Citizen Science in environmental observation and health research

21.05.2024 11:00 AM – 12:30 PM CET

Organiser: Wise Angle Consulting S.L.

OneAquaHealth | WISEANGLE SYNYO

1290 UNIVERSIDADE D COIMBRA SHINE 2Europe TOULOUSE INP EFMI EUROPEAN FEDERATION for MEDICAL INFORMATICS UNIVERSITY OF OSLO ENORA INNOVATION SYNYO

WISEANGLE Consiglio Nazionale delle Ricerche Dipartimento Medicina Veterinaria Produzioni Animali UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II HIT Holon Institute of Technology HL7 Europe GHENT UNIVERSITY

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

HOUSEKEEPING RULES

The session will be entirely recorded and published on the OneAquaHealth Open Information Hub.

All participants except speakers and moderators will be **muted by default**.

Feel free to post your questions in the **chat**.

If you would like to speak, raise your hand and wait for the moderator to give you the floor.

AGENDA

Key information

Time	Topic	Presenter
11:00 – 11:05	Welcome and objectives of the webinar	**Valentina Tageo** Wise Angle Consulting S.L, Spain
11:05 – 11:17	Citizen Science Approaches in the OneAquaHealth Project	**Maria Feio** University of Coimbra, Portugal, **Harm op den Akker** SHINE 2Europe, Portugal
11:17 – 11:29	Citizen Science Approaches in the DRYvER Project	**Bálint Pernecker** University of Pécs, Hungary
11:29 – 11:41	Citizen Science Approaches in the E4Warning Project	**Elisa Mora, Frederic Bartumeus** Centro de Estudios Avanzados de Blanes (CEAB-CSIC), Spain
11:41 – 11:50	Q&A session	**All participants**
11:50 – 12:02	The Citizeen App: experiences from the developing company OUR WATCH LEADS LDA (OWL)	**Pedro Resende** (OWL, Citizeen App)
12:02 – 12:14	The success factors of Invasoras.pt, an information and citizen science platform on invasive plants in Portugal	**Elizabete Marchante** (University of Coimbra, Invasoras.pt)
12:14 – 12:26	Q&A session	**All participants**
12:26 – 12:30	Wrap up and conclusions	**Valentina Tageo** Wise Angle Consulting S.L, Spain
12:30	**END OF THE WEBINAR**	

OneAquaHealth

The OneAquaHealth project

Protecting urban aquatic ecosystems to promote One Health

Maria João Feio | Coordinator (mjf@ci.uc.pt)

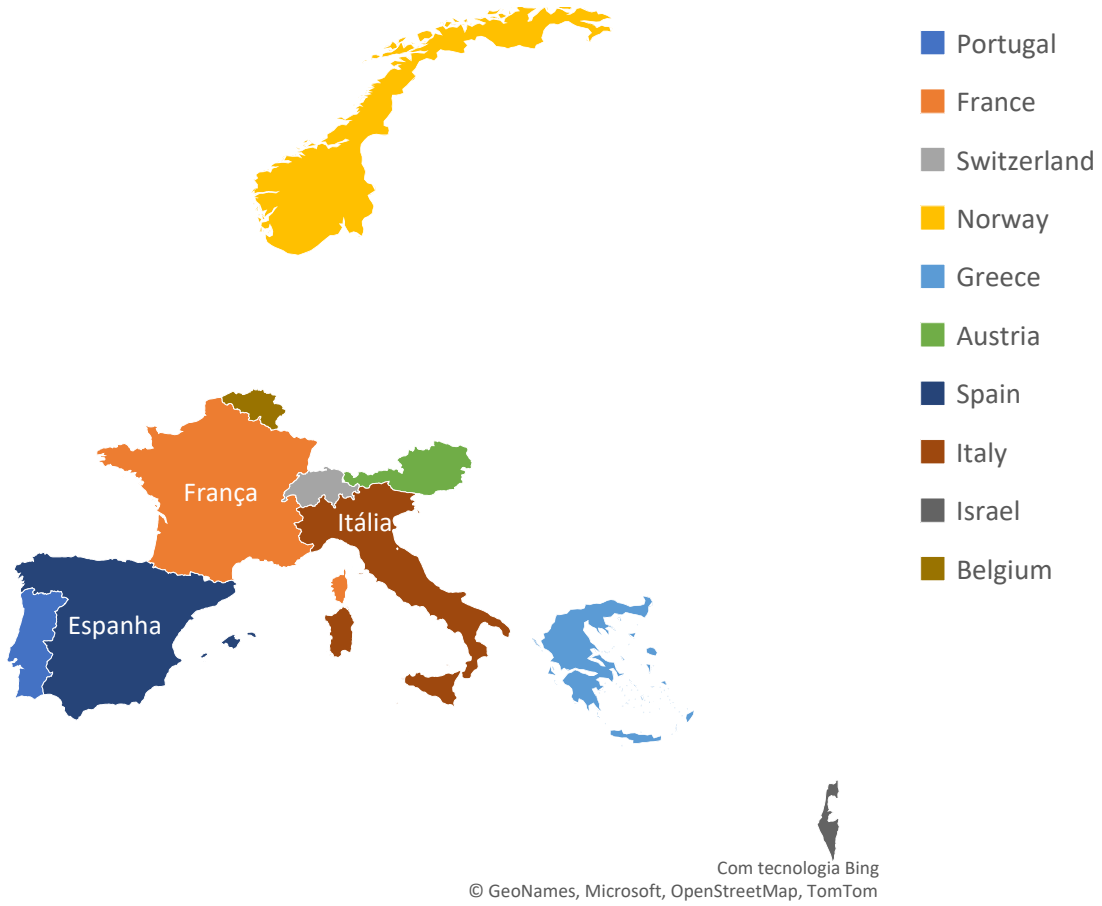
University of Coimbra & MARE/ARNET, Portugal

OneAquaHealth Webinar: *Citizen Science in environmental observation and health research*

21 May 2024

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101086521.

OneAquaHealth partners



14 partners, 10 countries

HORIZON EUROPE Framework Programme (Research and Innovation Action)

Call: Innovative governance, environmental observations and digital solutions in support of the Green Deal (HORIZON-CL6-2022-GOVERNANCE-01)

Topic: Environmental observations solutions contributing to meeting "One Health" challenges

Biology/Freshwater Ecology/Biodiversity conservation

Human Health/Public Health

Veterinary

Social Sciences

Humanities and Arts

Informatic engineering/GIS

OneAquaHealth concept...

The health of freshwater ecosystems and human health and wellbeing in urban contexts are highly interconnected

Improving results in one will result in the improvement of the other, **reestablishing the balance between nature and humans**

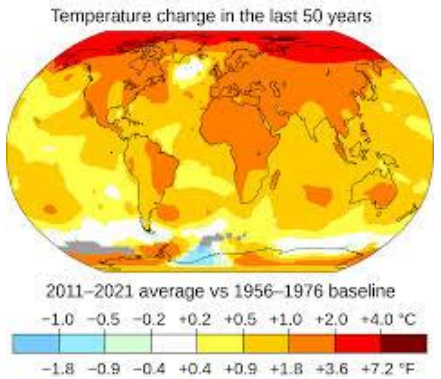
DEGRADED URBAN FRESHWATER ECOSYSTEMS

are a source of (water and vector-borne) diseases and lack of wellbeing that affect animals, plants and humans

Human Health

Water-borne and vector-borne diseases

Lack of wellbeing associated to environmental urban degradation: noise, air pollution, water pollution, lack of natural areas, disconnection with nature…



Climate changes

OneAquaHealth concept

HEALTHY URBAN AQUATIC ECOSYSTEMS as SOLUTION

Provide **better air, water, soil quality, better climate, flood mitigation, areas for improving physical and mental health**

CONSTITUTING

a BARRIER AGAINST THE EMERGENCE AND SPREAD OF HUMAN DISEASES

KEY OBJECTIVES

OneAquaHealth

IDENTIFY the level of integrity of urban aquatic ecosystems.

DETERMINE adequate early warning indicators to assess ecosystem health and predict disease outbreak risks.

INTEGRATE live Earth observation data to monitor early warning indicators.

DEVELOP a tool to allow the selection of measures to act upon early warnings and ensure environmental monitoring.

ENGAGE stakeholders raising their awareness to the importance of urban streams.

RESEARCH CITIES

OneAquaHealth

ITALY

PORTUGAL

BELGIUM

NORWAY

FRANCE

RESEARCH ACTIVITIES

TEST INDICATORS

DEPLOY EXPERIMENTS

FILL KNOWLEDGE GAPS

CITIZEN SCIENCE ACTIVITIES

TEST TOOLS

DIFFERENT CLIMATIC AREAS

CULTURAL BACKGROUNDS

DIFFERENT EXPERIENCES

20 SAMPLING SITES

OneAquaHealth Research sites

OneAquaHealth

100 sampling sites
in 5 Research sites/cities

Health of animals, plants, ecosystems and humans

OAH DIGITAL SOLUTIONS

OneAquaHealth

Predictive models

The models will use machine learning approaches such as multilayer perceptron-artificial neural networks and discriminant function models. Their adaptation will require new machine learning methods.

Decision Support System (DSS)

The DSS will be implemented through a web server system and use data provided by ESA's Copernicus Program and NASA's Landsat images. The DSS is based on R packages conceived to implement PROMETHEE methods and support the Multiple Criteria Decision Analysis (MCDA).

Environmental Surveillance System
focused on urban areas and aquatic ecosystems

Open Information Hub

The Hub will contain all the project information and allow the visualization of outputs and support tools for decision making.

City dashboards

The dashboards represent web applications that enable citizens and public institutions to access the data and their statistics through an optimized search graph and a graphical visualization.

Citizen Science Application

A mobile and desktop application for environmental observation will designed and supported by a back-office, which will enable citizens and public institutions to access data and statistics through an optimized search graph and a graphical visualization.

FOLLOW US

OneAquaHealth

Open Information Hub | www.oneaquahealth.eu

https://www.facebook.com/OneAquaHealth/

https://twitter.com/OneAquaHealth

mjf@ci.uc.pt

Scan Me

Consiglio Nazionale delle Ricerche

Funded by the European Union

OneAquaHealth

Citizen Science Approaches in OneAquaHealth

SHINE 2Europe

Harm op den Akker, Ângela Freitas, Inês Saavedra, Carina Dantas

Tuesday, May 21st, 2024

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the granting authority can be held responsible for them.

Topics

- What are the envisioned outcomes of OneAquaHealth in a nutshell?
- Where do we need help from the various stakeholders?
- The OneAquaHealth Citizen Science Research Framework
  - Phase 0 – Establishing a Collaborative Ecosystem
  - Phase 1 – Participatory Design
  - Phase 2 – Recruitment & Training
  - Phase 3 – Development
  - Phase 4 – Implementation “Citizen Science in Action”
  - Phase 5 – Communication & Knowledge Sharing

What are the envisioned outcomes of OneAquaHealth in a nutshell?

OneAquaHealth

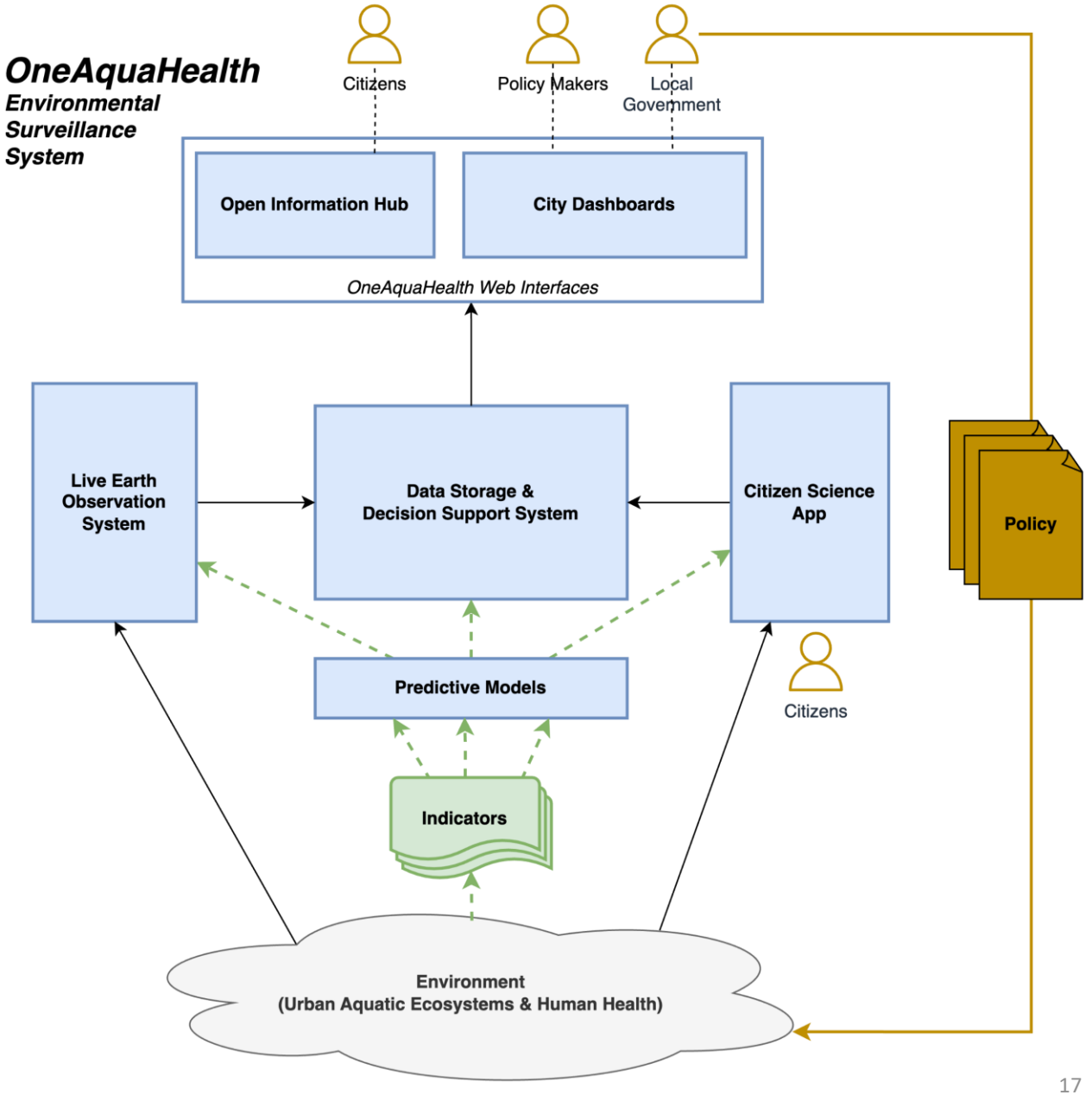
What is the ”elevator pitch”, and what will we deliver…

The “elevator pitch”:

“OneAquaHealth is building tools to ***observe the environment.*** The output is used to ***provide relevant feedback*** to policy makers, allowing them to make ***better policy decisions***. The ultimate aim is to ***improve the environment*** and subsequently the ***health of citizens***.”

Legend:

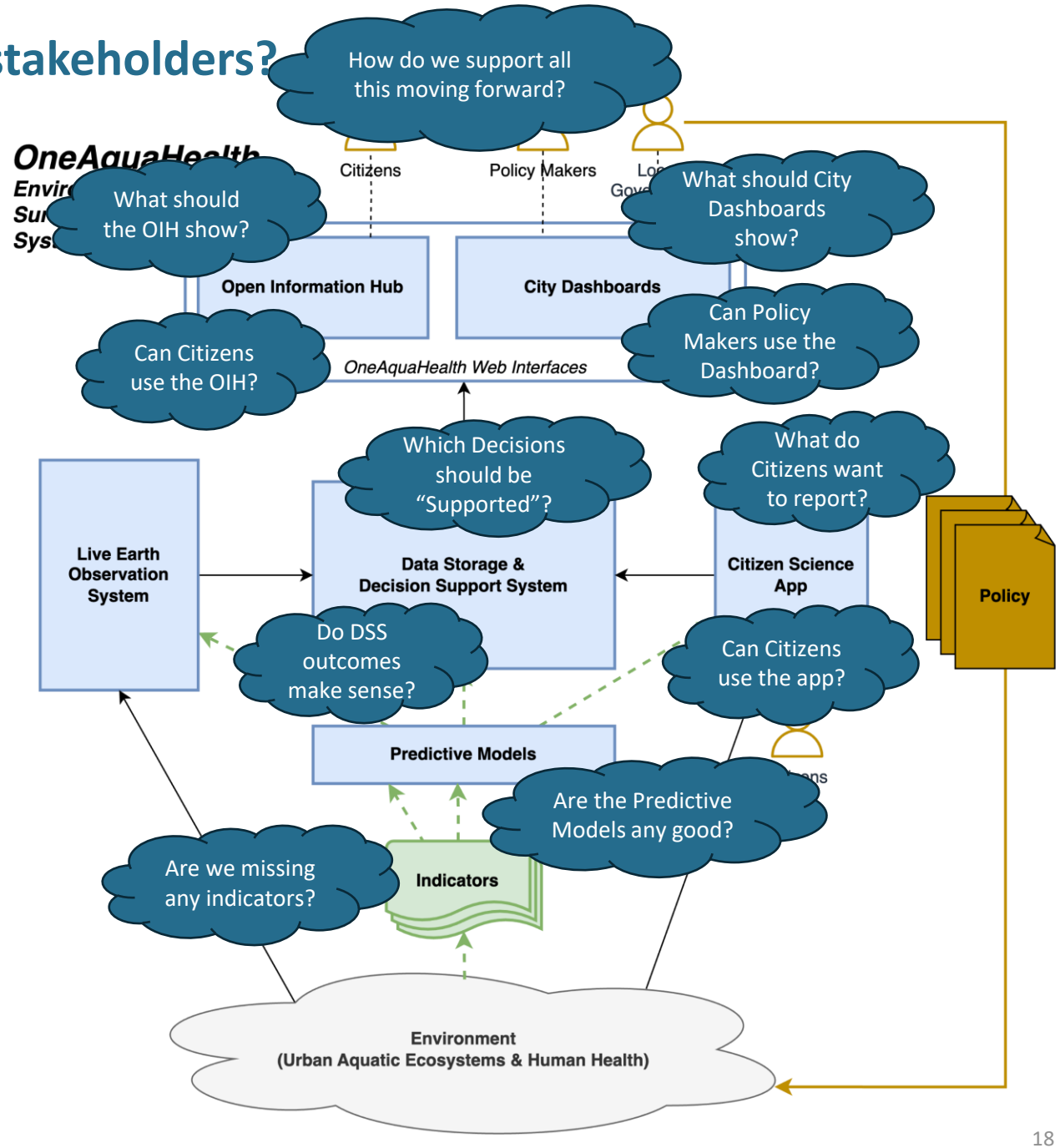
- Research activities in green (definition of indicators).
- Development activities in blue (various system components).
- Stakeholders and related activities in orange (end-users and their influence).



Where do we need help from the various stakeholders?

Where and why is Stakeholder input needed?

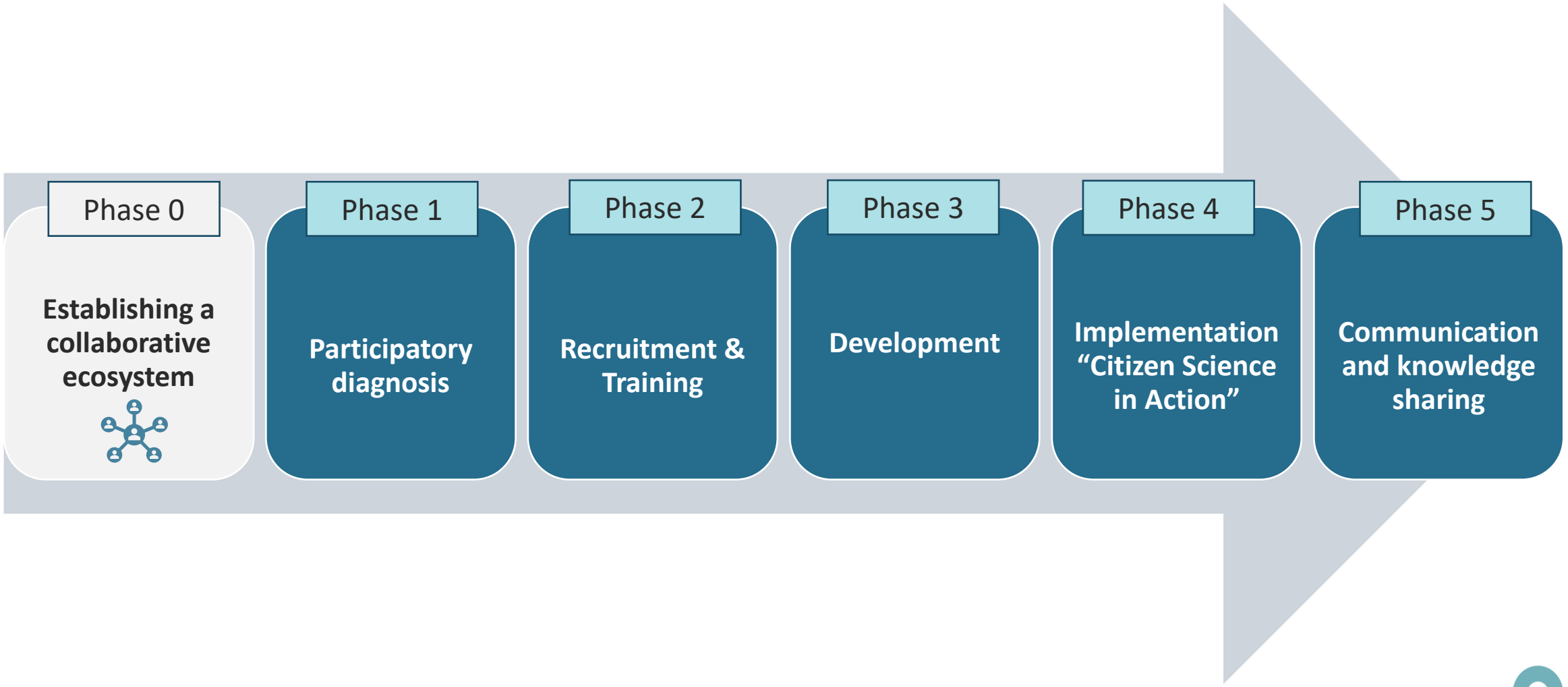
- What should the Open Information Hub show?
- Can Citizens use the Open Information Hub?
- What should City Dashboards show?
- Can Policy Makers use the City Dashboards?
- Are we missing any indicators?
- Are the predictive models any good?
- Which Decisions should be “Supported”?
- Do the DSS outcomes make sense?
- What do Citizens want to report?
- Can Citizens use the app?
- How do we support the deployment and maintenance of OneAquaHealth moving forward?



