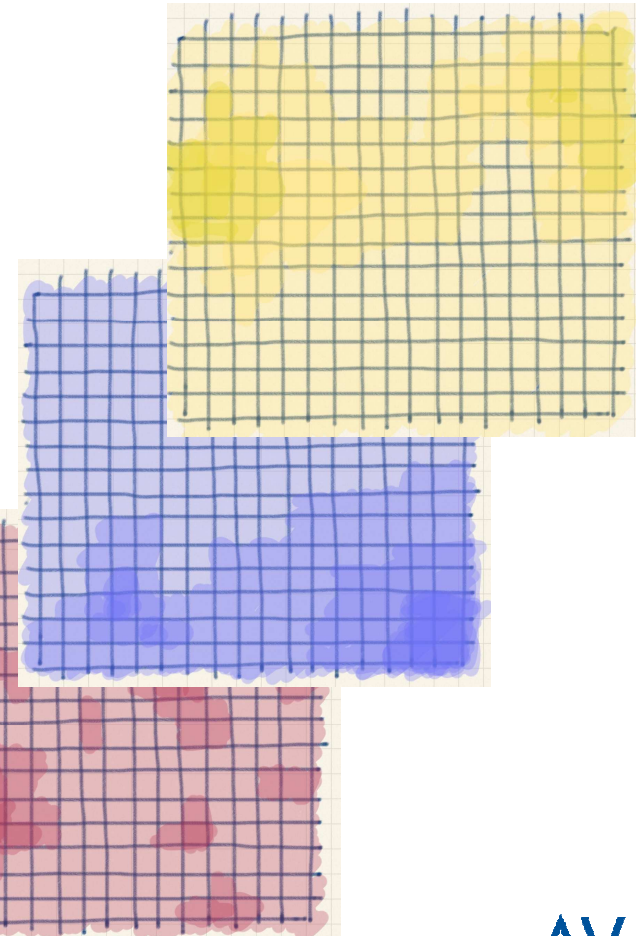
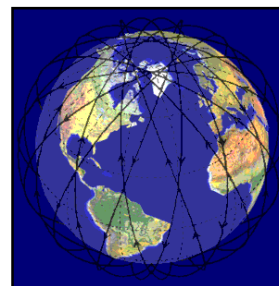
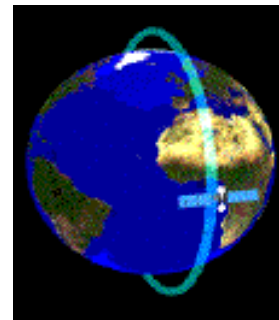
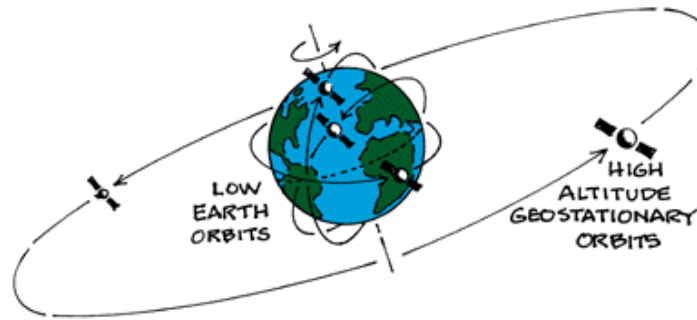
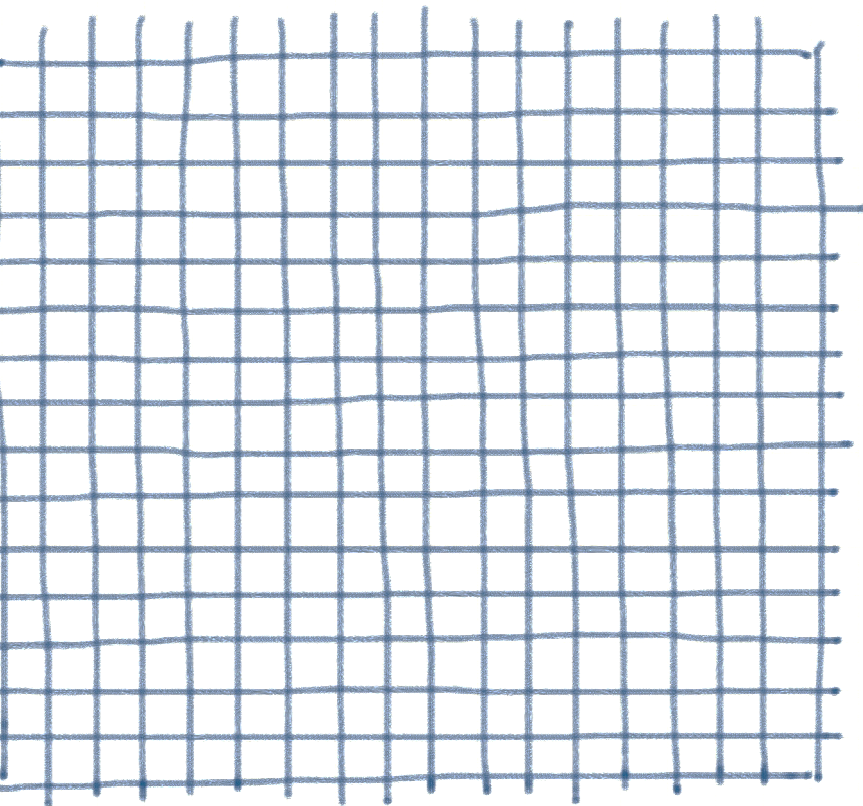
BUT: Field surveys are labour intensive and expensive

The costs of field surveys can be reduced by combining strategic sampling and spatial models using remote sensing data