The OneAquaHealth Citizen Science Research Framework

OneAquaHealth

The 6 Phase Citizen Science Operational Framework



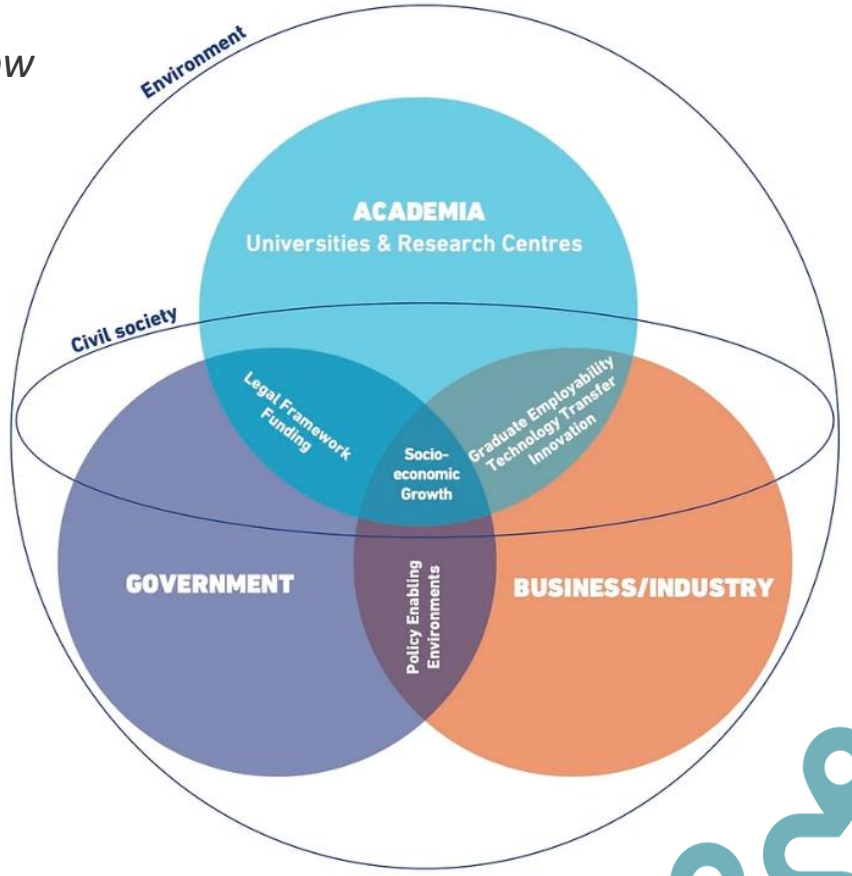
Phase 0 – Establishing a Collaborative Ecosystem ✓

"A Local Alliance is the collective name for the group of stakeholders that are somehow involved in the adoption of the OneAquaHealth solution in a specific region."

Typology of Stakeholders is based on the **"quintuple-helix" approach**, including **Academia, Industry, Government**, **Civil Society**, and **the environment**.

Instead of engaging with each stakeholder type individually, Local Alliances allow us to bring everyone together.

Allowing identification and discussion of potential conflicts of interests.



Phase 0 – Establishing a Collaborative Ecosystem ✓

Civil Society

- **Have your voice heard** and the ones of those you represent;
- **Be aware of** potential **upcoming changes** to policy and have a say;
- **Improve** your green and sustainable practices

Government

- **Connect to** researchers in environmental health;
- Be among the **first to gain insights** into the latest knowledge;
- **Let your voice be heard** and help shape the development of tools

Industry

- **Be aware of** potential **upcoming changes to policy**;
- **Have a say** in the formulation of these policy; recommendations;
- **Define ecologically sustainable practices**

Academia

- **Grow your research network** and **collaborate** with our European consortium;
- Be among the first to **get access to research data** being collected in the project

Environment

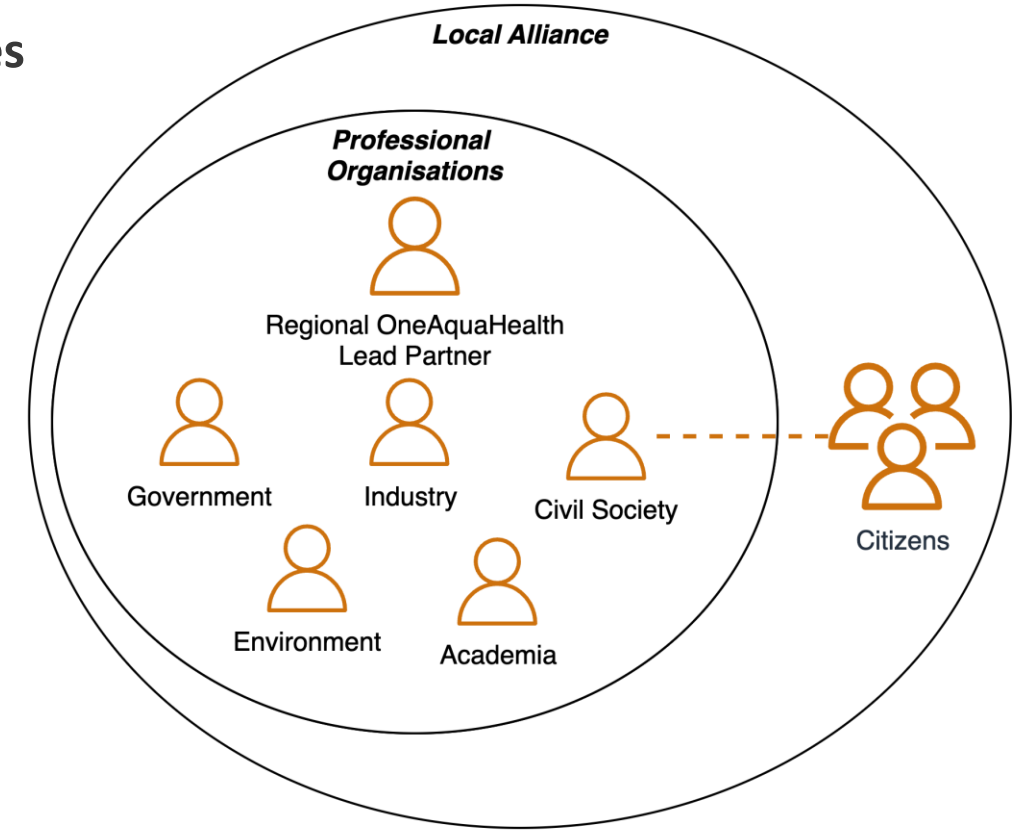
- **Receive new data** about the urban freshwater ecosystems;
- Receive **relevant information** about the **emergence of human diseases or epidemics**;
- Receive **most up-to-date and efficient strategies**

Phase 0 – Establishing a Collaborative Ecosystem ✓

Local Alliances are formed by (and led by) Regional OneAquaHealth Lead Partner **in each of the five Research Sites**

Form crucial connections to local Citizens.

Alliances must survive the end of the project to ensure sustainability.



Phase 1 – Participatory Design ✓

The first phase of citizen engagement was to gather local views, opinions and experiences of citizens, which will ultimately contribute to defining the research process itself.

A Focus group on Citizen's needs was conducted in each of the five research sites to identify topics that citizens are concerned about in their relation and interaction with the environment, particularly concerning local urban aquatic ecosystems.

The results of this phase are currently being compiled and reported.

Phase 2 – Recruitment & Training

Recruitment strategy

The initial group of citizens (including the previous focus group participants) will be involved in the research process (see Phase 3 - Development).

The larger set of Citizen Scientists may be reached through:

1. **Local Alliances** – which were formed in each research site and are essential vehicles for recruitment
2. **Local Public Platforms** – such as Citizen Labs, Urban Living Labs or community-based groups
3. **Open Calls to the community** – e.g. through local news outlets
4. **Researcher's social networks** – e.g. personal acquaintances of the OAH staff
5. **"Snowball sampling"** – recruited citizens may 'recruit' their friends and family

Phase 2 – Recruitment & Training

Training

A. Training on the topic (this is focused on contexts and environmental monitoring aspects)

- To explain the OAH project
- To discuss **indicators** to be collected and tested, considering the **specific context of each research site** (with input from Phase I – Participatory diagnosis)
- To learn on **how to conduct environmental observations** (may include blended formats for environmental training)

B. Training on the process of data collection (this is operational and technical)

- **Which data** will be collected and **how it will be reported**?
- **How to use** the Citizen Science App?

C. Train the trainer: to create and train new groups of citizen scientist

- **How to create and train new groups**, thus expanding the citizen observation capacity in each site?

Phase 3 – Development

In the **Development Phase**, citizens will help co-design the specifics of the study to be conducted in their research site.

The initial research protocol is designed by the consortium, based on the outcomes of **Phase 1 – Participatory Design**.

In the development phase, citizens provide **feedback** to **finetune** the designed research protocol:

- Is **the right data** being collected to support local policymaking?
- Are **the training procedures clear** and easy to follow?
- Are the tools (i.e. the Citizen Science App) **adequate and easy to use**?
- Is the recruitment strategy **optimal for the local context**?
- …

Phase 4 – Implementation “Citizen Science in Action”

Data collection and tool testing

- The project becomes operational in the research sites.
- The Citizen Scientists **start making environmental observations** and **testing the OAH Citizen Science App in the field**
- Environment-related data and Human health-related data are fed into the OneAquaHealth system

Gamification

During this phase, additional **gamification strategies** will be tested to enhance the **engagement** of the Citizen Scientists, and to encourage the recruitment of additional participants.

Phase 5 – Communication & Knowledge Sharing

Knowledge sharing strategy

- Citizens will be also involved in sharing and **delivering the research results to policy-makers and society**, through the organization of events at universities, schools, local assemblies, as well as leisure and volunteering organisations.

- **Monitoring events will be periodically promoted** by the project partners to keep the interest and engage new participants.

Innovative dissemination actions

Theatre-in-Science Play
A theatre play will be **co-created with citizens** through citizen science assessments (e.g., inquiries) or direct organised talks (live or through videoconference) and presented in unconventional venues in Portugal (near real urban streams, in the city).

OneAquaHealth

Questions?

In pursuit of the disappearing water with a mobile phone

User engagement in the DRYRivERS citizen science project

Bálint Pernecker

Department of Hydrobiology, University of Pécs

perneckb@gamma.ttk.pte.hu

OneAquaHealt Webinar

21/05/2024

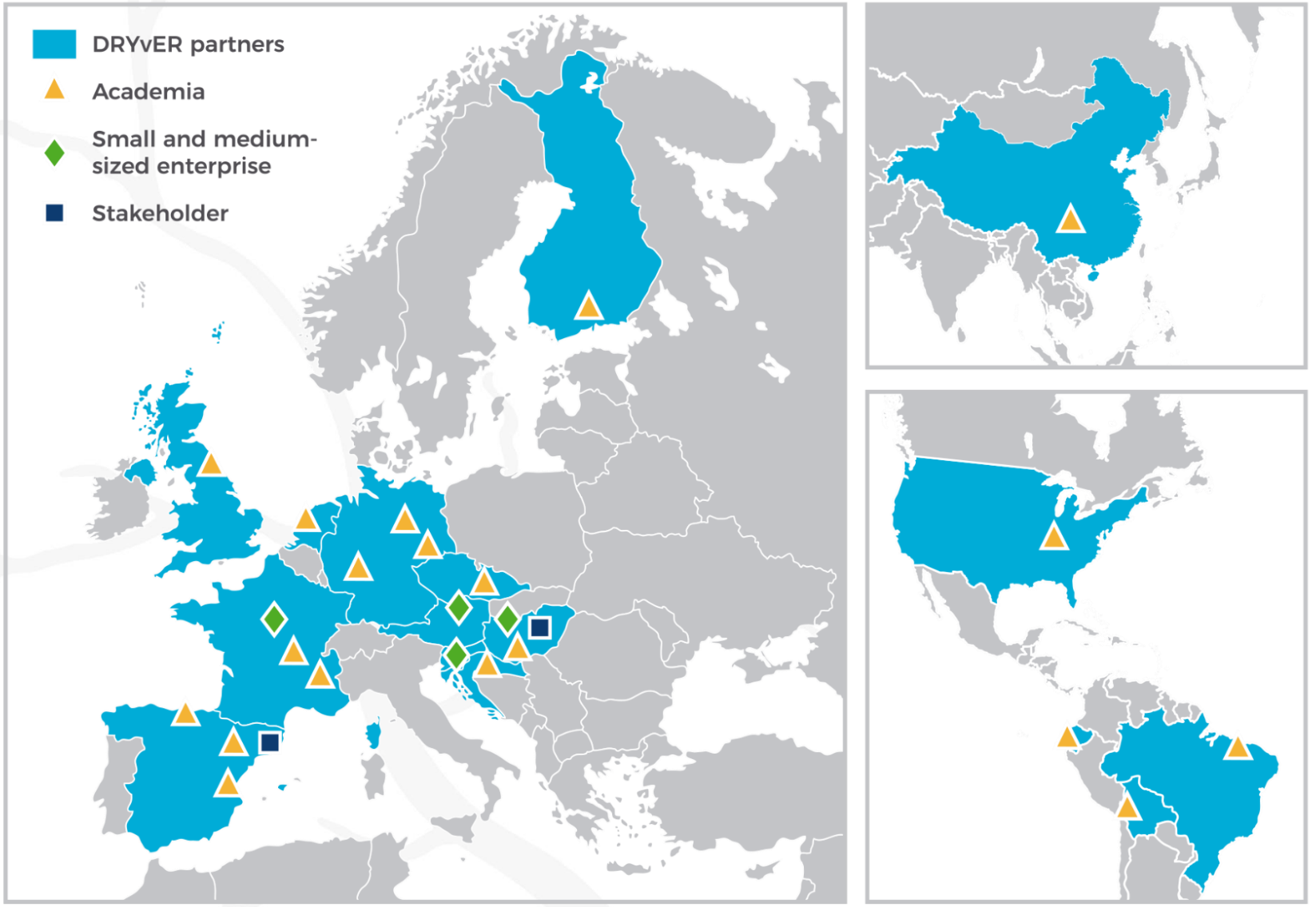
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 869226

The DRYvER project

16 countries

25 institutes

100+ researchers

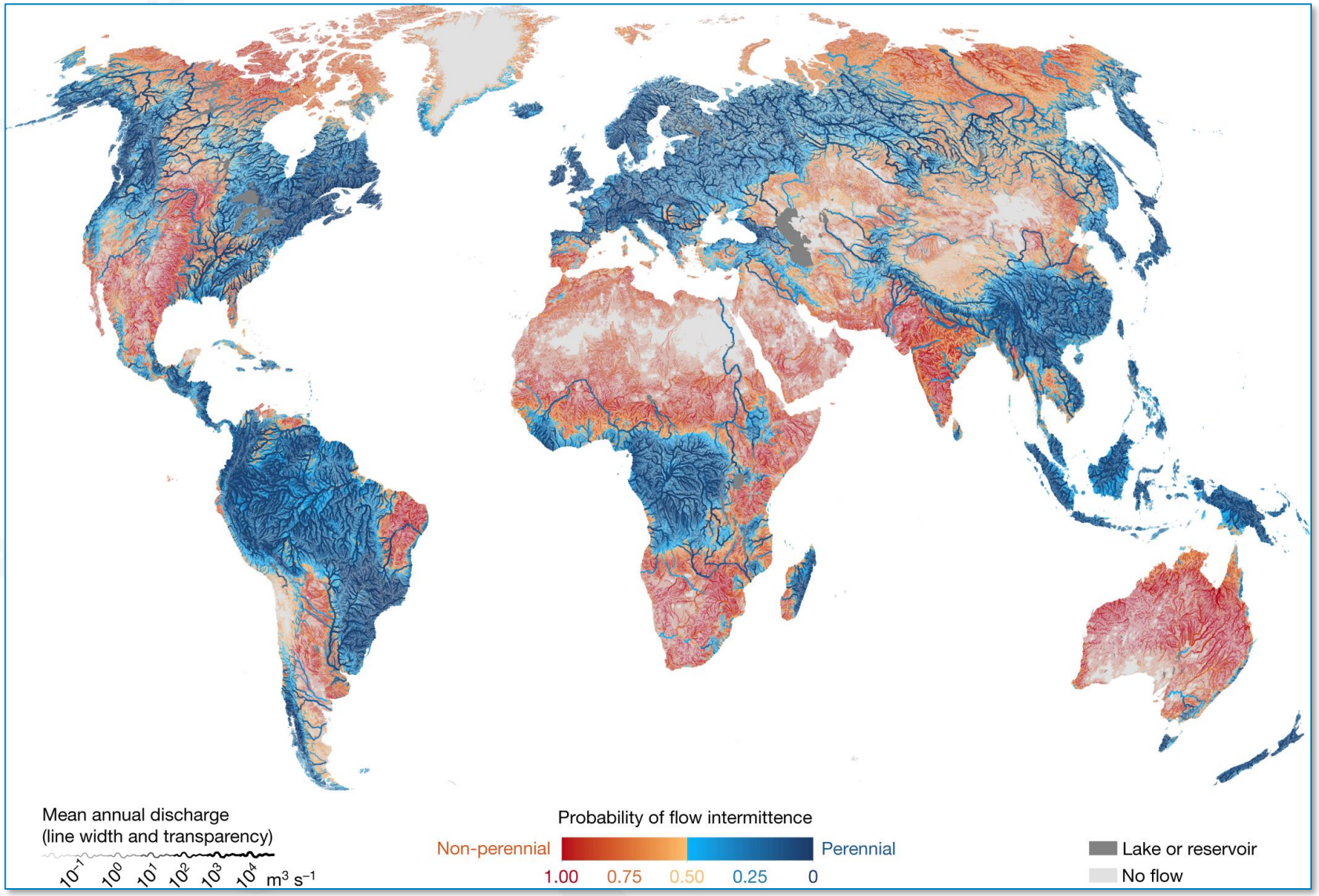


https://www.dryver.eu

What is the problem?

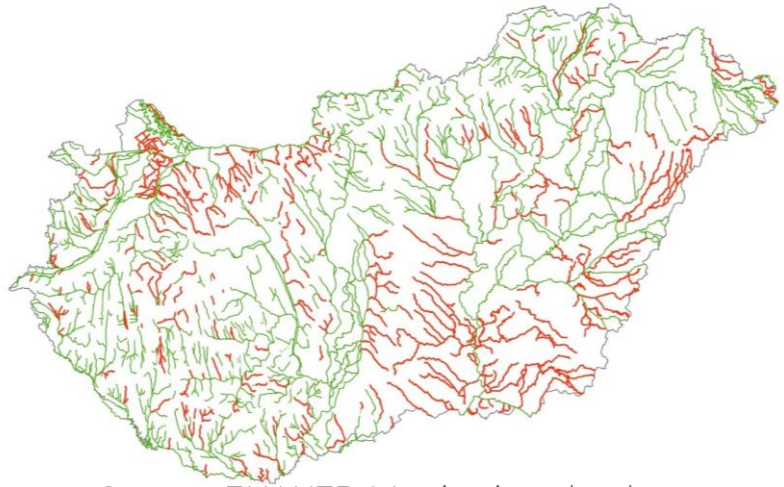
- The drying up of streams?
- More than 50 % of the Earth's streams are intermittent
- (natural and anthropogenic too)
- Somewhere it has always been the case
- However, in other parts of the word it is a new phenomenon

Messager et al. 2021



What is the problem?