BUT: This requires expertise and access to state of the art tools and RS data

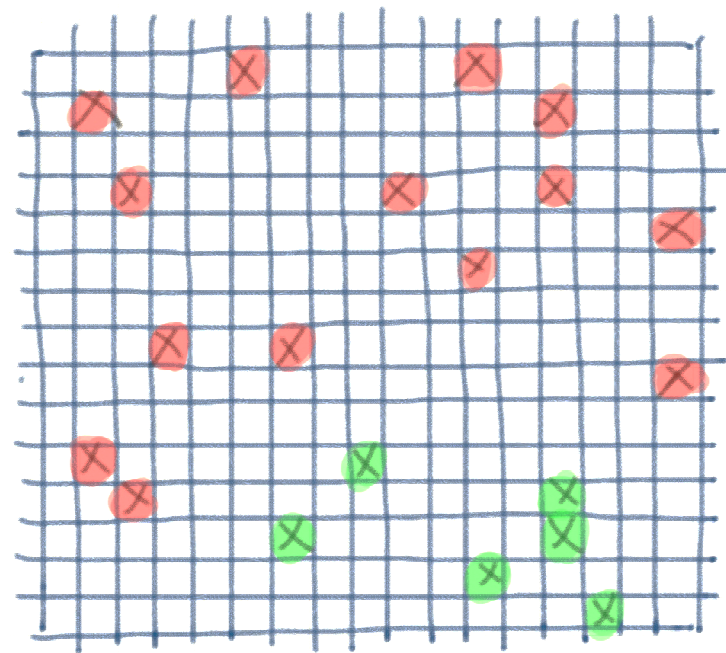
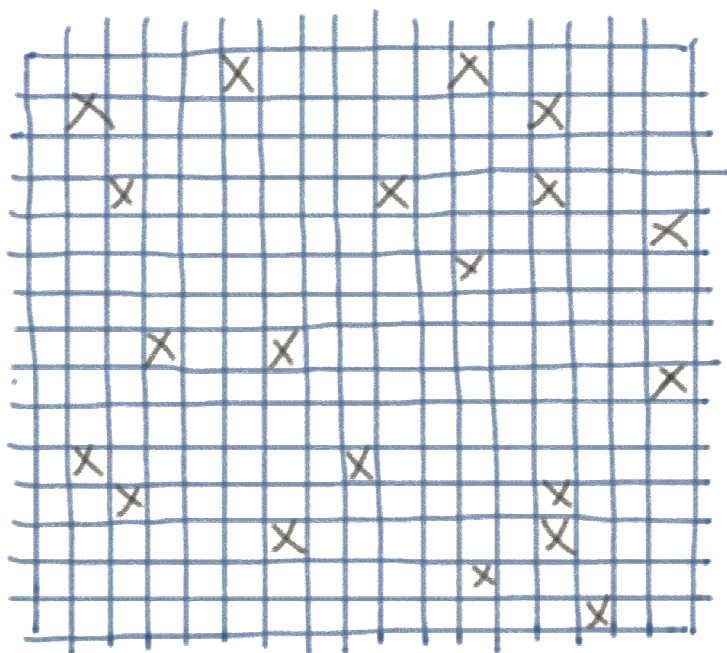


How can satellite imagery (and other environmental data sets) contribute?





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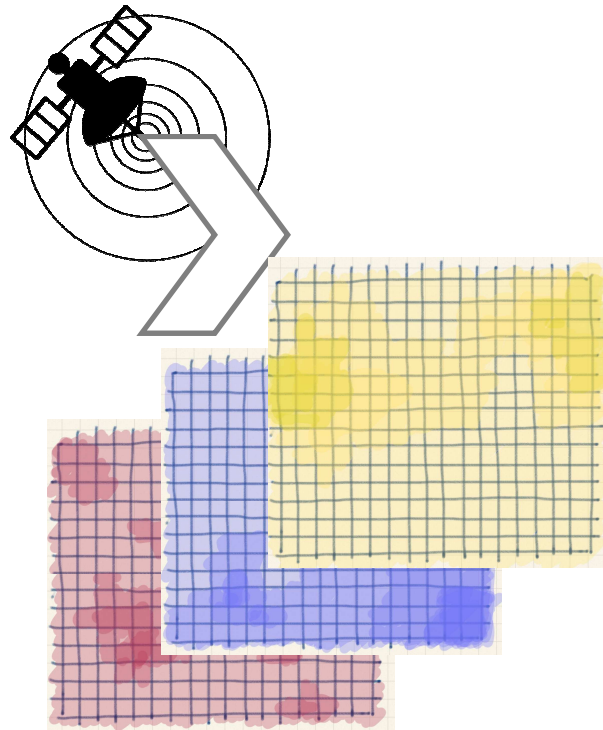
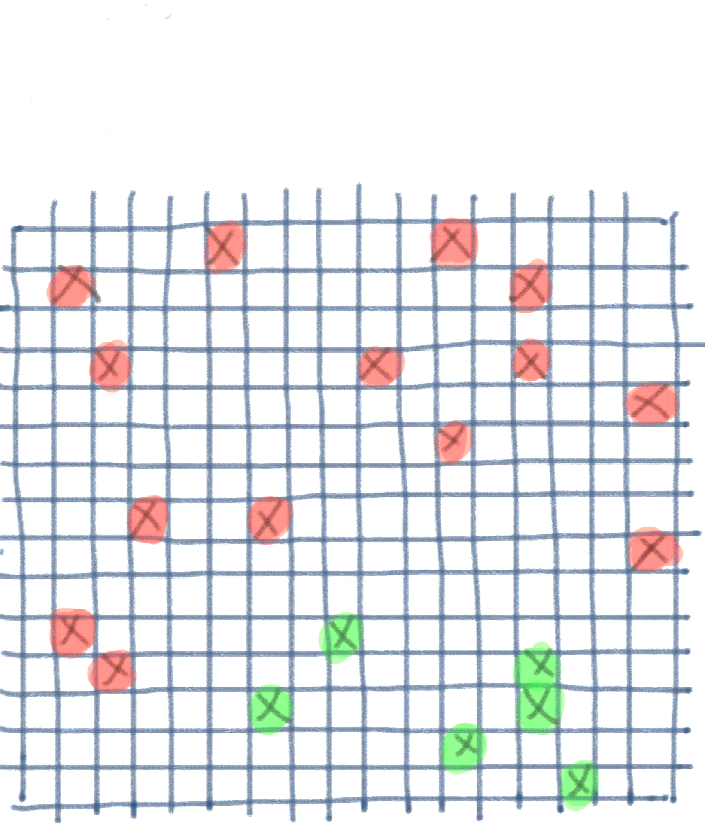


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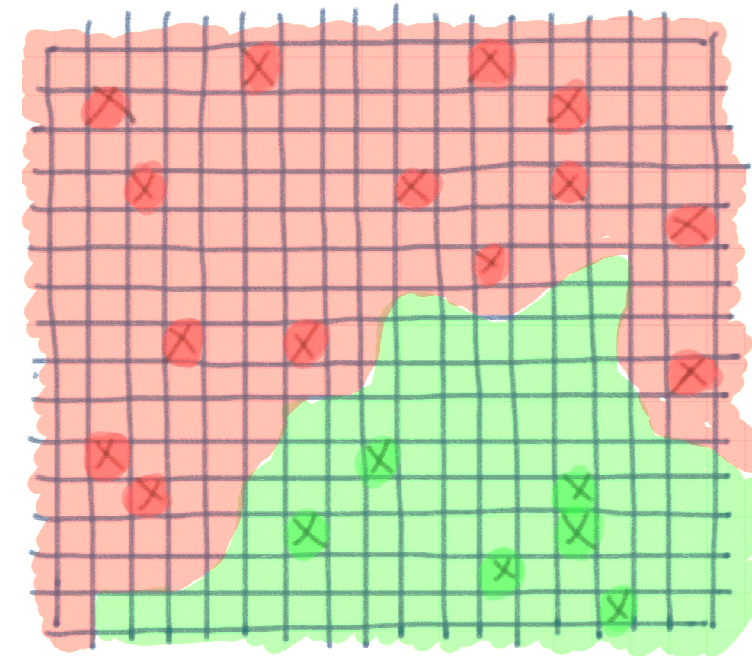


How can satellite imagery

(and other environmental data sets) contribute?



$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon$$

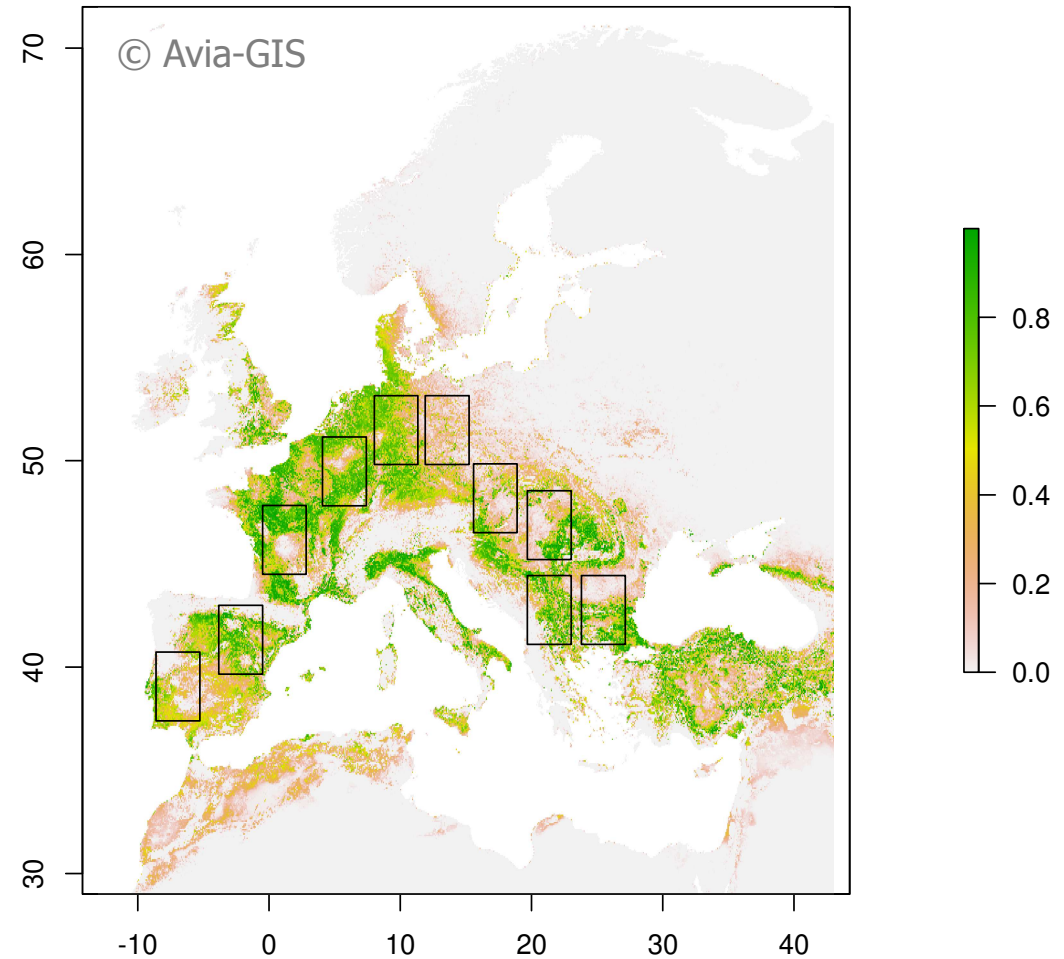
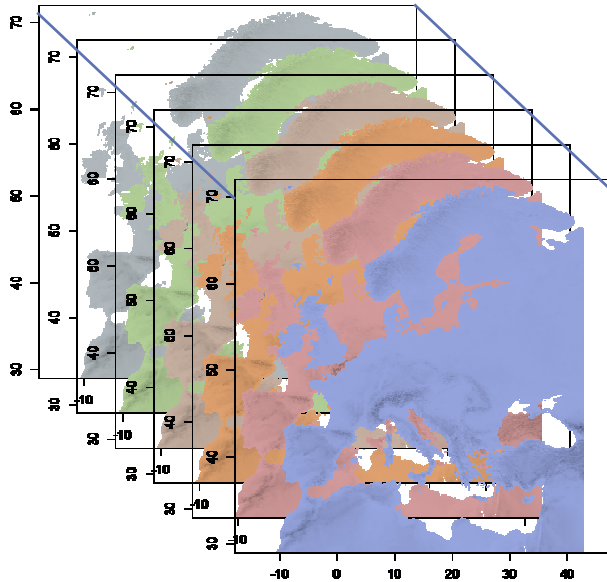


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How can sample size be optimized?