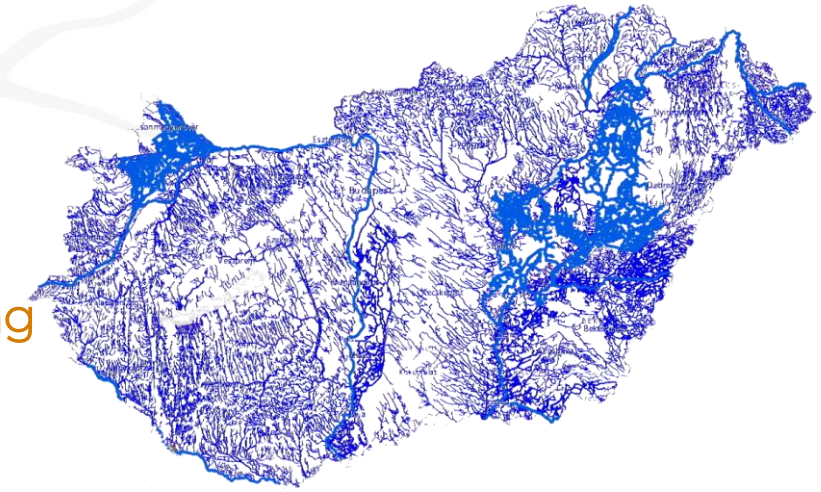
- Perennial waters are shifting towards an intermittent flow regime
- This affects mostly small headwater streams
- These make up the largest part of river networks
- Almost no hydrological data is available on these streams



Source: EU WFD Monitoring database

In Hungary

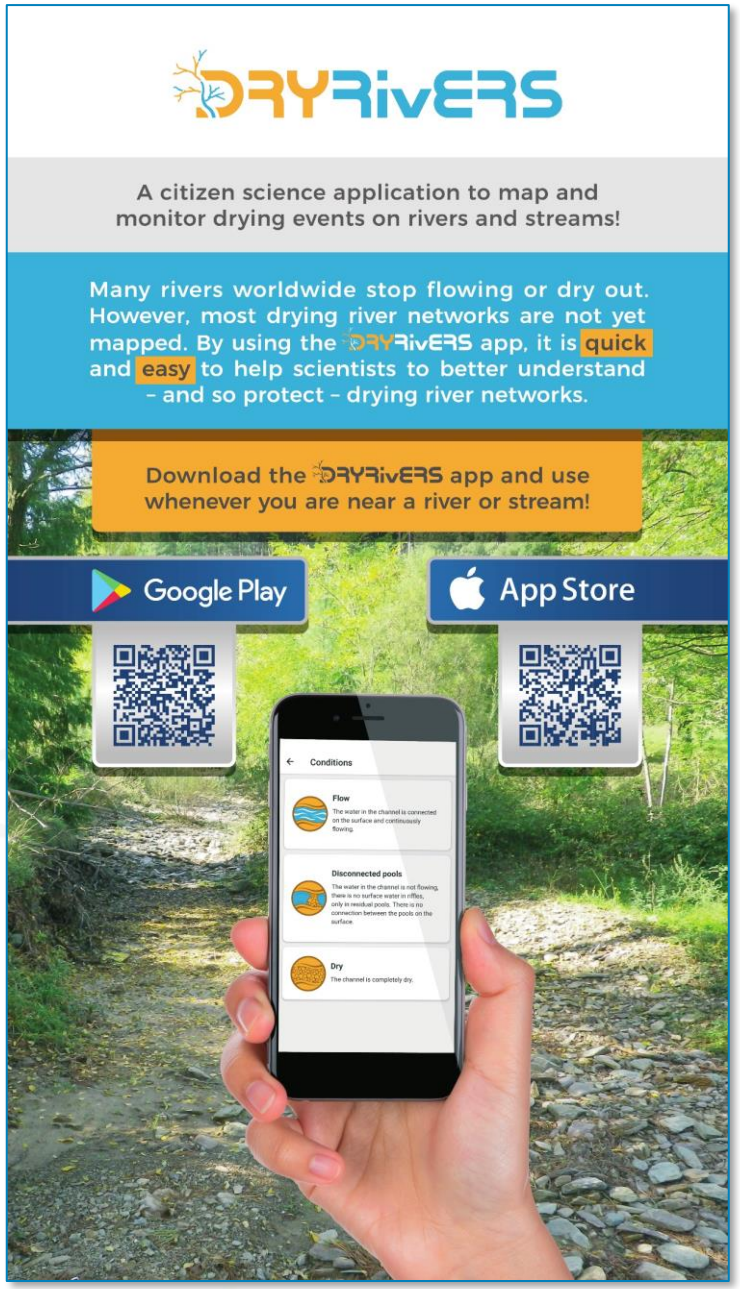
- More than 9 800 sections registered
- Only ~10 % have detailed monitoring data (catchment>10 km^2)
  - ~30 % of these water bodies are definitely affected by drying
- The rest (8 800) 1st and 2nd order streams may be affected!



https://geoportal.vizugy.hu/vizkeszletgazd_vgt/

The DRYRivERS application

- The aim of the DRYRivERS app is to **enable citizens to collect information about drying events**.
- With this field information, citizens will contribute to the **mapping of drying rivers** and will help to i**mprove scientific predictions** of the future impacts of climate change in these ecosystems.



The two "faces" of DRYRiVERS

1) The mobile application

- Quick and easy offline data recording on the field.

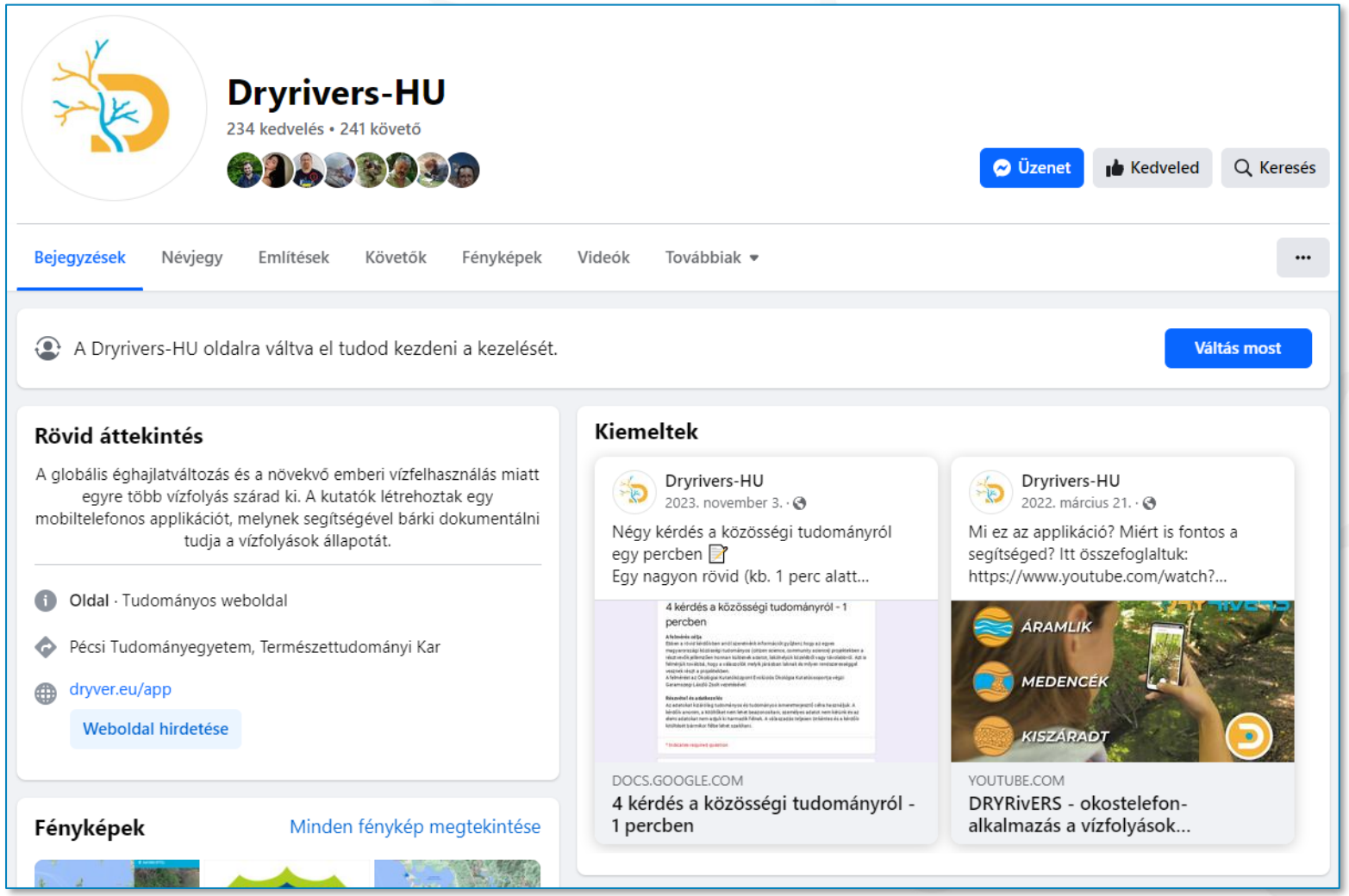
2) The web application

- Filtering, visualization, editing, and downloading data, as well as retrieving statistics and managing profiles.

+1) Supporting websites

- Guides and manuals, promotional materials, etc.
- FB page has also been created to support users:
- https://www.facebook.com/Dryrivers.HU

Facebook



Facebook page created specifically to support Hungarian users!

- News
- Information
- Aid
- Local challenges

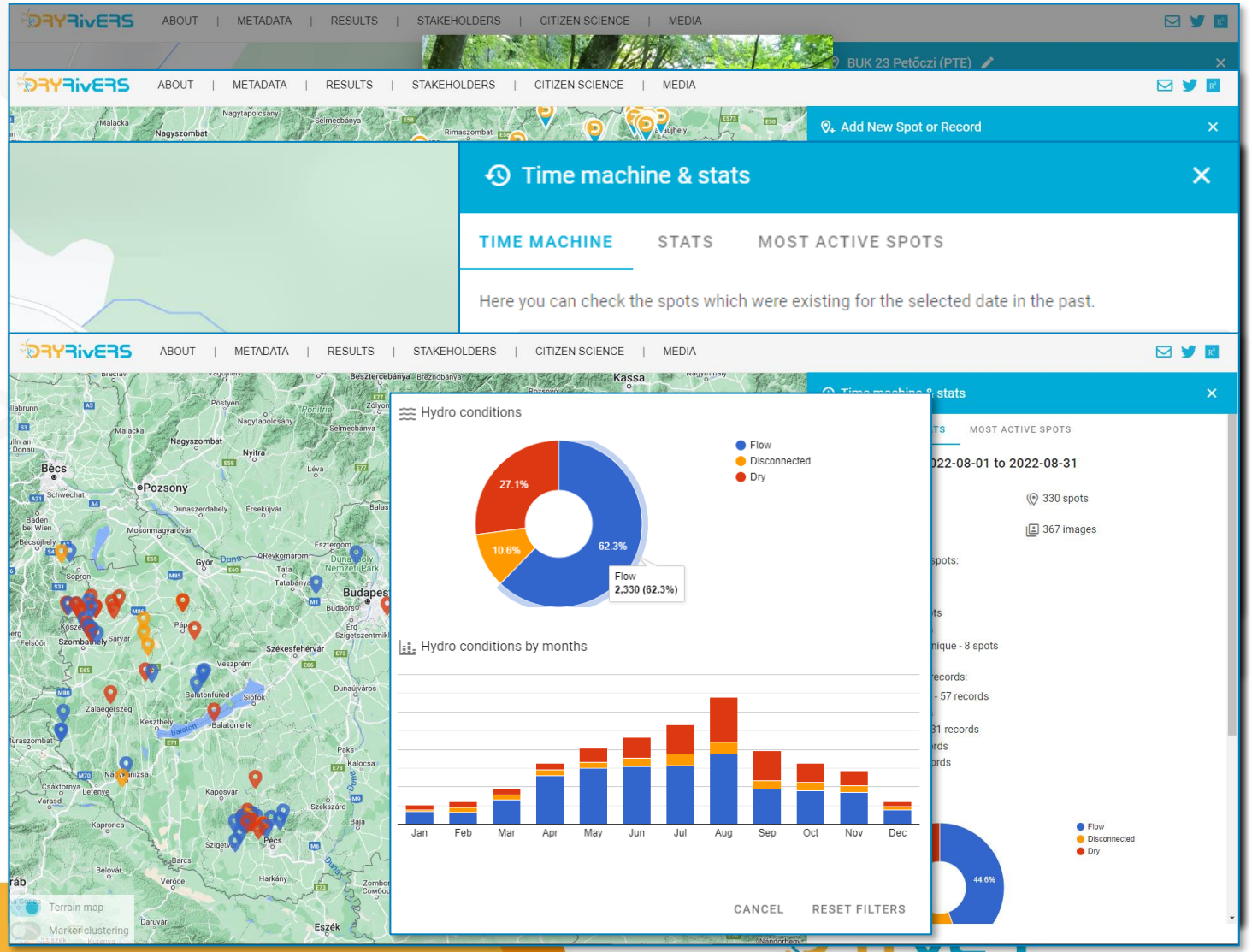
@Dryrivers.HU

The mobile application

The web application - https://www.dryver.eu/app

Main features:

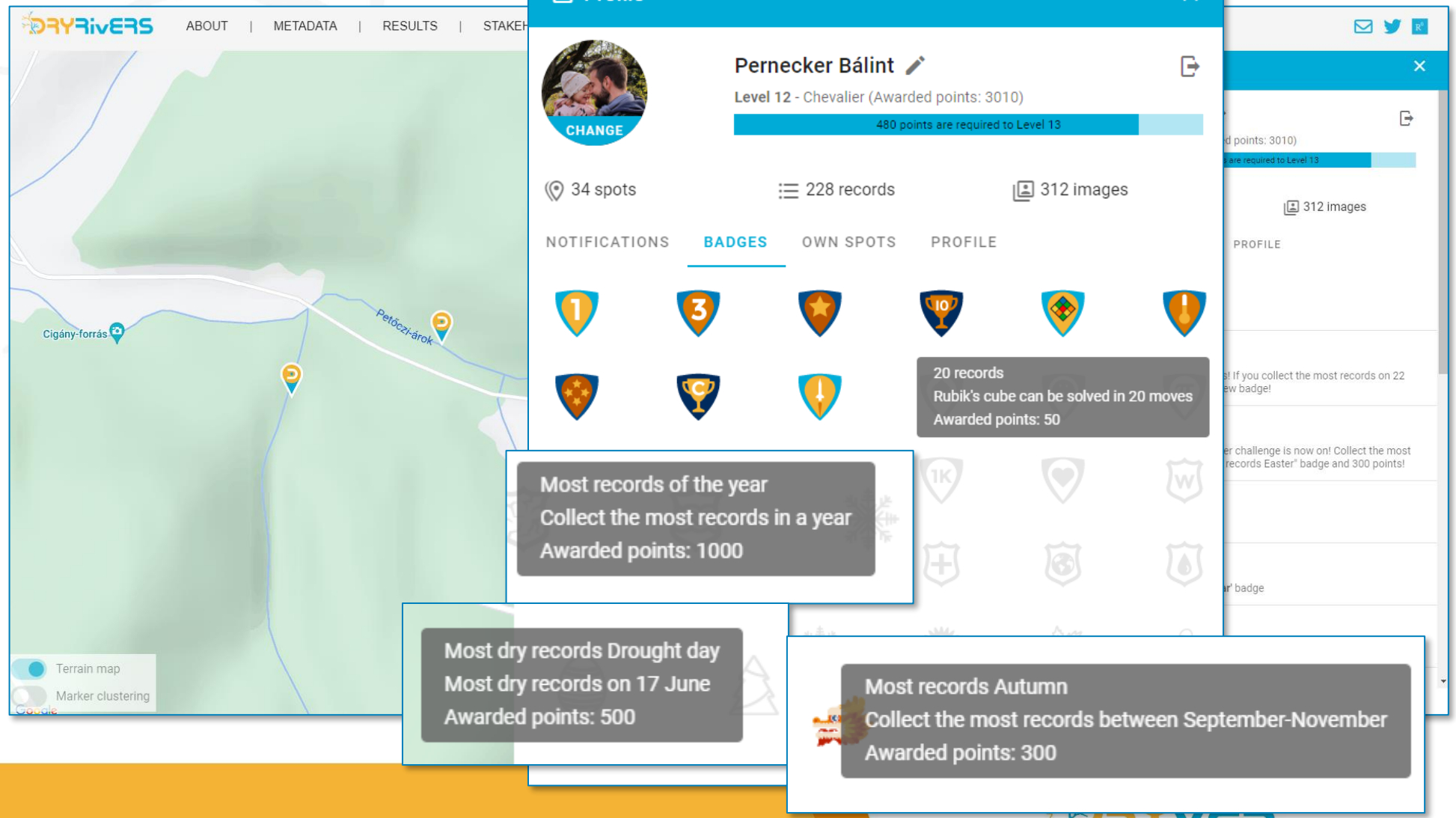
- Real-time map of all recorded data
- The users here can
  - add new spots and records
  - edit their previously recorded data
  - download data
  - use Time machine & stats:
    - filter data/spots/records
    - statistics
  - get information (tutorial)



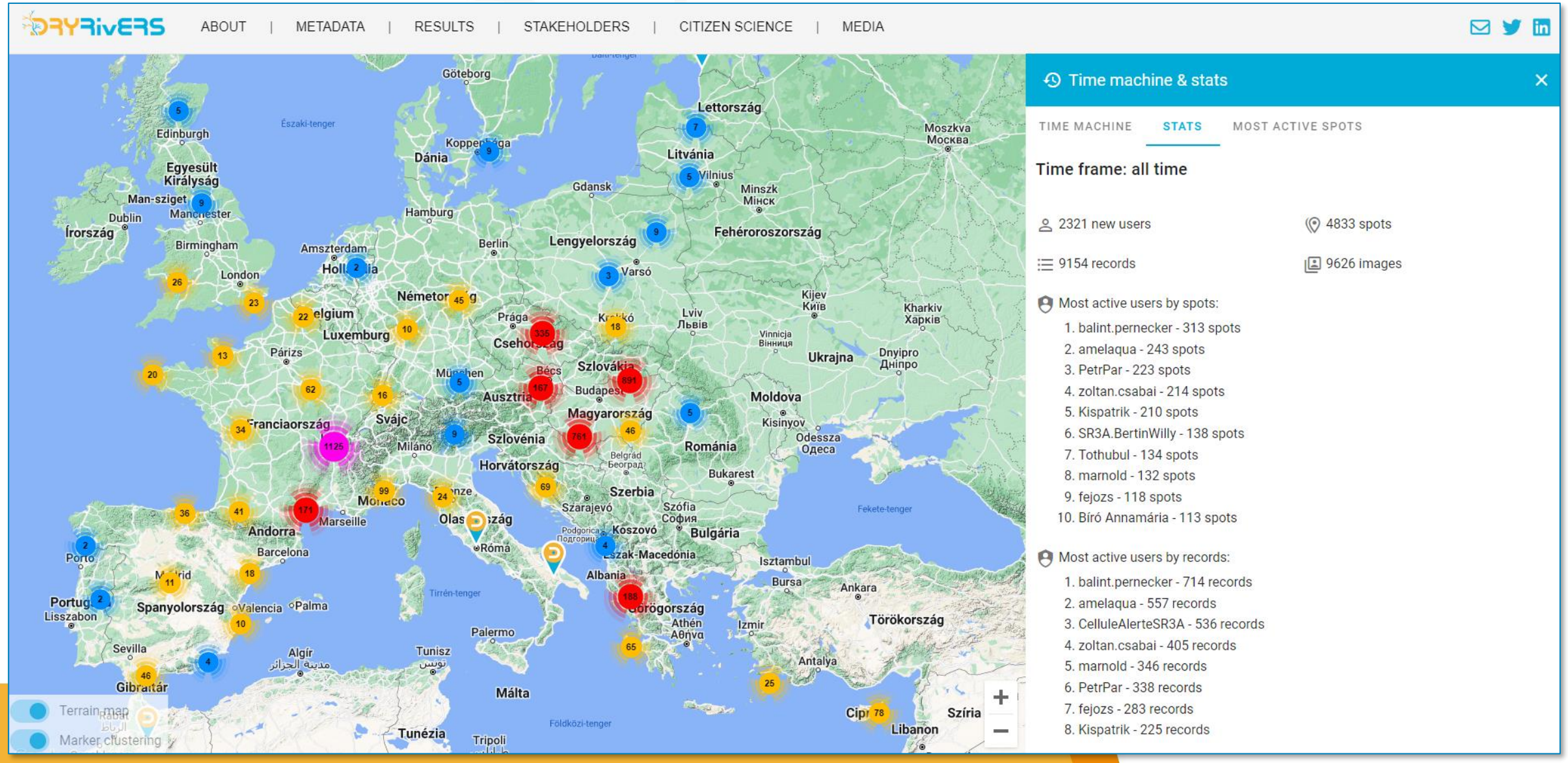
The web application - https://www.dryver.eu/app