The virtual vector

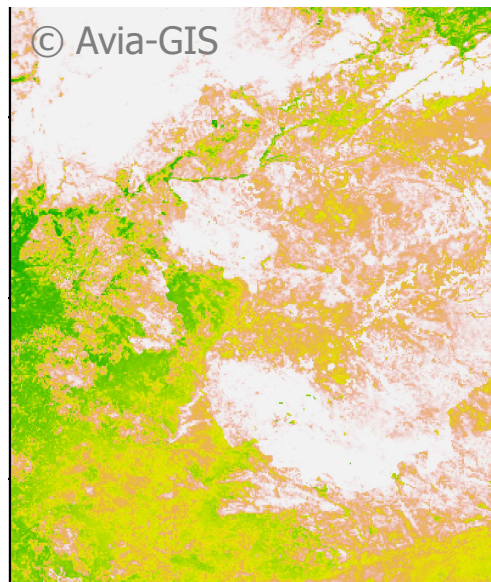
Eco-climatic Predictor Variables
1X1km



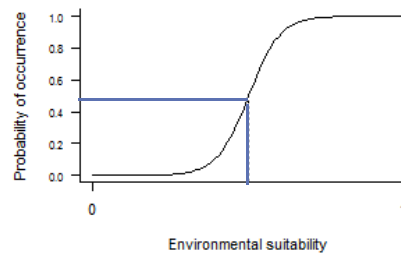
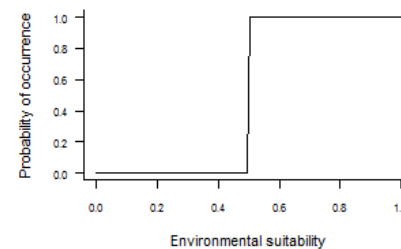
10 test areas of 400X400km = 160.000 km² each

The virtual vector

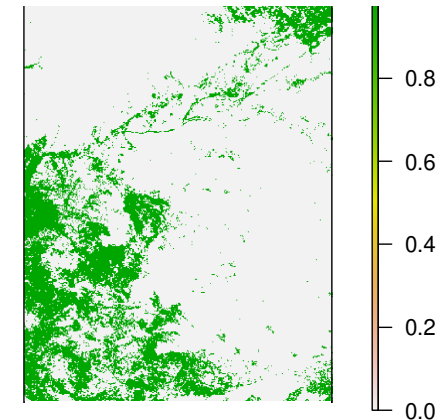
Methodology



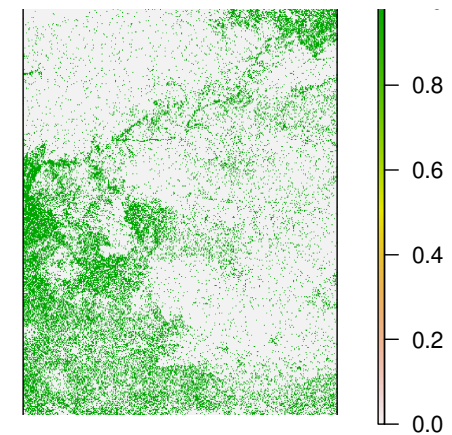
Habitat suitability



Response curve

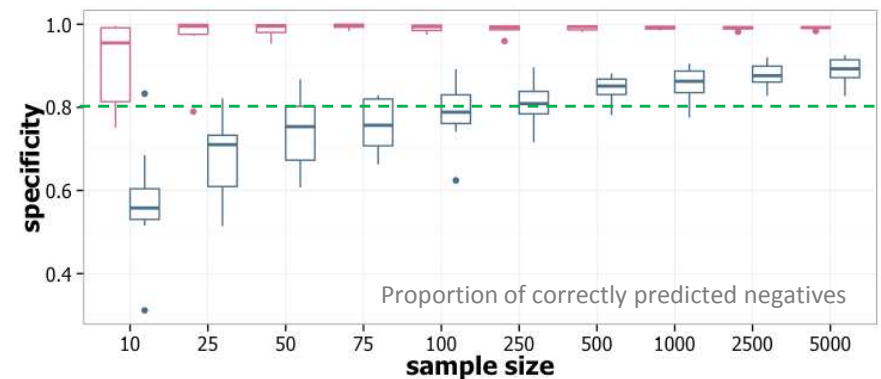
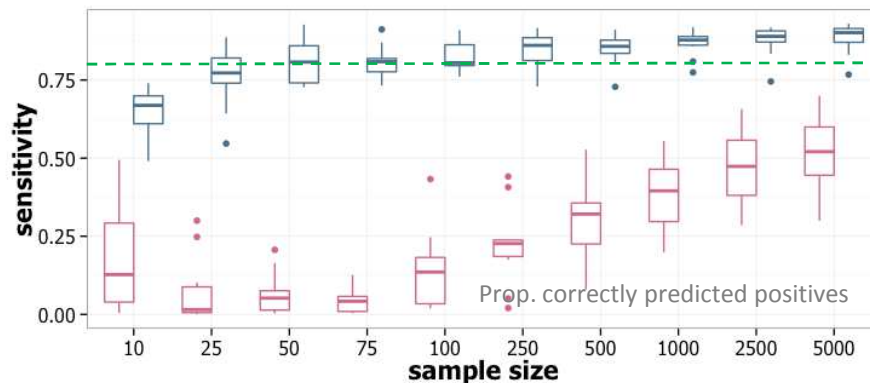
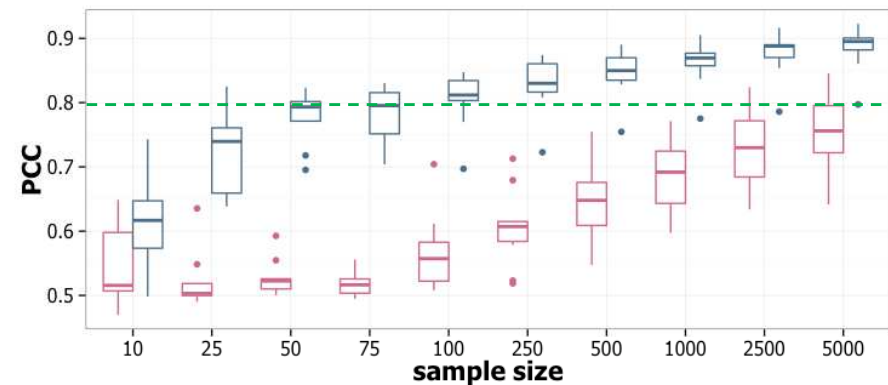
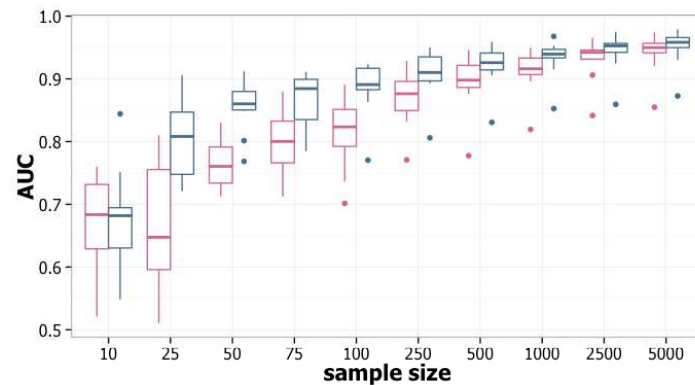


PA map



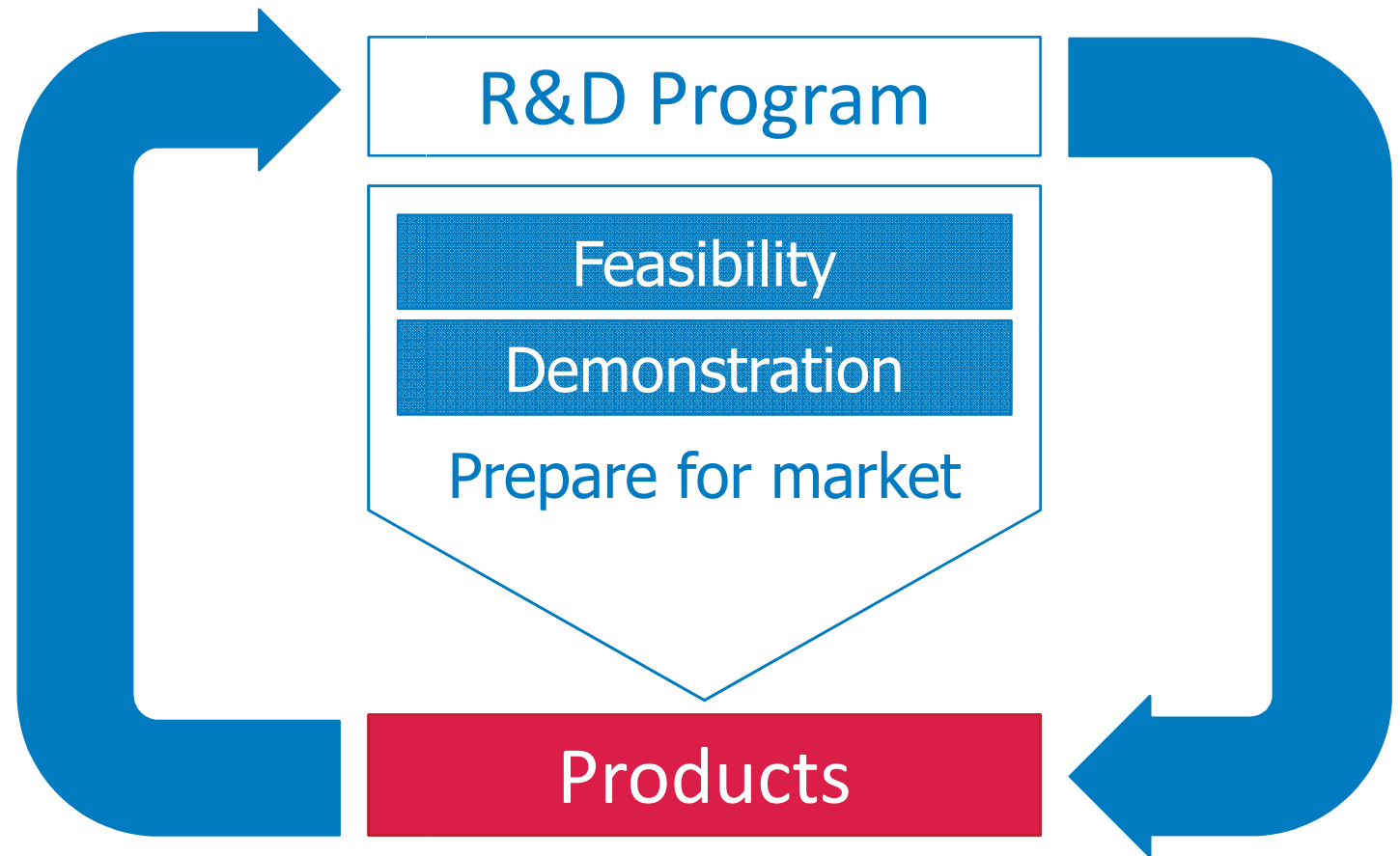
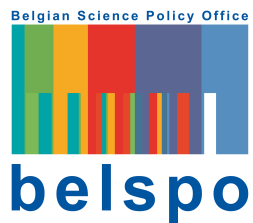
Testing sample size