Main features:

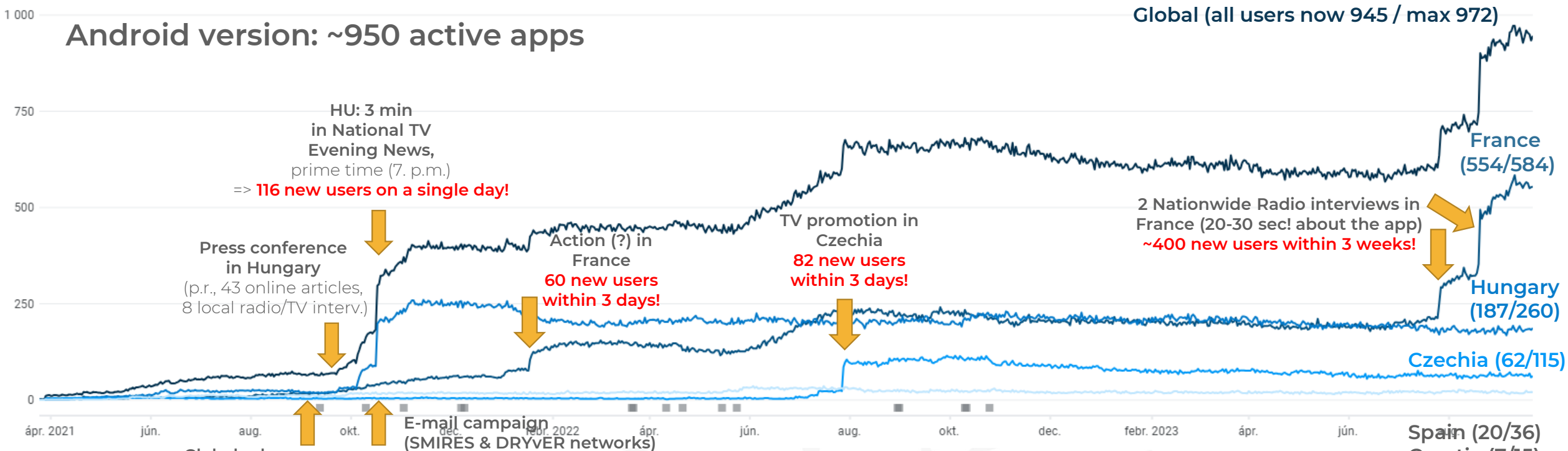
- User profile



The web application - https://www.dryver.eu/app



Android version: ~950 active apps

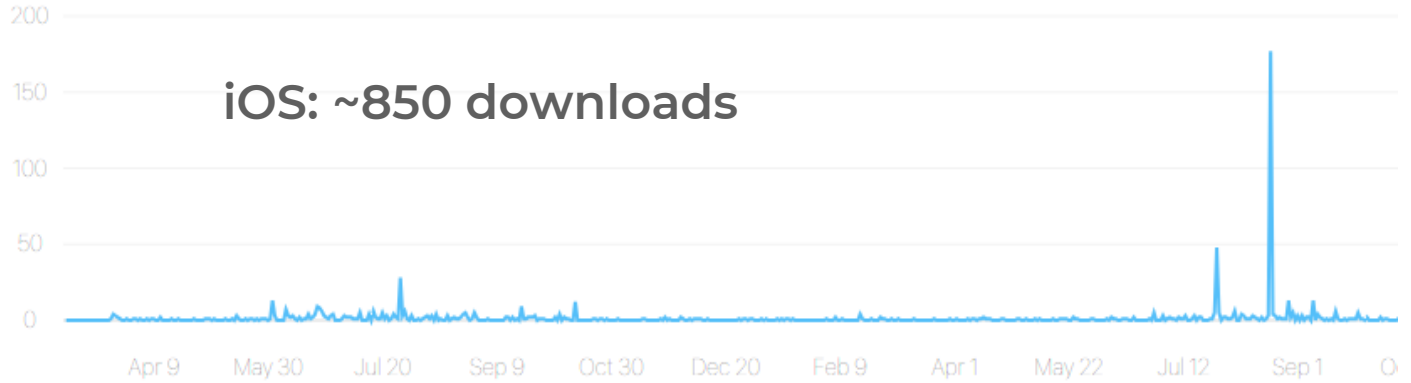


UK (12), Germany (17), Brazil (9), Bolivia (7), Italy (7), Belgium (6), Columbia (3), Austria (3), Hollandia (3), Portugal (2), Denmark (2), Chile (2), Switzerland (2), + 26 with 1.

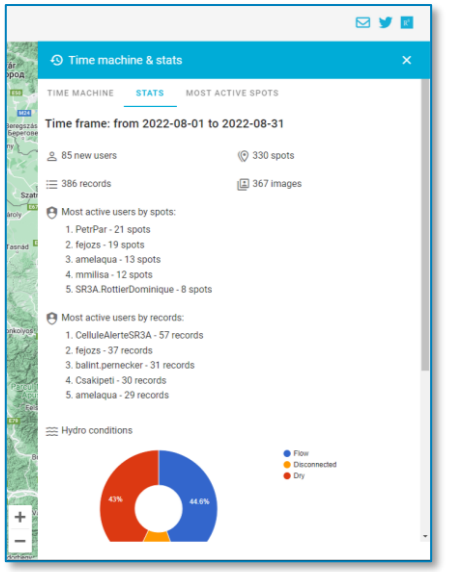
Spain (20/36)
Croatia (7/15)
Finland (7/21)

- More than 2300 registered users
- ~ 1500-1600 active apps worldwide.
- ~ 85% from FR, CZ, HU where local campaigns were made.
- Any small but widely distributed promotion may help
- Especially TV/radio spots/interviews
- **Engagement level:**
  - **~40-50% of users left within 1 year**
  - **50% remained and ~10% active, continuously reporting**

iOS: ~850 downloads

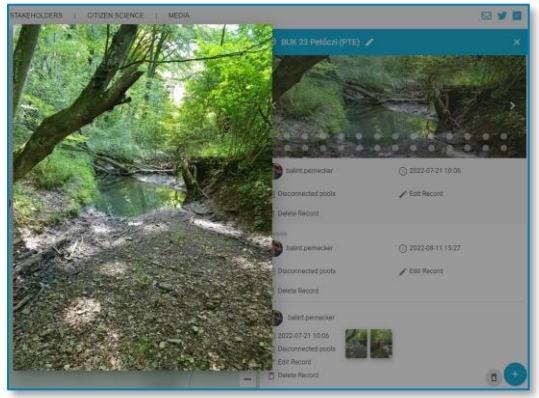


What helps us to convince and retain as many users as possible?



Efforts to increase user engagement

- **Immediate feedback:** the result of the user's work is visible immediately.
- **Full open access data:** all users have full and immediate access to all data.
- **Push notification:** automatic or unique, group or personal notifications from admins to users.
- **Gamification:** scoring, ranking, badging, and challenges.



Main drawback in our case

DRYRivERS is/was a small side-project of the DRYvER H2020 research project

=> NO dedicated budget for long term maintenance

=> NO money and NO manpower for marketing & management

=> all what 'was done' and 'will be done' is based on volunteering

Is this type of user engagement effective?

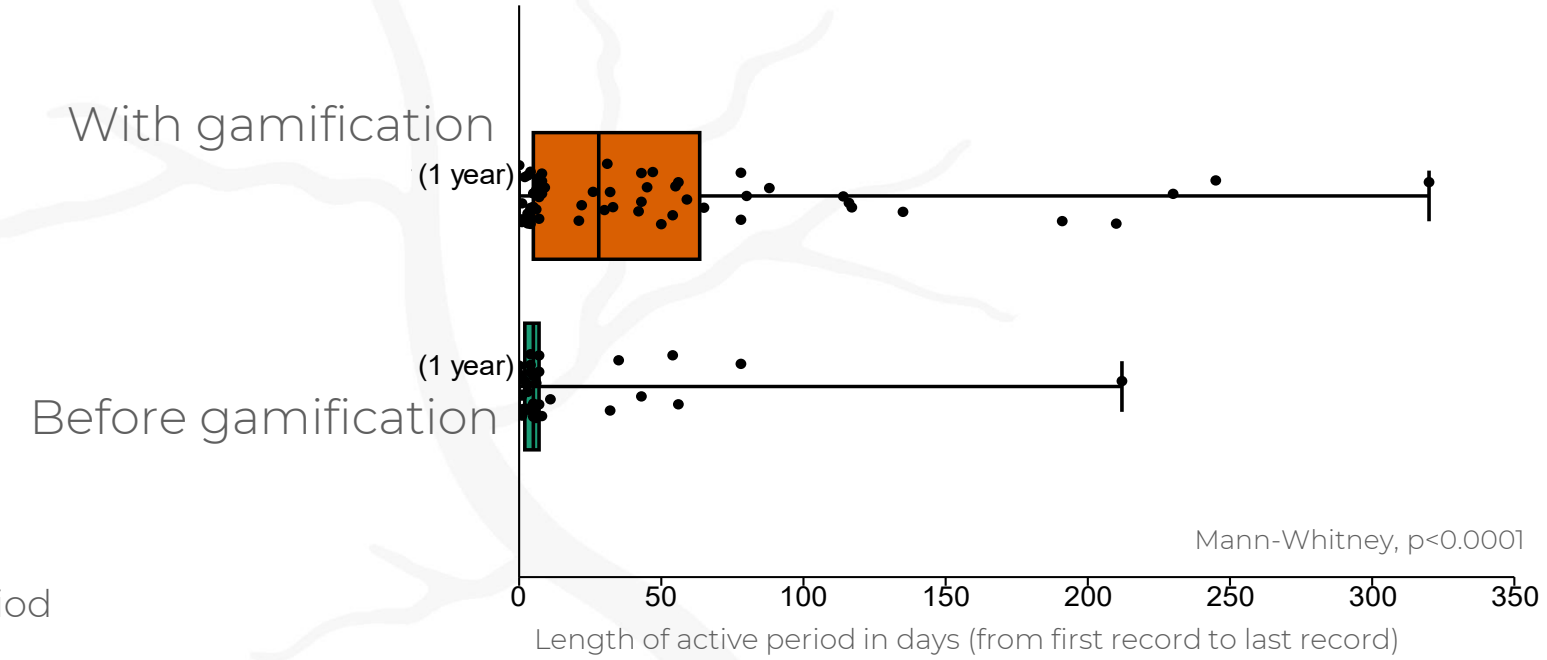
Preliminary results based on a pre-selected set of users from Hungary
(having more records than 1, excluded those who registered before the 1-y period and/or remained active after the 1-y period)

More users stay with us!

Before gamification	With gamification
~5%	~18%

% of active (>1 record) users are still with us
(have active app on phone) by the end of 1-y period

Longer active periods!



Truchy et al. 2023 - BioScience

EUROPEAN UNION PRIZE FOR CITIZEN SCIENCE

Honorary mentions

OXFORD

Editor's choice

BioScience, 2023, **73**, 513–521

https://doi.org/10.1093/biosci/biad045

Advance access publication date: 19 July 2023

Forum

Citizen scientists can help advance the science and management of intermittent rivers and ephemeral streams

Amélie Truchy, Zoltán Csabai, Louise Mimeau, Annika Künne, Bálint Pernecker, Willy Bertin, Florent Pellizzaro and Thibault Datry

Amélie Truchy (amelie.truchy@inrae.fr), Louise Mimeau, and Thibault Datry are affiliated with INRAE, UR RiverLy, Centre Lyon-Grenoble Auvergne-Rhône-Alpes, in Villeurbanne, France. Zoltán Csabai and Bálint Pernecker are affiliated with the Department of Hydrobiology, in the Faculty of Sciences at the University of Pécs, in Pécs, Hungary; Zoltán Csabai is also affiliated with the Department of Botany and Zoology, in the Faculty of Sciences at Masaryk University, in Brno, Czechia, and with the Balaton Limnological Research Institute, in Tihany, Hungary. Annika Künne is affiliated with the Geographic Information Science Group, at the Institute of Geography at Friedrich Schiller University Jena, in Jena, Germany. Willy Bertin, and Florent Pellizzaro are affiliated with the Syndicat de la Rivière d'Ain Aval et de ses Affluents, in Ambérieu-en-Bugey, France.

Abstract

Intermittent rivers and ephemeral streams are the world's dominant type of river ecosystem and are becoming more common because of global change. However, the inclusion of intermittent rivers and ephemeral streams in water policies and management plans remains largely limited because monitoring schemes and tools are designed for perennial rivers. In the present article, we discuss how smartphone applications used by citizen scientists can quantify the extent and occurrence of intermittent rivers and ephemeral streams. We also introduce a new app, DRYRivERS, specifically designed to monitor intermittent rivers and ephemeral streams. After a year of use, we counted more than 3600 observations from more than 1900 river reaches across 19 countries and four continents. Through three case studies, we then show that citizen science can improve our knowledge of the prevalence of intermittent rivers and ephemeral streams in the landscape, enhance hydrological modeling and calibration, and guide managers in setting water abstraction restrictions. Together, our approach demonstrates how citizen science can be incorporated into environmental monitoring to better inform river management and policy.

Keywords: citizen science, intermittent rivers and ephemeral streams, smartphone app, hydrological modeling, water management

Truchy et al. 2023 - BioScience

How can drying observations help managers and scientists?

Case study I: Monitoring river hydrological state for regulatory purposes

- The **Syndicat de la Rivière d'Ain Aval et ses Affluents (SR3A)** is a public authority responsible for managing the river Ain catchment, in France. **SR3A is using the DRYRivERS app rather than implementing water level in situ sensors.**

Case study II: Mapping intermittent rivers and ephemeral streams in the landscape

- Crowdsourced data could reveal **newly drying streams** (extreme drought in 2022 across Europe)
- Crowdsourced data have the potential for **supplementing data from gauging stations**, and could **complement** or sometimes **contradict** hydrological models.

Case study III: Modelling hydrological states of intermittent rivers and ephemeral streams

- Modelling drying events in river networks is a key step to understanding and conceptualizing IRES and to estimating hydrological patterns under **future climate scenarios**.
- **The outputs of the model showed an increase of the performance of the model to reproduce dry events when the crowdsourced data were included in the training data set.**

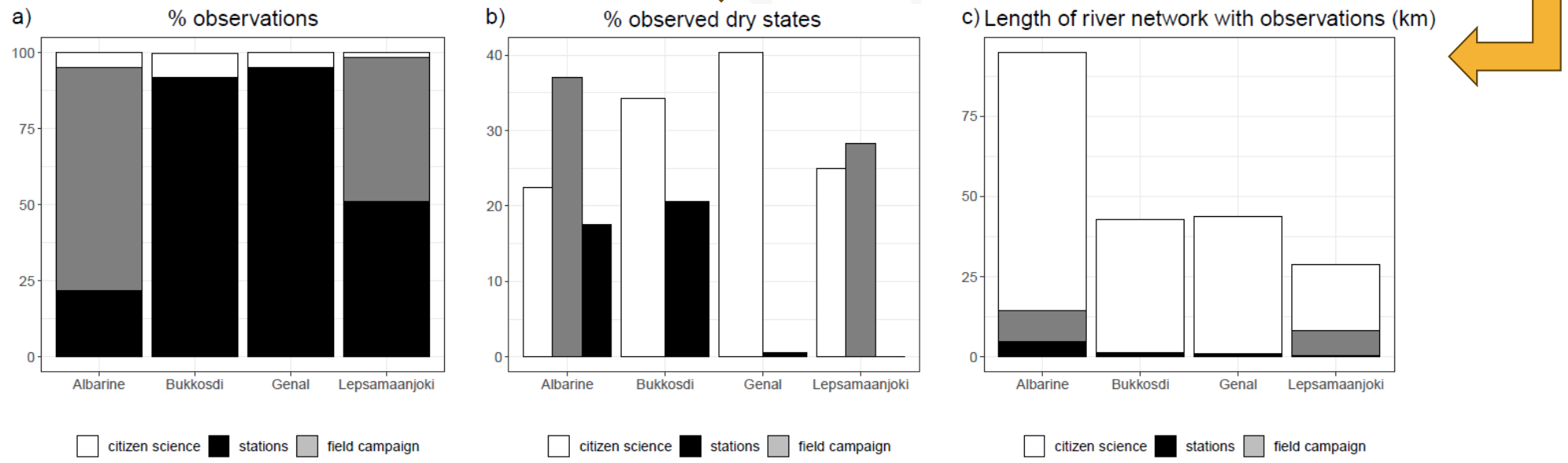
How do a CitSci projects can help research?

Validating hydrological models in four European drying river network

much less data compared to official monitoring and gauging stations

data from upper sections (more likely to detect drying)

CitSci covered an much larger part of the river network



More accurate hydrological models!

Thank you for your kind attention!

https://www.dryver.eu

YouTube
DRYvER_H2020
@DRYvER_H

@DRYvER_H2020

Bálint Pernecker
Department of Hydrobiology, University of Pécs
perneckb@gamma.ttk.pte.hu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 869226

Citizen Science Approaches in the E4Warning Project

Frederic Bartumeus, E4Warning director
Elisa Mora - Communication at Mosquito Alert
CEAB - CSIC

Funded by
the European Union

E4WARNING

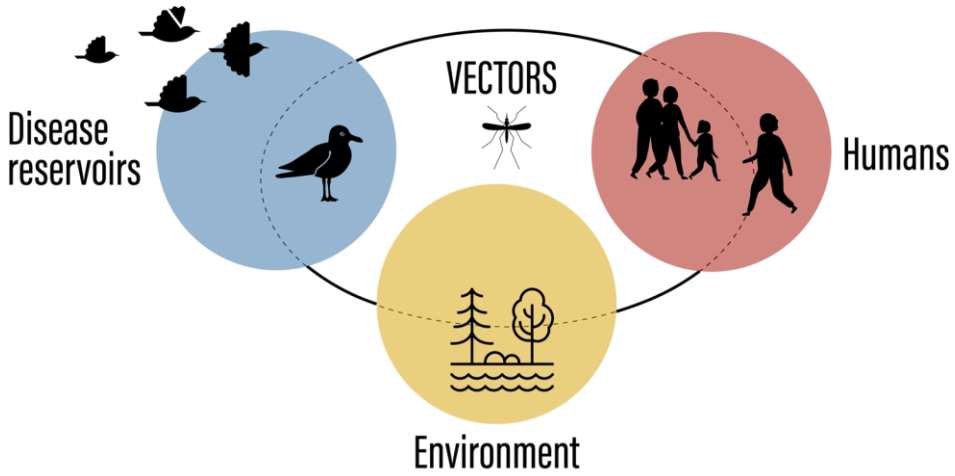
E4Warning Project

Eco-Epidemiological Intelligence for Early Warning and response to Mosquito-borne disease risk in Endemic and Emergence Settings

- Mosquito-Borne-Diseases are emerging
- The burden is high in tropical and subtropical areas. Increase in temperate areas
- Complex escenario needs an innovative and interdisciplinary approach

E4Warning - Environmental observations solutions contributing to meeting One Health challenges

ESSENCE: **HEALT DATA & ENVIRONMENTAL MONITORING**



INTERDISCIPLINARY & INNOVATIVE APPROACH from different fields

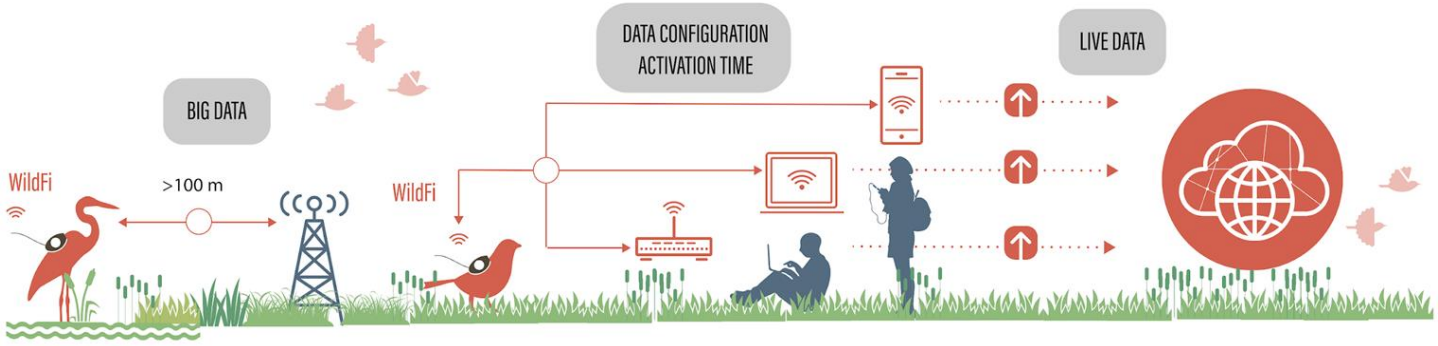
- Entomology
- Movement ecology
- Epidemiology
- Earth Observation science
- Sensor engineering
- **Citizen science expertise**
- Sociodemography
- Spatial statistical modelling

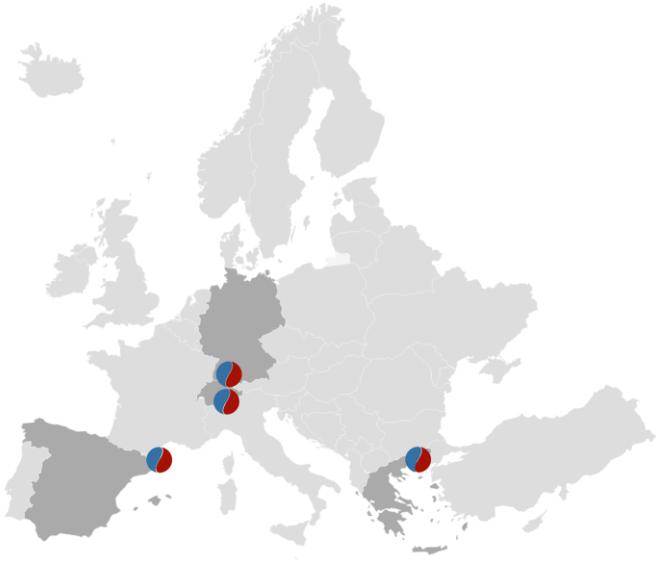
GOAL: Early Warning System under ONE HEALTH approach, which aims to improve our understanding of the interplay between humans, mosquitoes, reservoir species and the environment for a better disease intelligence capable of anticipating and identifying MBDs epidemic risk and outbreaks.