Random stratified sample, 50 replicates

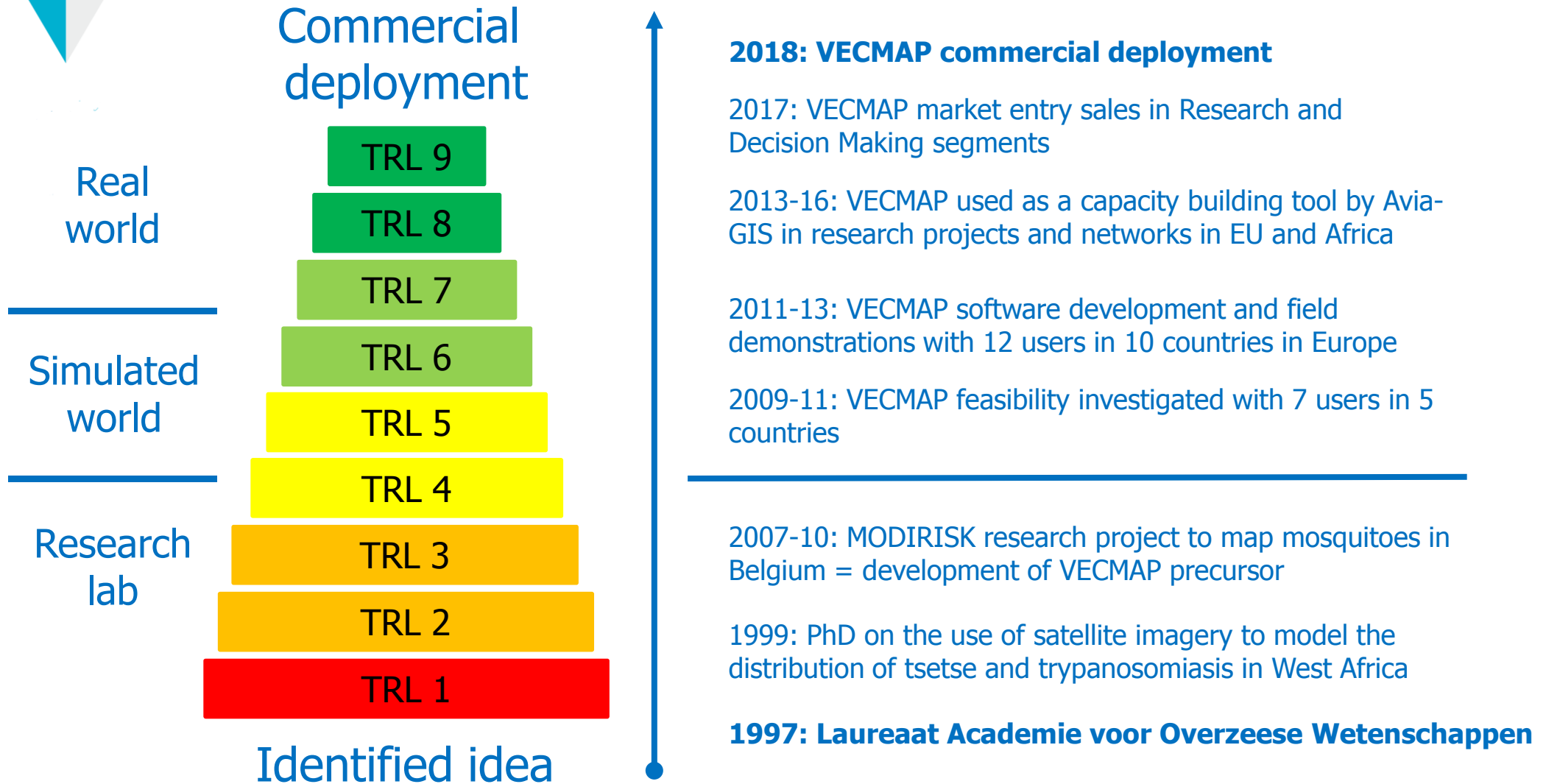


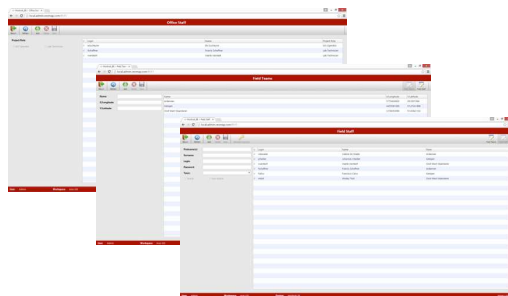
Blue – Balanced sample: 50% presence / 50% absence
Red – Unbalanced sample: 10% presence / 90% absence

How do we differ from research groups?



Software development

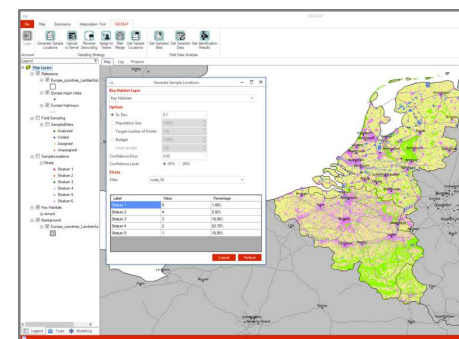
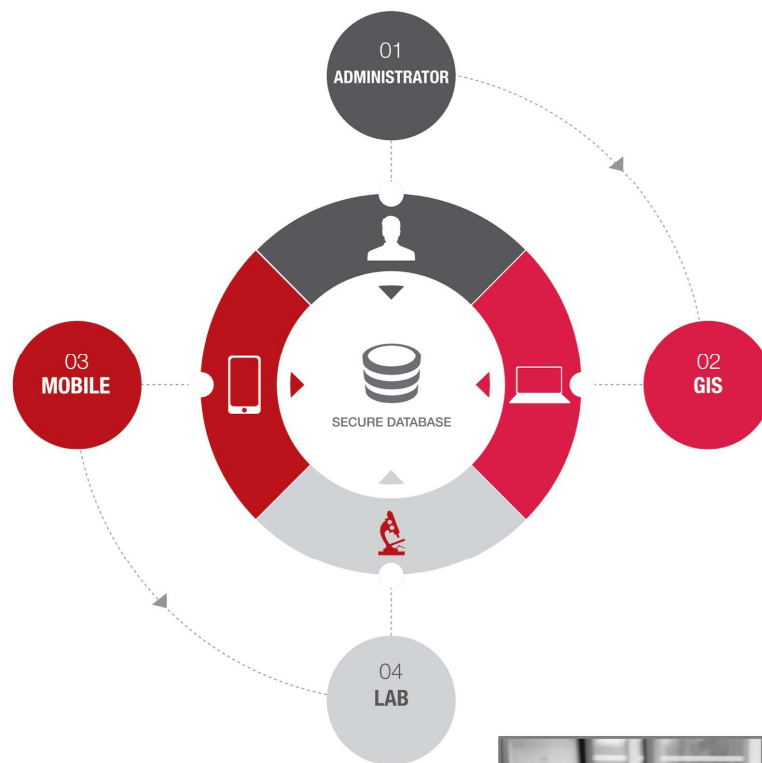
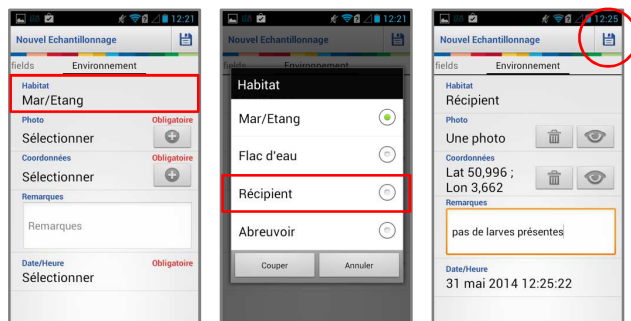




System set-up
Mobile app configuration
Project management
Team management
Staff management



Task assignment
Router
Offline data storage
Data synchronisation



Sampling strategy
Follow-up
Spatial analysis
Spatial modelling

Kempense innovation prize

Innovatieprijzen voor drie Kempense bedrijven

arc Baldyck op 11 november 2012

45 people like this.



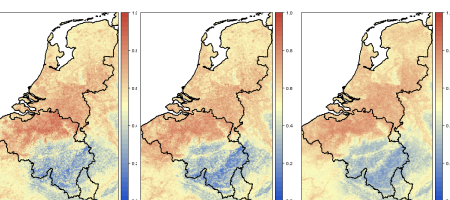
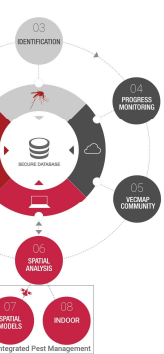
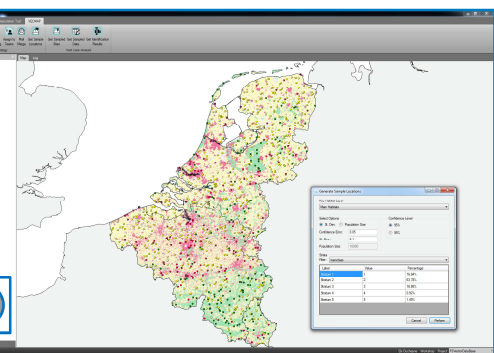
De Kempense Innovatieraad (KIR) heeft tijdens het Festival van de Creativiteit in Turnhout drie Kempense bedrijven een Innovatie Award toegekend. De prijzen gingen naar Avia-Gis uit Zoersel Galaxy Studios uit Mol en het Resource Lab uit Turnhout.

Het Festival van de Creativiteit was een enorm succes.

Lab forms
Species identification
Data upload



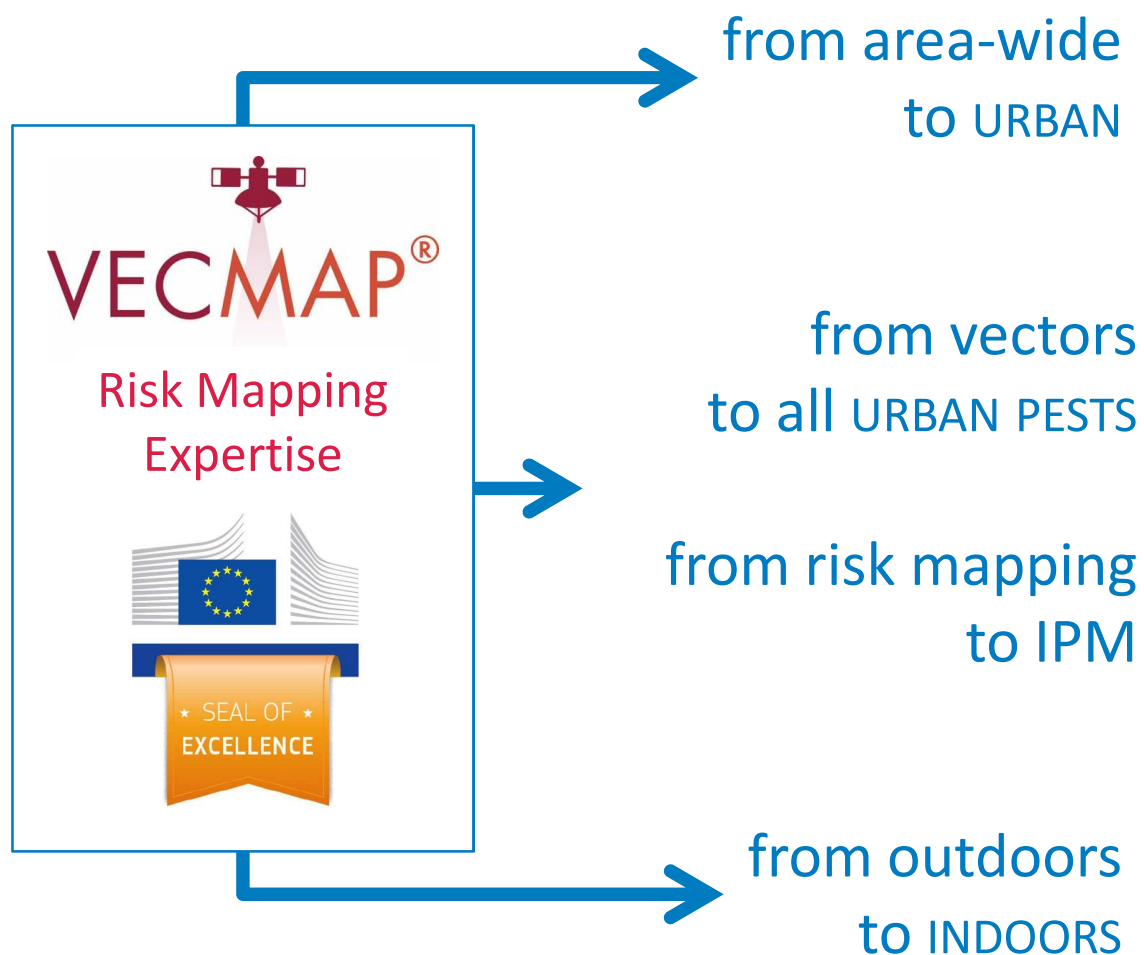
Next step: from risk mapping to IPM



900

600

300



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What value do we offer?