Wetlands and peri-urban areas to study pathogen spillover potential from wetlands

Calibrate and Validate novel monitoring tools at local scale:

- Traditional surveillance: abundance
- Smart-traps surveillance: real-time data
- **Citizen Science:** MOSQUITO ALERT for invasive species monitoring





- Aiguamolls de l'Emporda (Spain)
- Sichinia-Marathona (Greece)
- Bodanrück (Germany)
- Bolle di Magadino (Switzerland)

Aedes albopictus introduced + DENV imported

Culex sp. WNV suspected

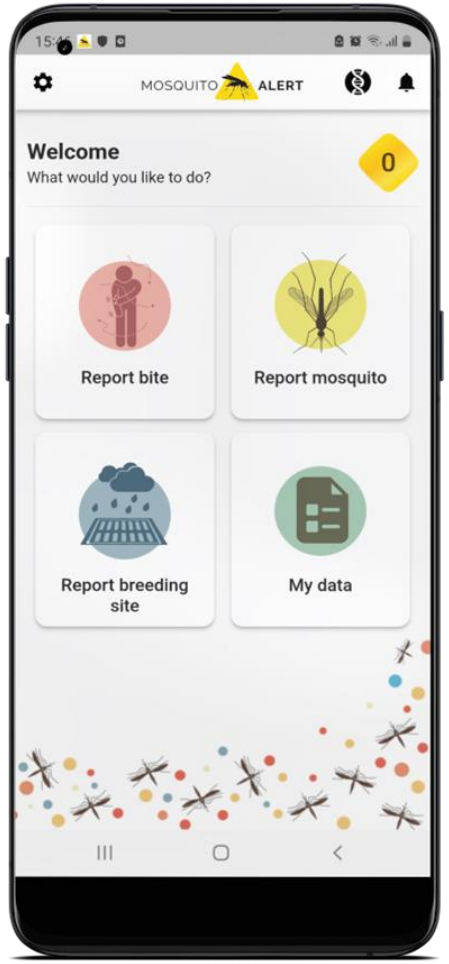
Why citizen science: the ubiquity of smartphones as an opportunity for mosquito surveillance

Citizens as sensors monitoring the presence and activity of mosquitoes in real-time with their personal observations. A supporting factor for citizens as sensors is the the high mobile phone penetration (67% of the world's population).

Citizen science **encourage individuals to collect information on mosquitoes** in their communities.

This also becomes a tool to **raise the citizen awareness of mosquitoes and arboviruses.**

- Scalability
- Real-time
- Flexibility
- Integrative (communities)
- Transparency
- Cost-effective
- Big data
- Scientific standards

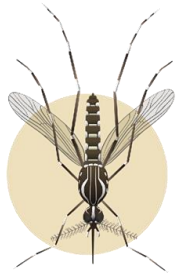


Google Play Store (Android)
Apple Store (iOS)

20 languages

The Mosquito Alert app (data collection)

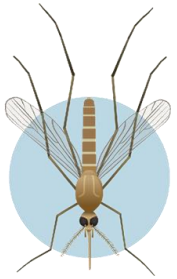
Ae. albopictus



Ae. aegypti

Ae. japonicus

Ae. koreicus



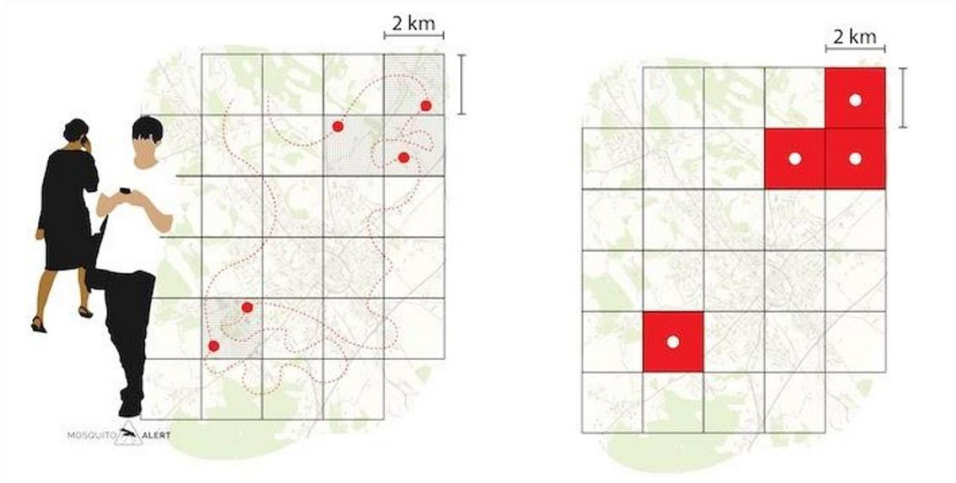
Culex pipiens

Report bite

Breeding sites

Collect samples

Notification system to communicate with participants



Background tracking system to estimate the sampling effort in a given area and time. Essential information to model the data.

Multilingual app (24languages)

Human-mosquito interaction

Breeding sites

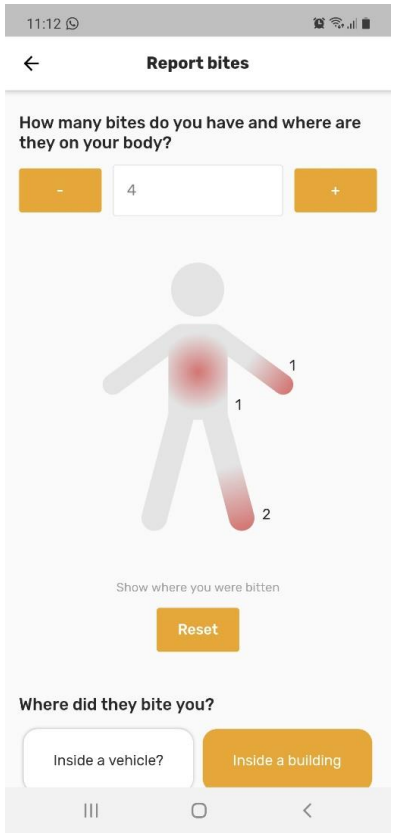
Notification system (direct contact with user)

Specimens and DNA collection

Gamification (improved)

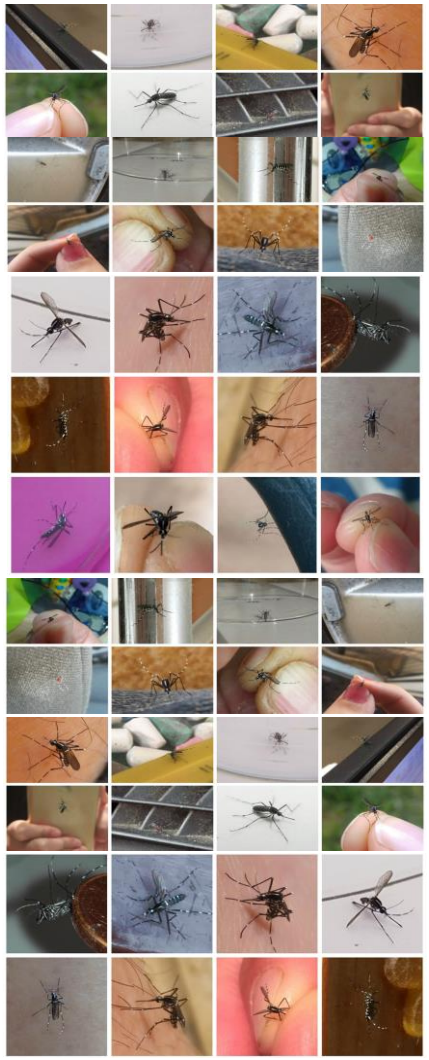
Report mosquito

Report of the user

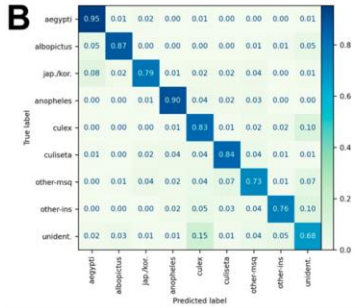


E4WARNING

Pictures

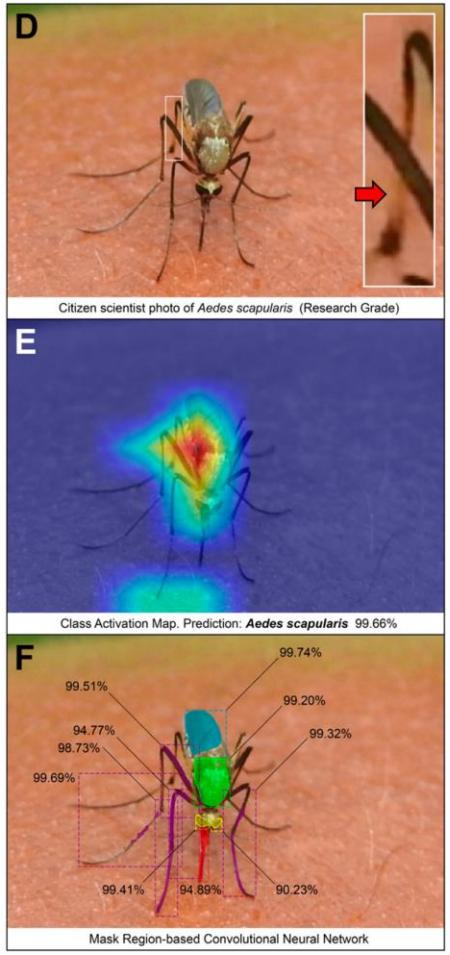


Artificial Intelligence (AIMA)



C

class	MA	GBIF
Aedes aegypti	84	1897
Aedes albopictus	1953	0
Aedes japonicus / koreicus	241	829
Anopheles spp.	101	1332
Culex spp.	2278	0
Culiseta spp.	695	1231
other mosquito	534	1145
other insect	1796	75
unidentifiable	1029	0

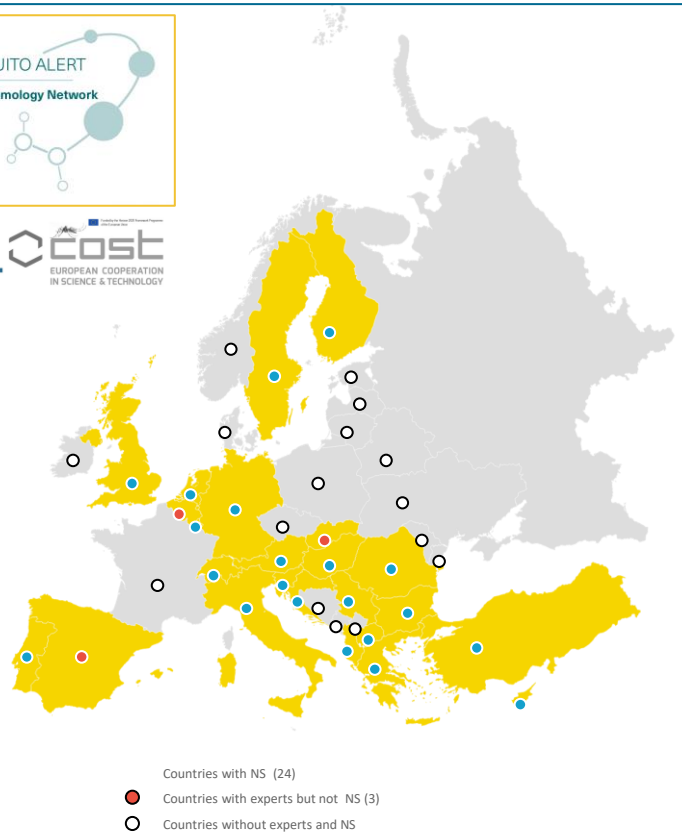


European Network of Digital Entomology

MOSQUITO ALERT
Digital Entomology Network

AIM
Aedes Invasive Mosquitoes

cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

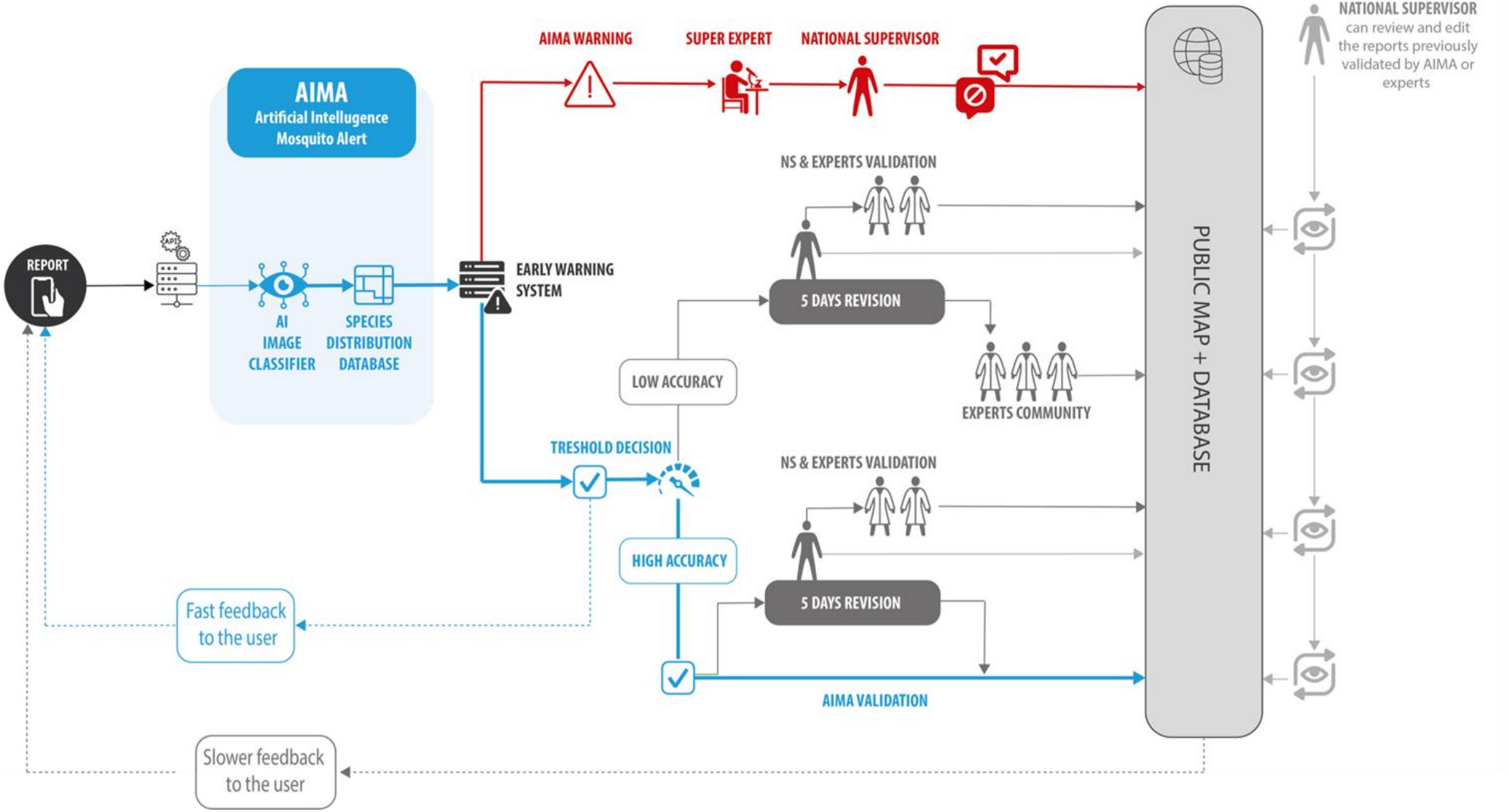


106 Experts

Pataki BA, et al. **2021**. Deep learning identification for citizen science surveillance of tiger mosquitoes. ***Scientific Reports 11***: 4718

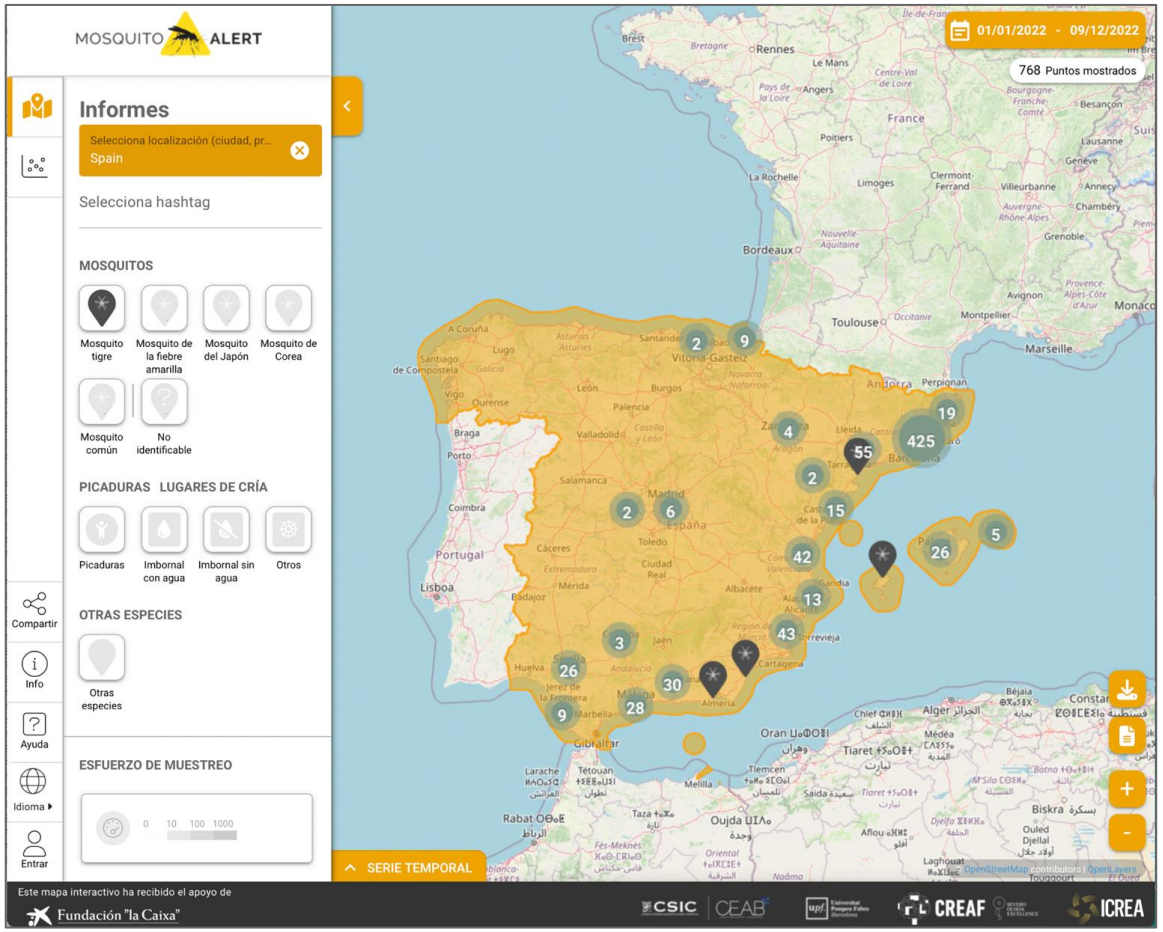
Carney RM et al. **2022**. Integrating global citizen science platforms to enable next-generation surveillance of invasive and vector mosquitoes. ***Insects 13***: 675

Towards a real-time system: AI and human-in-the-loop

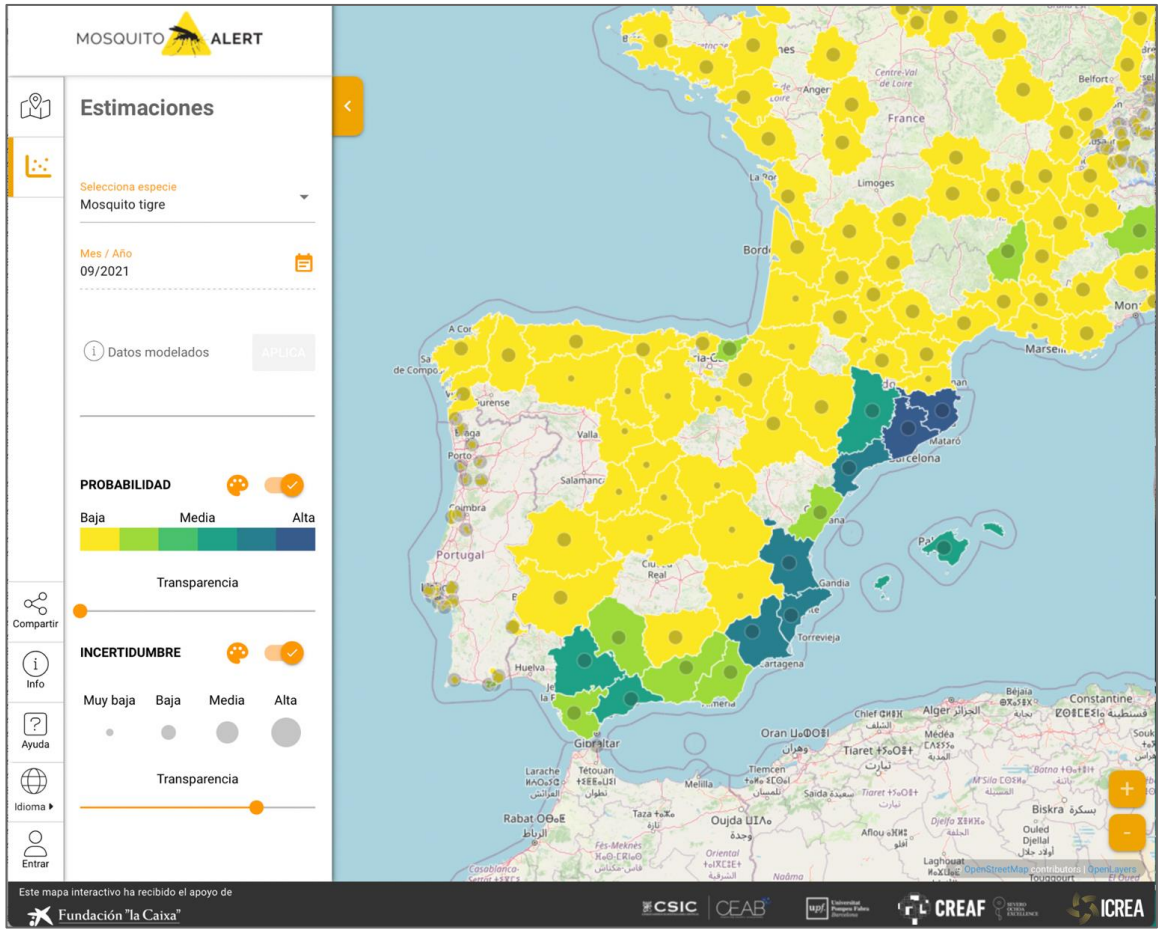


Mosquito Alert - Public map

Citizen science observations and data download

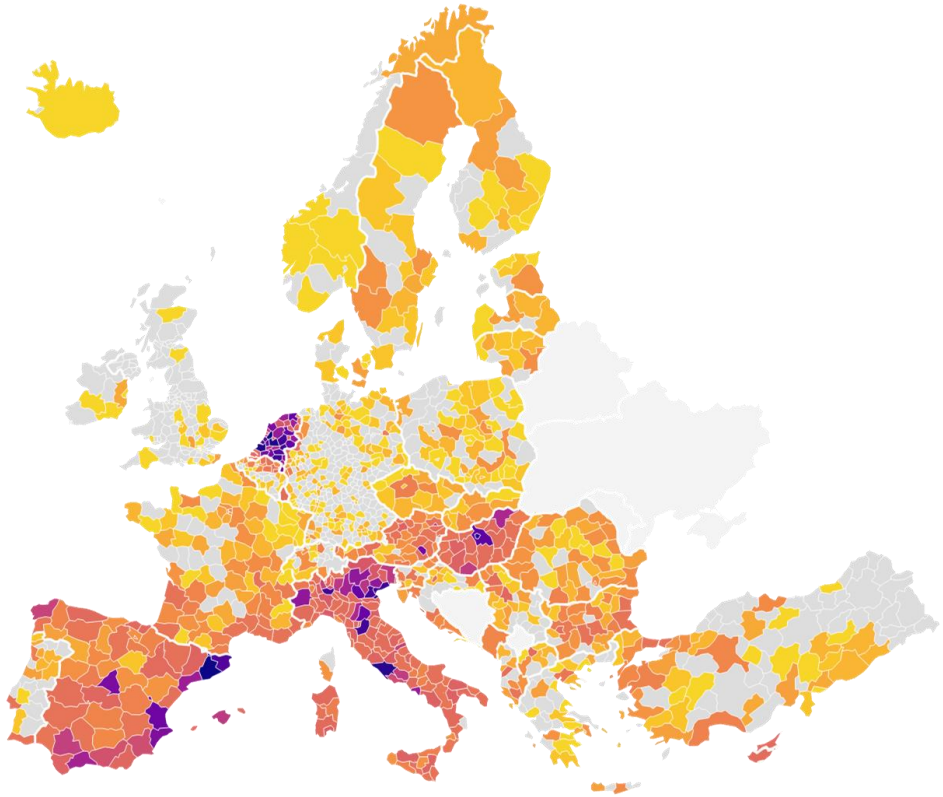


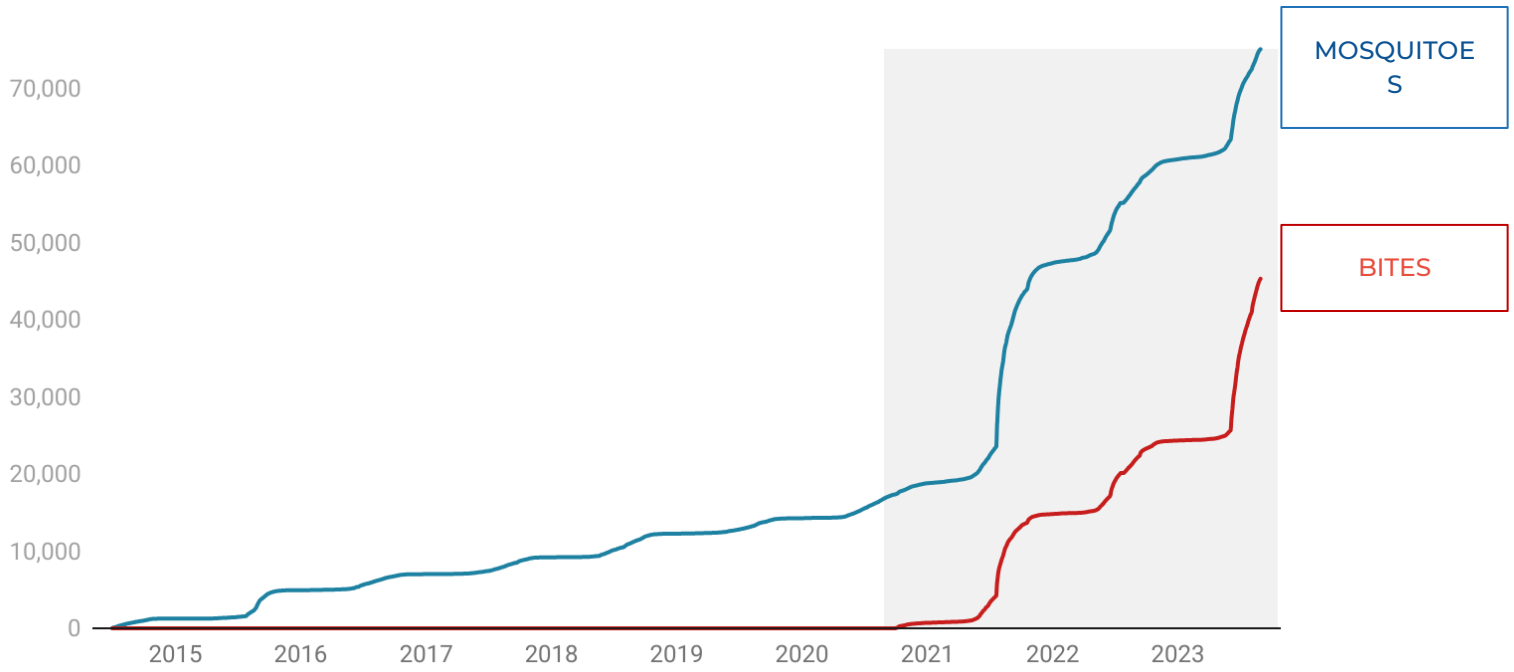
Models considering background tracking



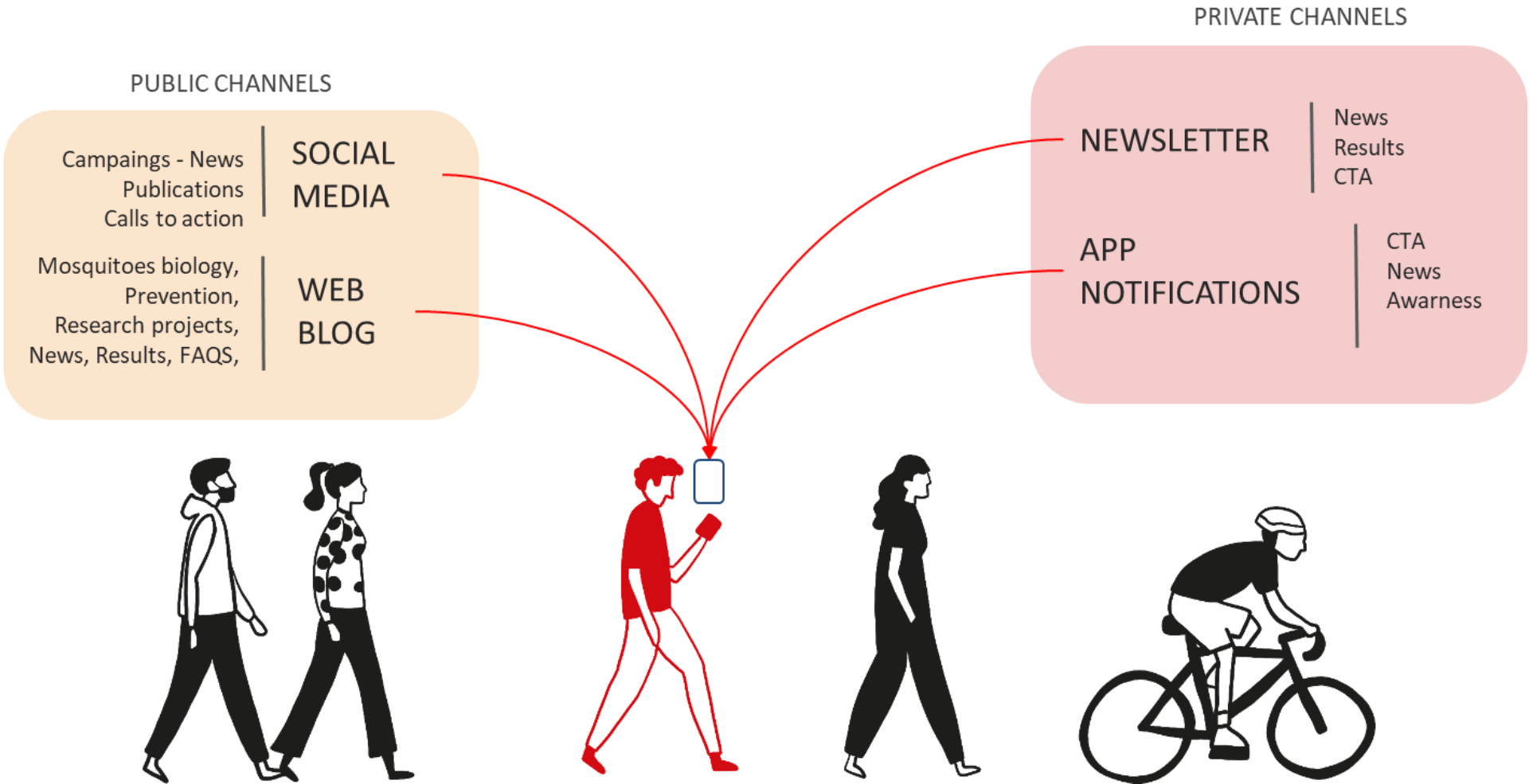
EUROPEAN PARTICIPATION NUMBERS

54.762 USERS	86.168 MOSQUITOES	49.640 BITES	19.089 BREEDING SITES





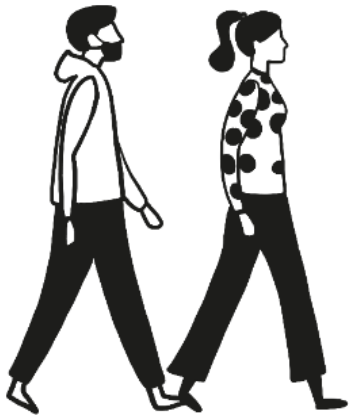
MOSQUITO ALERT AS A SCIENCE COMMUNICATION TOOL



MOSQUITO ALERT AS A SCIENCE COMMUNICATION TOOL

PUBLIC CHANNELS

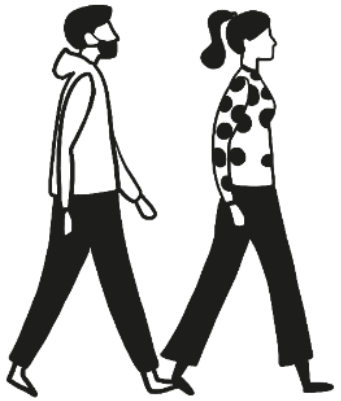
Campaings - News Publications Calls to action	SOCIAL MEDIA
Mosquitoes biology, Prevention, Research projects, News, Results, FAQS,	WEB BLOG

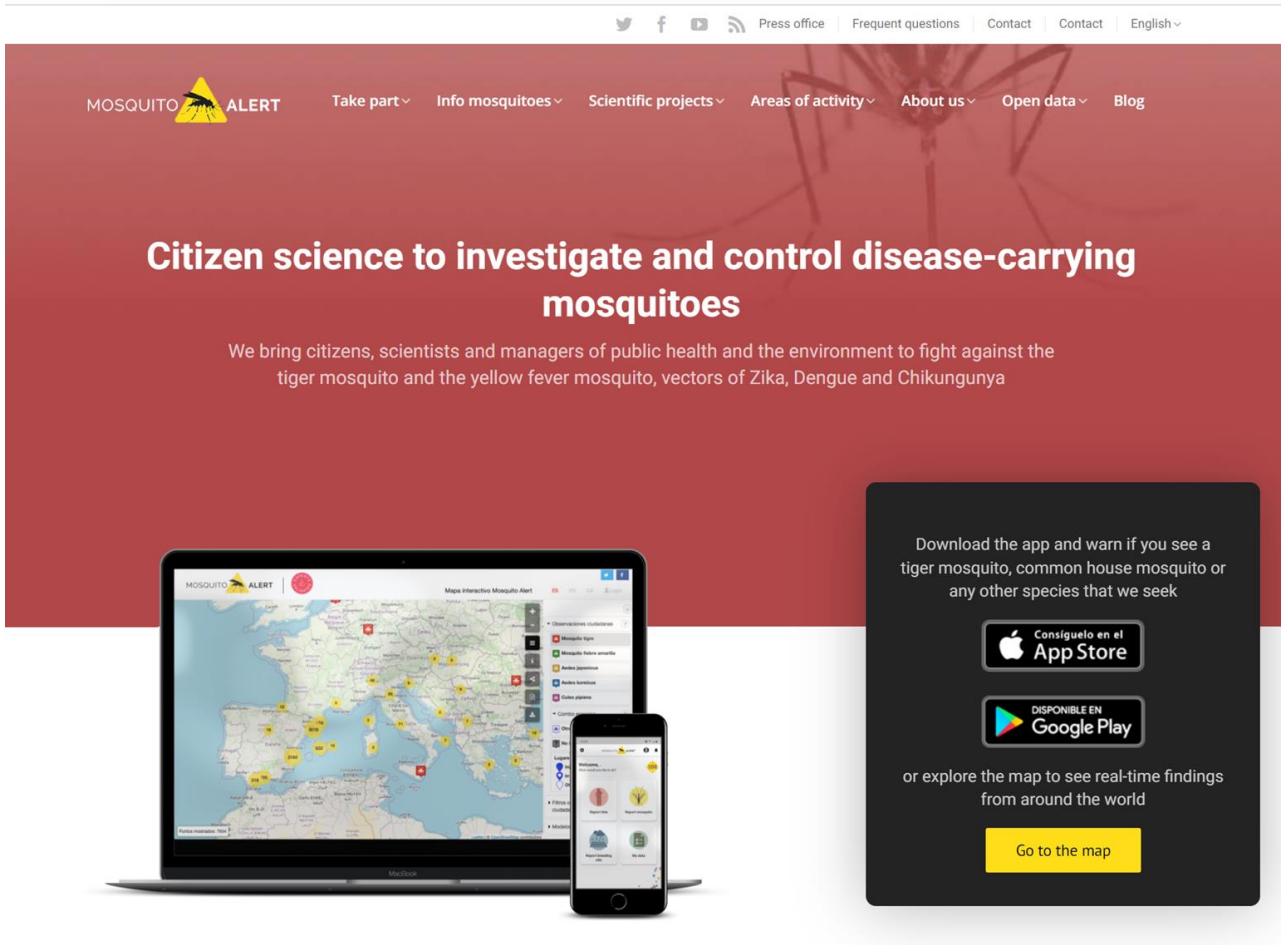


MOSQUITO ALERT AS A SCIENCE COMMUNICATION TOOL

PUBLIC CHANNELS

Campaings - News Publications Calls to action	SOCIAL MEDIA
Mosquitoes biology, Prevention, Research projects, News, Results, FAQS,	WEB BLOG

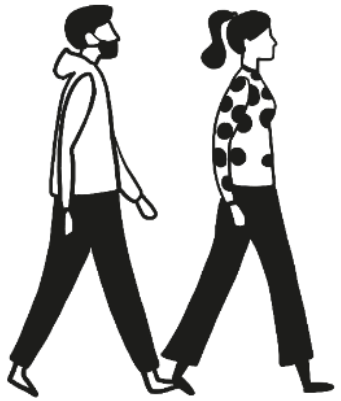


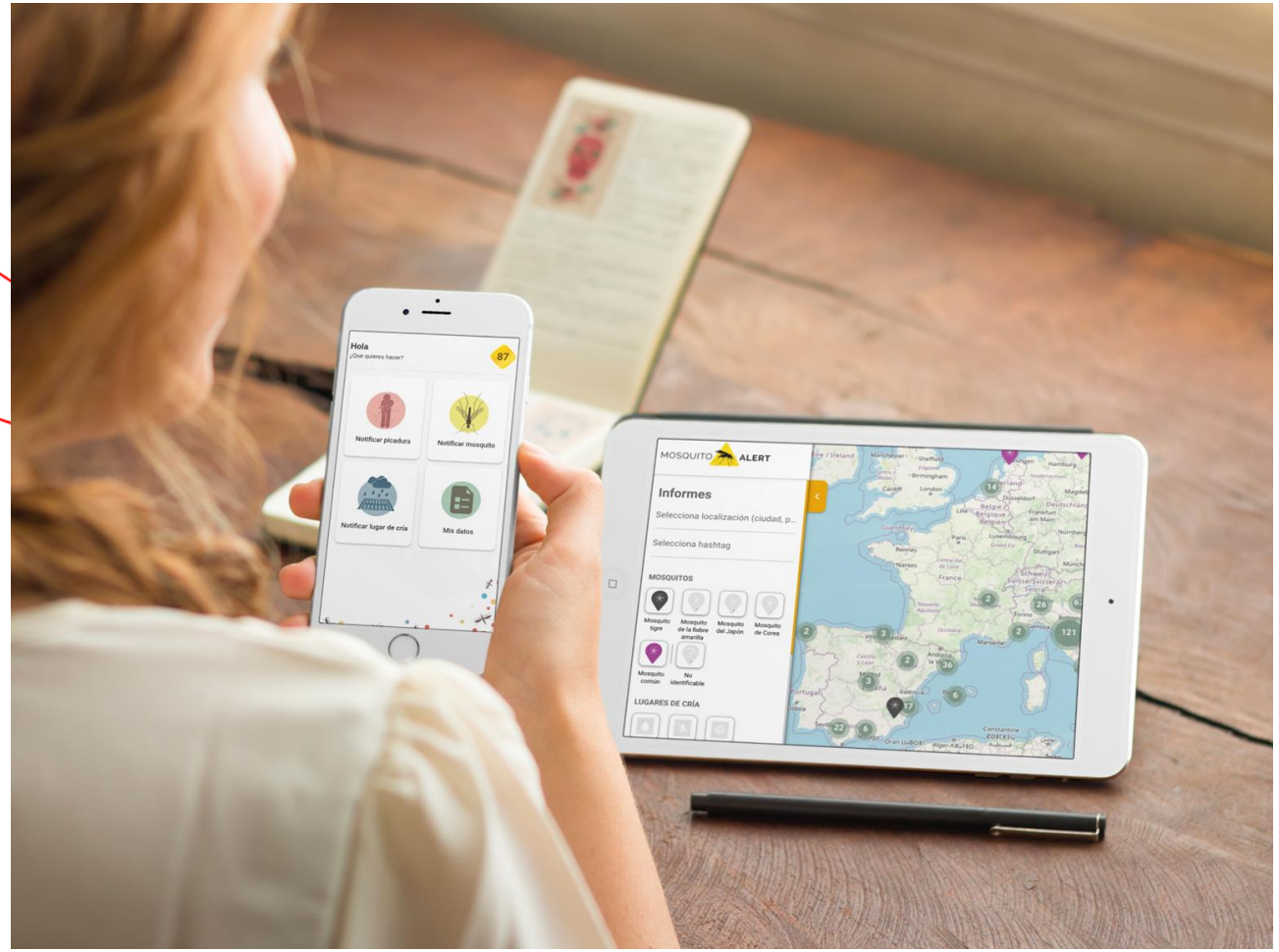


MOSQUITO ALERT AS A SCIENCE COMMUNICATION TOOL

PUBLIC CHANNELS

Campaings - News Publications Calls to action	SOCIAL MEDIA
Mosquitoes biology, Prevention, Research projects, News, Results, FAQS,	WEB BLOG





MOSQUITO ALERT AS A SCIENCE COMMUNICATION TOOL

Completa nuestra encuesta
Leer más

--- AI Mosquito Alert ---

Identified species: Aedes albopictus

Identification score: 1.0

Nuestro sistema de IA ha determinado que el mosquito de tu informe es un ejemplar de mosquito Tigre **Aedes albopictus**. Muy buena fotografía!. Muchas gracias por tu colaboración.