Research Institutes



Public Health Decision Makers

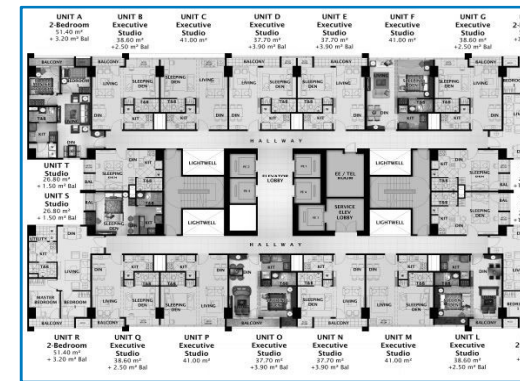


Urban



Pest Control

Private

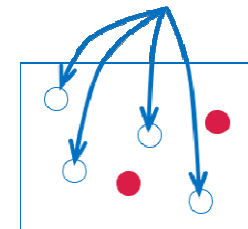


Survey costs reduced by at least 60%
AND significantly increase data quality

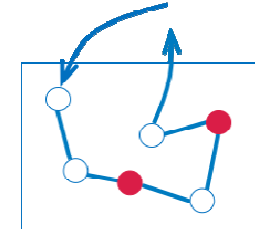
Focus on research
instead of technology
development

Improved decision
making with smaller
teams

Efficiency X2



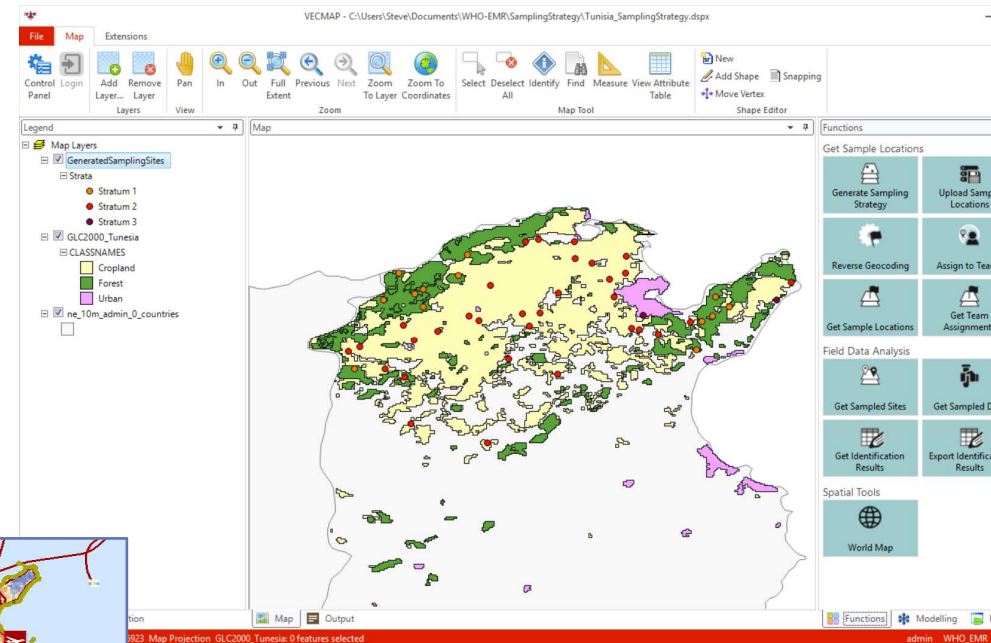
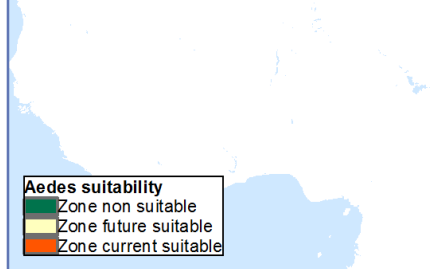
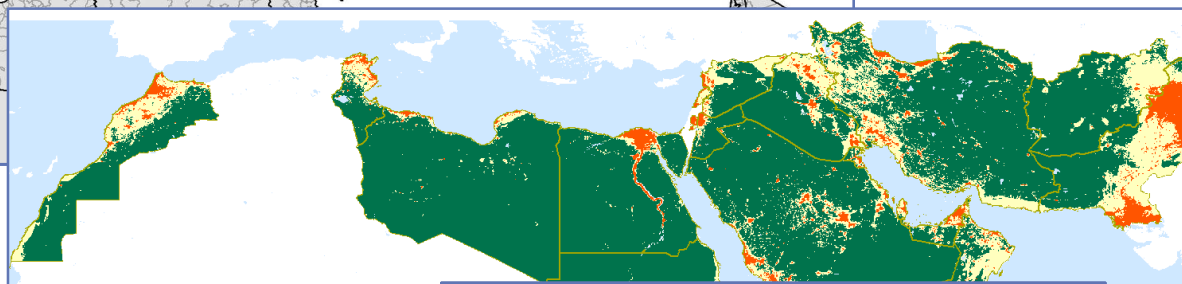
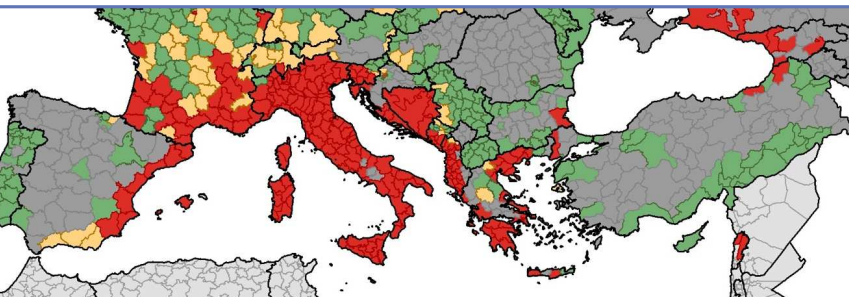
Revenue X2 &
Increased market share



AVA

Ongoing example

ZIKA Eastern Mediterranean Region



Acknowledgments



Avia-GIS VECMAP development team





Thank you for your questions

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