Este mensaje ha sido generado automáticamente por el sistema de inteligencia artificial de Mosquito Alert. Si nuestro sistema de validación experta lo considera

Mensaje del día - 13/09/2023
Leer más

--- AI Mosquito Alert ---

Identified species: Aedes albopictus

Identification score: 0.9991

Nuestro sistema de IA ha determinado que el mosquito de tu informe es un ejemplar de mosquito Tigre **Aedes albopictus**. Muy buena fotografía!. Muchas gracias por tu colaboración.

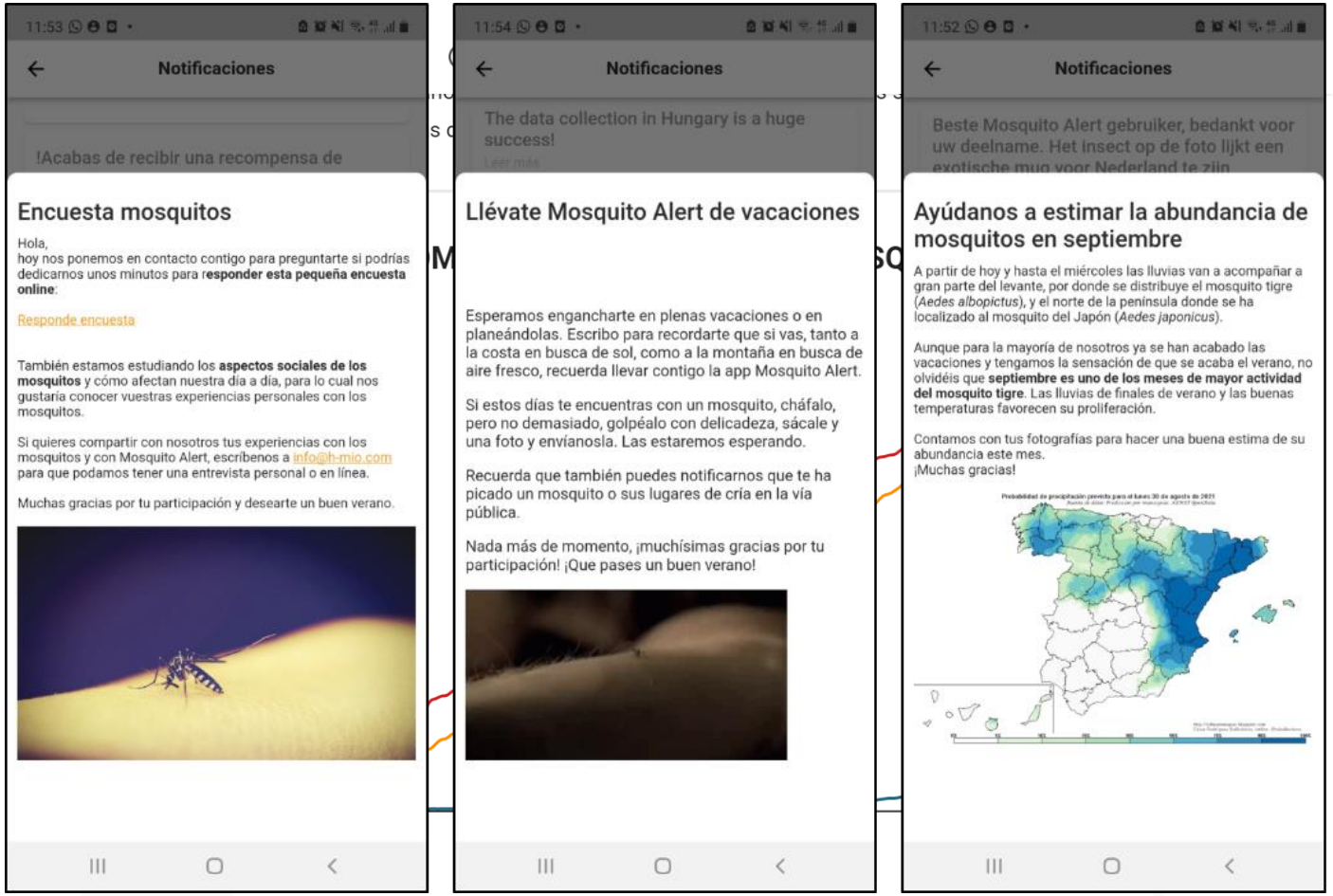
Este mensaje ha sido generado automáticamente por el sistema de inteligencia artificial de Mosquito Alert. Si nuestro sistema de validación experta lo considera oportuno, próximamente recibirás una nueva notificación con la clasificación final de tu informe según la opinión de nuestros expertos en entomología.

PRIVATE CHANNELS

NEWSLETTER
- News
- Results
- CTA

APP NOTIFICATIONS
- CTA
- News
- Awarness

MOSQUITO ALERT AS A SCIENCE COMMUNICATION TOOL



PRIVATE CHANNELS

NEWSLETTER
- News
- Results
- CTA

APP NOTIFICATIONS
- CTA
- News
- Awarness

COMMUNICATION ACTIONS AT DIFFERENT LEVELS
-NATIONAL ACTIONS-

CAMPAIGNS 6-9 June 2023 – IMPACTS

2 press releases

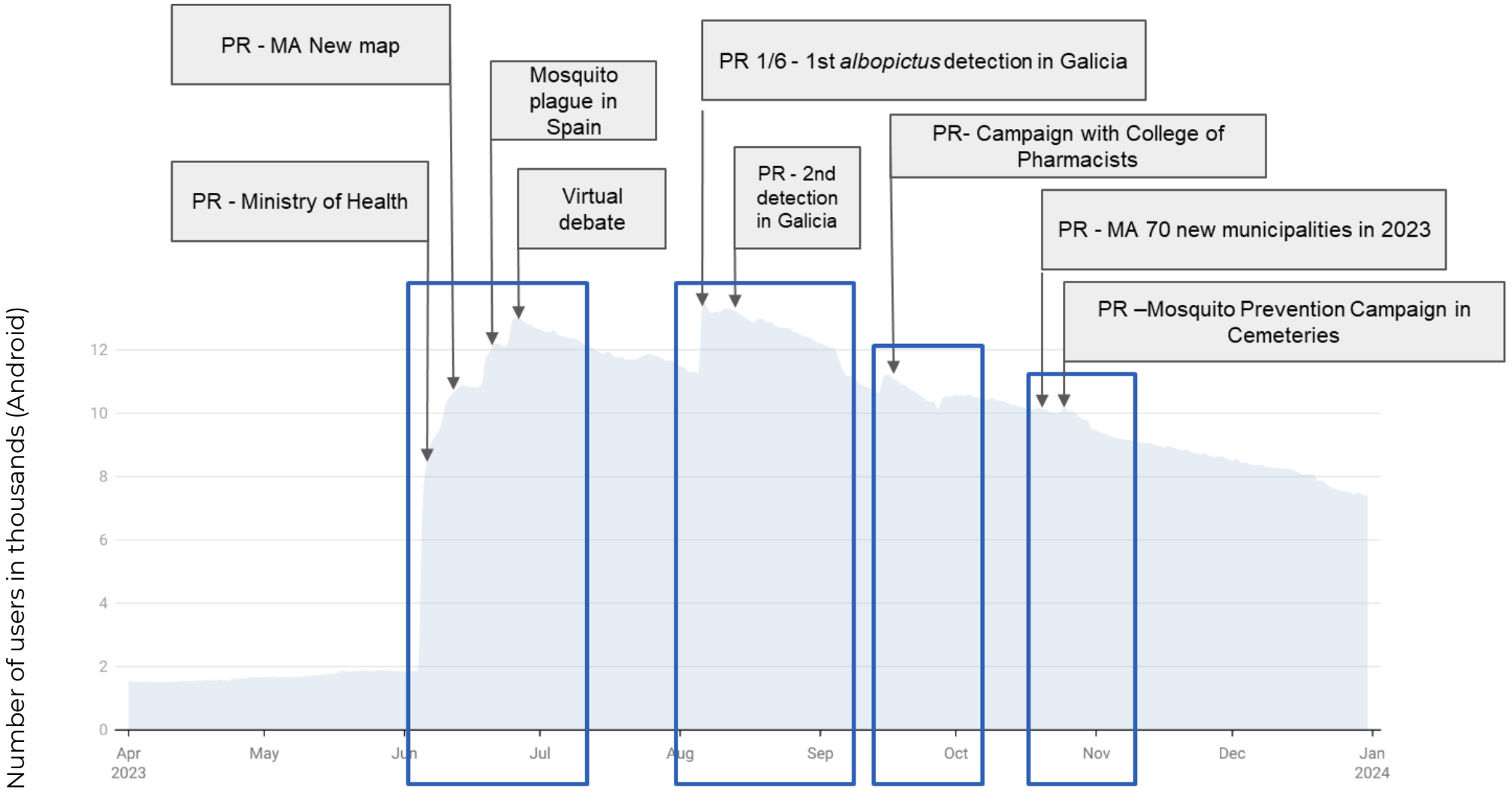
- June 6th: MA & Ministry of Health - Citizen Science included as a tool in the public health vectors program
- June 8th: MA & Big Mosquito Bites (Fundació la Caixa) New Mosquito Alert Interactive Map

Covered by more than 220 media publications

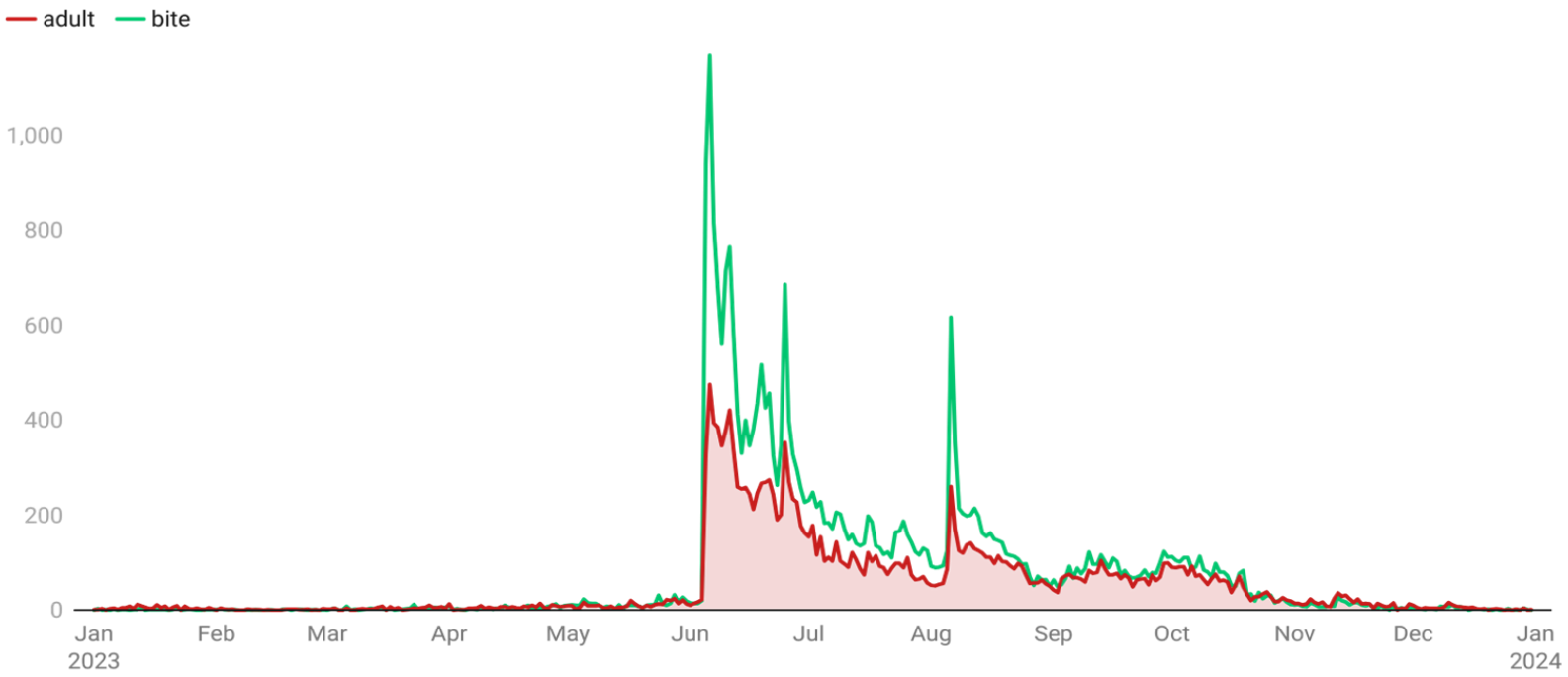
Managed more than 50 Radio/TV interviews

144 MENTIONS	64 SOCIAL MEDIA MENTIONS	80 NON-SOCIAL MENTIONS	372 K SOCIAL MEDIA REACH
2.7 M NON SOCIAL MEDIA REACH	459 INTERACTIONS	74 USER GENERATED CONTENT	265 LIKES
7 33% POSITIVE MENTIONS	14 67% NEGATIVE MENTIONS	$ 254 K AVE	63 MENTIONS FROM TWITTER

Source: Brand24

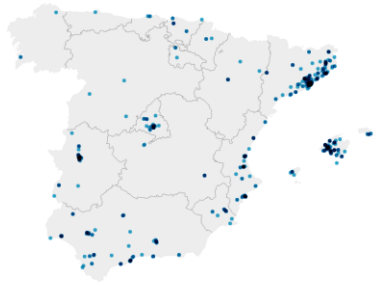


Number of users in Spain has been sustained over months through the repeated use of communicative events.

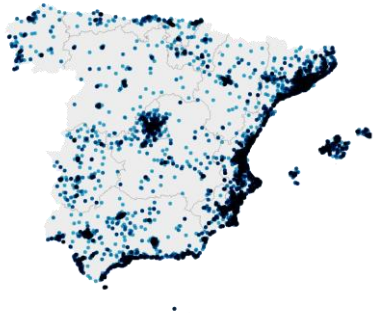


47,022 reports

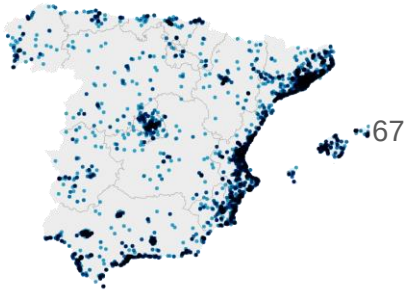
Effects of the sustained communication on the participation during the mosquito season months in Spain.
Temporal & Spatial coverage.



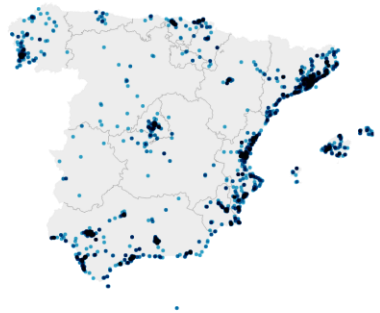
May - 719 reports



June - 20,584 reports

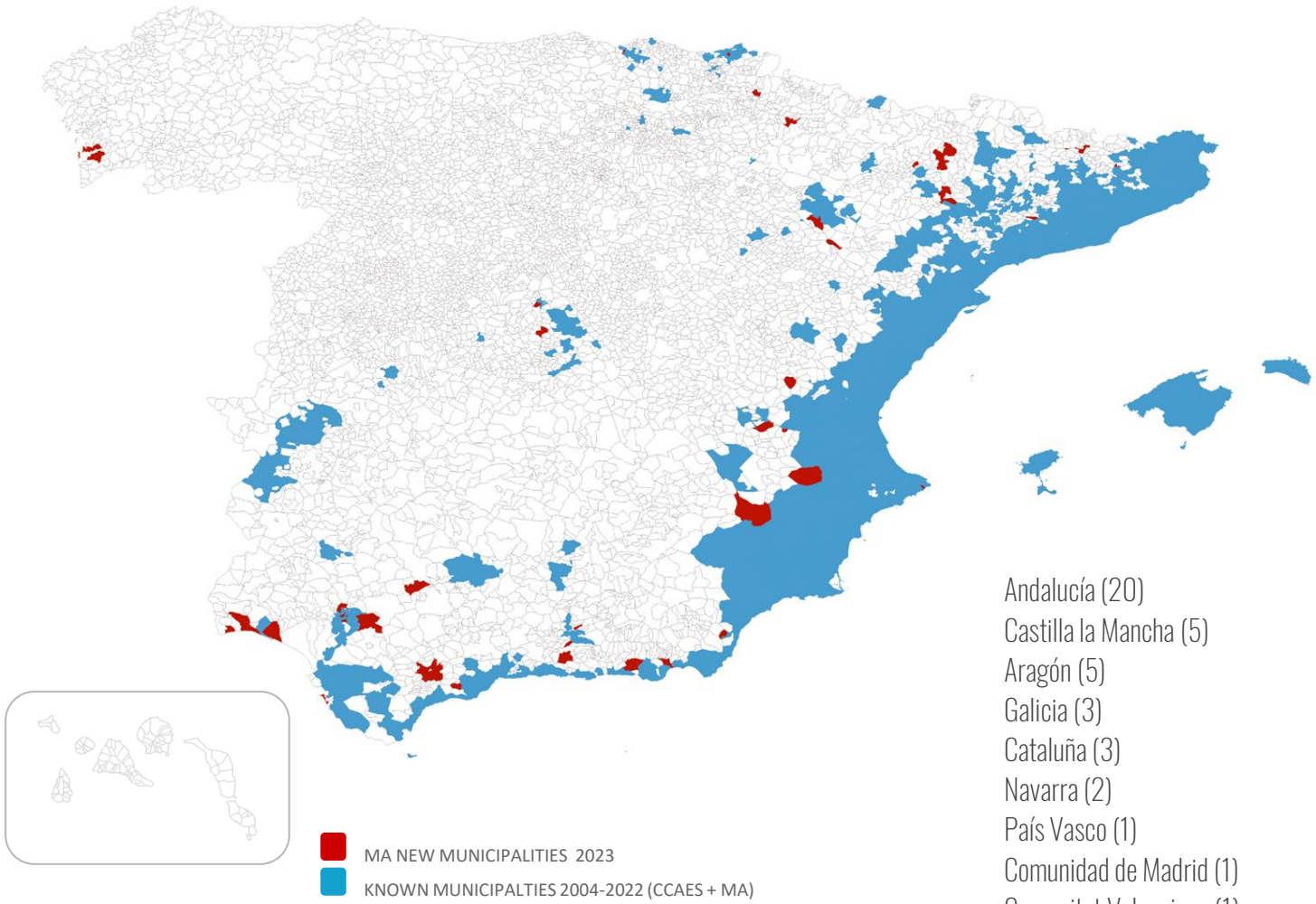


August - 7,660 reports



September - 4,664 reports

TIGER MOSQUITO: CITIZENS DETECT THE SPECIES FAR FROM THE EXPANSION FRONT



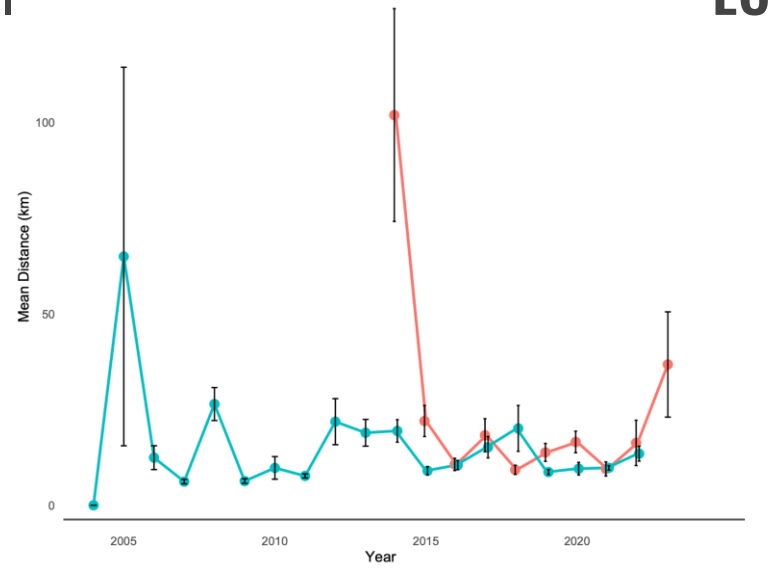
Andalucía (20)
Castilla la Mancha (5)
Aragón (5)
Galicia (3)
Cataluña (3)
Navarra (2)
País Vasco (1)
Comunidad de Madrid (1)
Comunitat Valenciana (1)

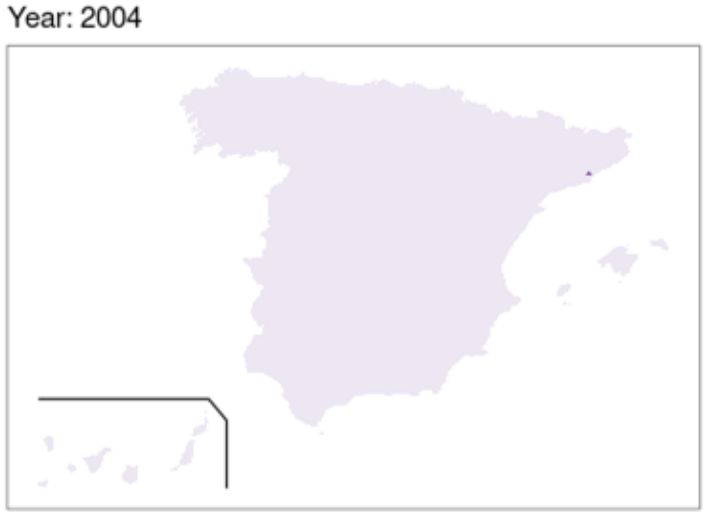
EARLY DETECTIONS IN DIFFERENT PROVINCES

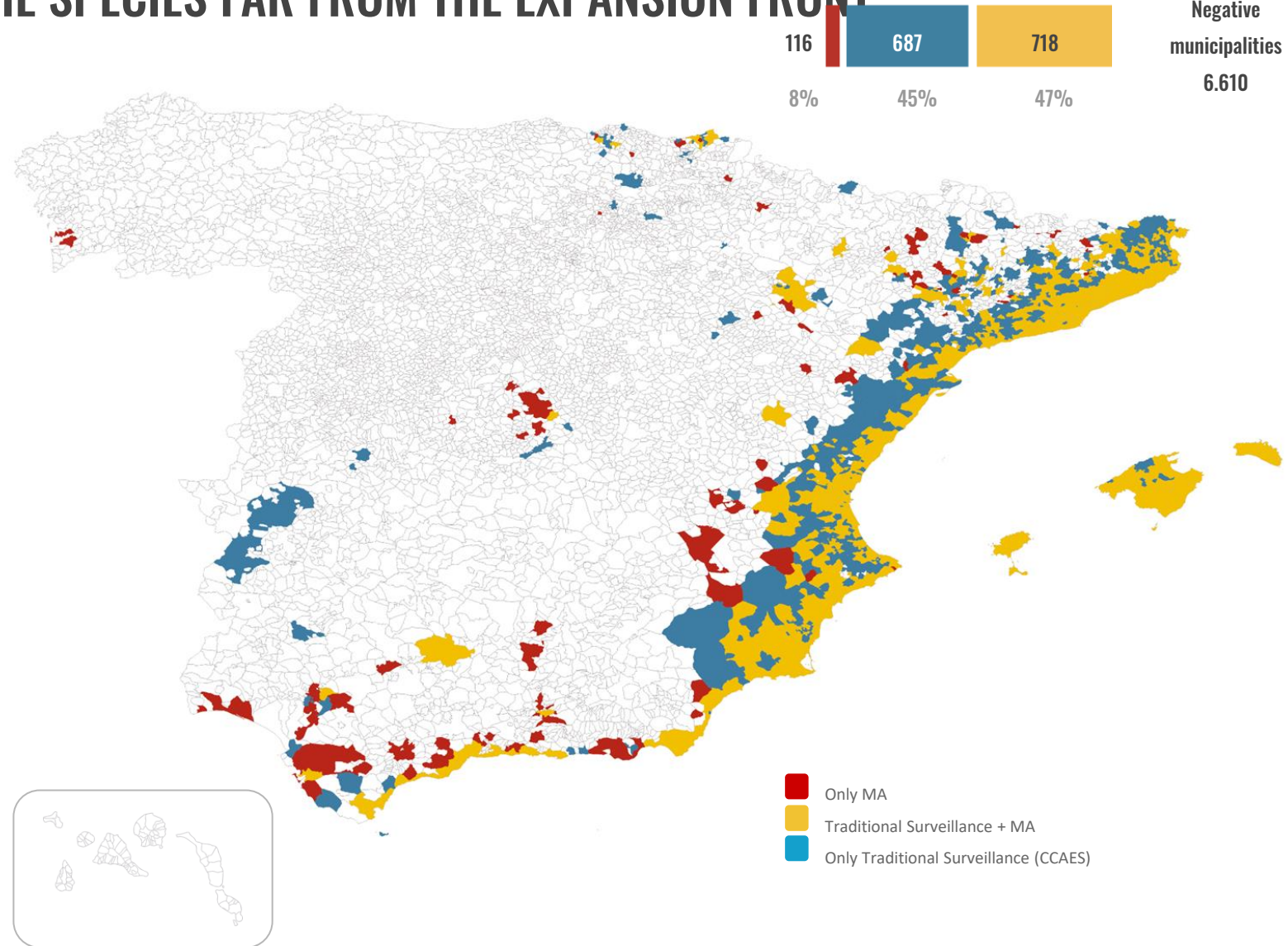
Zaragoza (2014)
Teruel (2014)
Huesca (2015)
Málaga (2014)
Sevilla (2015)
Jaén (2016)
Huelva (2021)
Albacete (2019)
Pontevedra (2023)

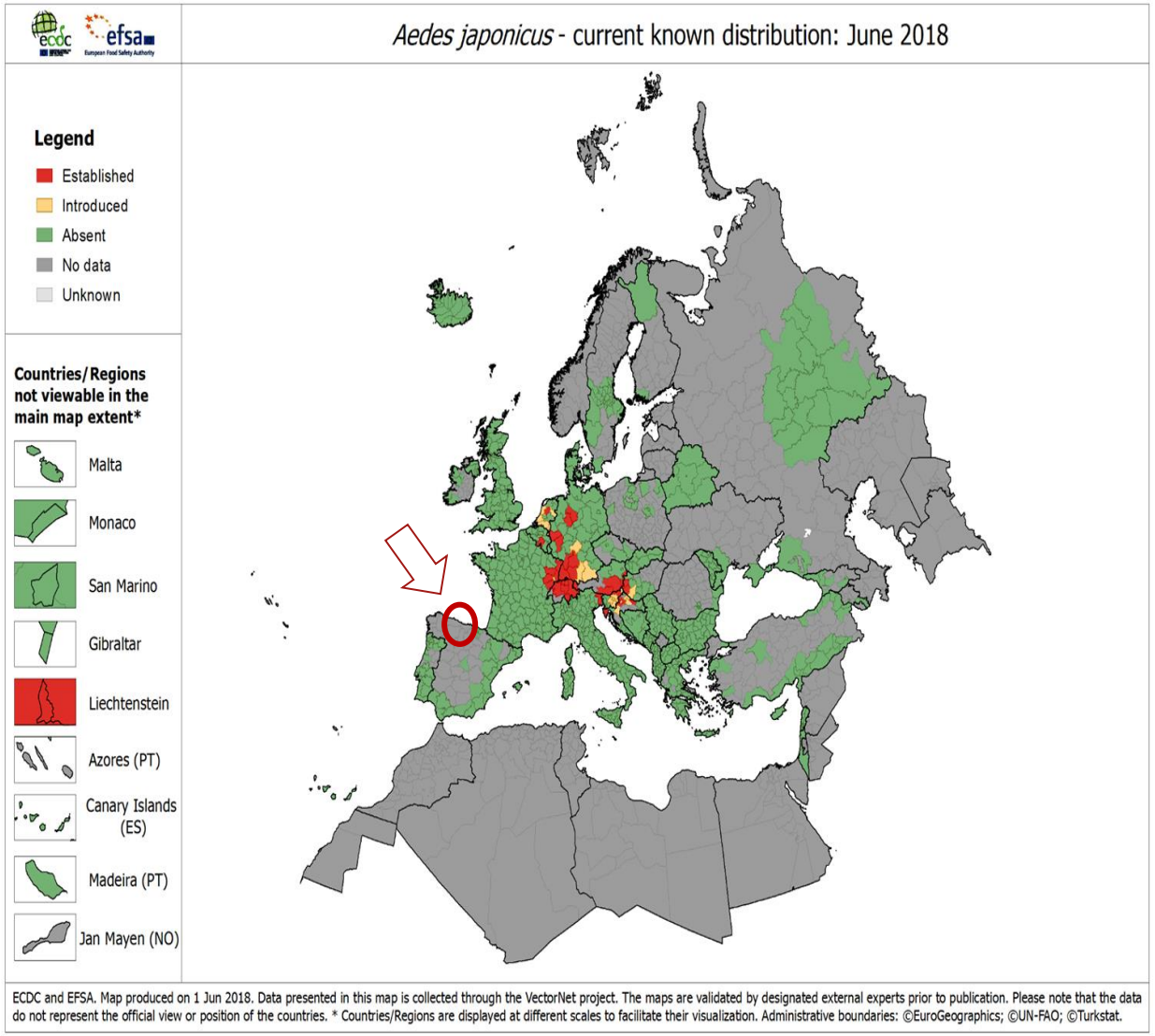
Financiado por la Unión Europea NextGenerationEU
GOBIERNO DE ESPAÑA
Plan de Recuperación, Transformación y Resiliencia
GOBIERNO DE ESPAÑA MINISTERIO DE SANIDAD

TIGER MOSQUITO: CITIZENS DETECT THE SPECIES FAR FROM THE EXPANSION FRONT

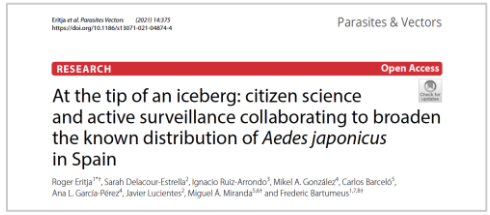


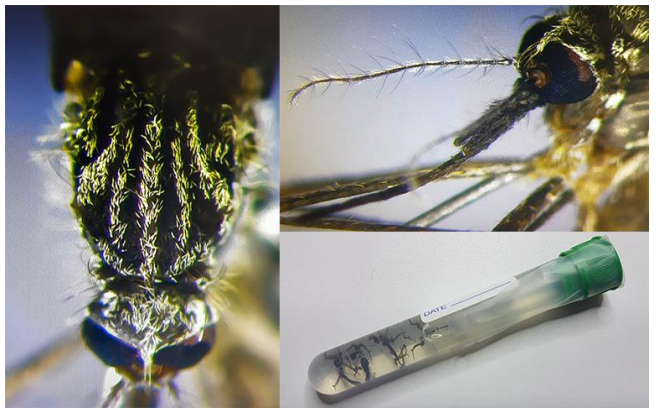





ecdc
efsa
European Food Safety Authority
Aedes japonicus - current known distribution: June 2018
Legend
Established
Introduced
Absent
No data
Unknown
Countries/Regions not viewable in the main map extent*
Malta
Monaco
San Marino
Gibraltar
Liechtenstein
Azores (PT)
Canary Islands (ES)
Madeira (PT)
Jan Mayen (NO)
ECDC and EFSA. Map produced on 1 Jun 2018. Data presented in this map is collected through the VectorNet project. The maps are validated by designated external experts prior to publication. Please note that the data do not represent the official view or position of the countries. * Countries/Regions are displayed at different scales to facilitate their visualization. Administrative boundaries: ©EuroGeographics; ©UN-FAO; ©Turkstat.


Parasites & Vectors
RESEARCH
Open Access
First detection of *Aedes japonicus* in Spain: an unexpected finding triggered by citizen science


Parasites & Vectors
RESEARCH
Open Access
At the tip of an iceberg: citizen science and active surveillance collaborating to broaden the known distribution of *Aedes japonicus* in Spain



THANK YOU

elisa.mora@ceab.csic.es

Citizeen

CITIZEEN IS A CARBON AND BIODIVERSITY MAPPING SOLUTION
A PRODUCT DEVELOPED BY THE STARTUP **OWLPLACES** WITH THE
SUPPORT OF **MARE** AND THE **UNIVERSITY OF COIMBRA (UC)**

OWLplaces

MARE

1 2 9 0
UNIVERSIDADE D
COIMBRA

Context: Biodiversity and Carbon

Estimates suggest that **urban areas are responsible for 70 percent of global Carbon** emissions, with **transport and buildings being among the largest contributors** (IPCC, 2022).

Green Finance Report "unlocking the trillions" **3.5T€ euros the investment required to reach goals for sustainable real estate.**

Companies & Governments now have several benefits and costs that demand to **improve and monitor their real estate footprint**

How can companies and governments improve, monitor and report the sustainability of their properties?

Solution: Citizeen app

"**Human-centric technology and AI** providing tools for the in-situ teams of our clients' organizations, enabling them to monitor, improve, and transparently showcase their impact on biodiversity and carbon absorption."

- Monitor any Location worldwide using Geospatial data, AI and App;
- Verification Carbon and Sustainability;
- Report before vs after improvements;
- Prescribe Nature-Based Solutions (NBS) for Carbon Offset;
- Show with transparency Location and Extent of CO_2 Offset Projects.

Methodology

- **1) Calculate Life Cycle Assessment (LCA) footprint:**
- Geospatial data global footprint CO_2 embedded vs CO_2 absorbed;
- Water;
- Energy;
- Waste.

- **2) Prescribe NBS Solutions and Certify Credits:**
- Prescription of Nature-Based Solutions for CO_2 offset;
- Monitor, Report and Verify with geospatial data + ground truth;
- Certify CO_2 and Biodiversity Credits.

- **3) App**
- Monitor Regenerative Projects Locations (Geospatial Data);
- Contribute with in-situ Photos and Samples (Ground-truth);
- Show with transparency Location and Extent of Carbon Projects.

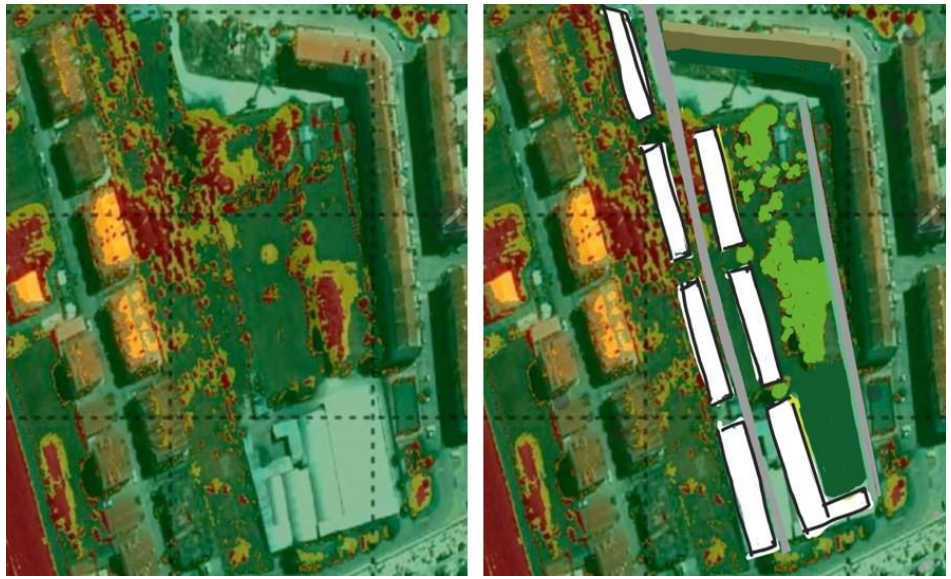
+

+

Why us?

"We are the 1st complete solution using Earth Observation data to diagnose, prescribe and monitor Biodiversity and CO2 Offset projects in our cities, tackling where 70% of CO_2 is produced*"

- Locating the best areas to implement construction;
- Locating the best areas to protect and enhance biodiversity;
- Solutions with improved environmental impact (EPDs);
- Prescribe Regenerative Architecture and NBS for CO_2 offset.

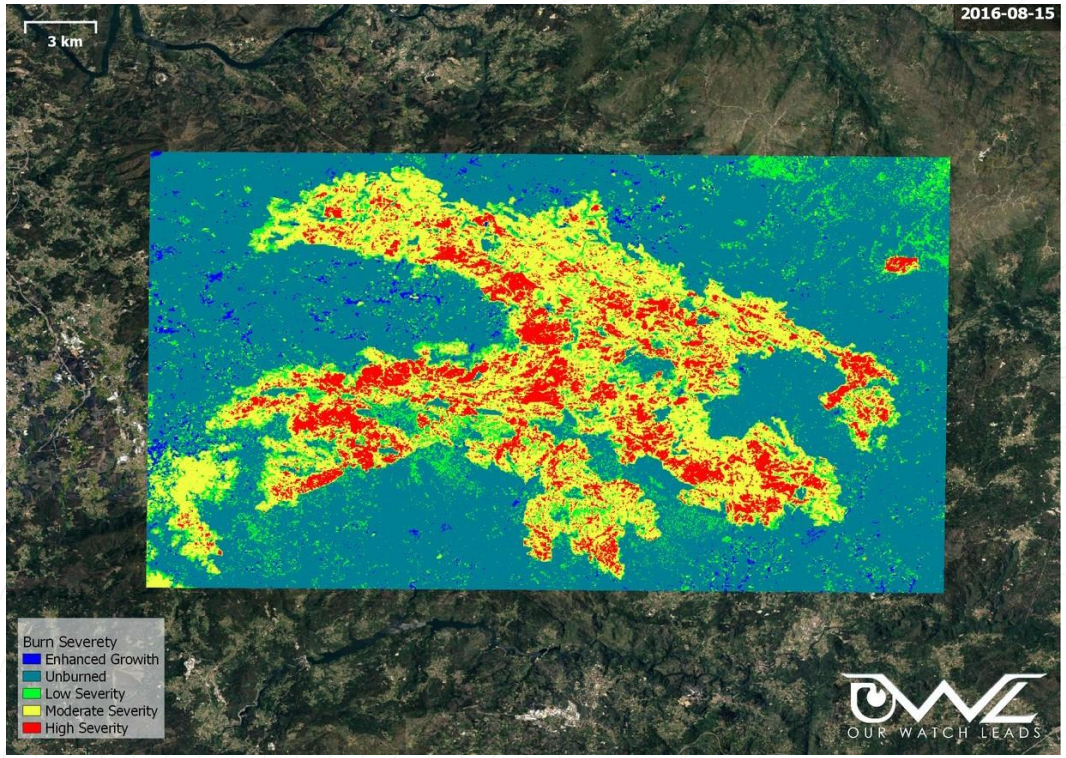


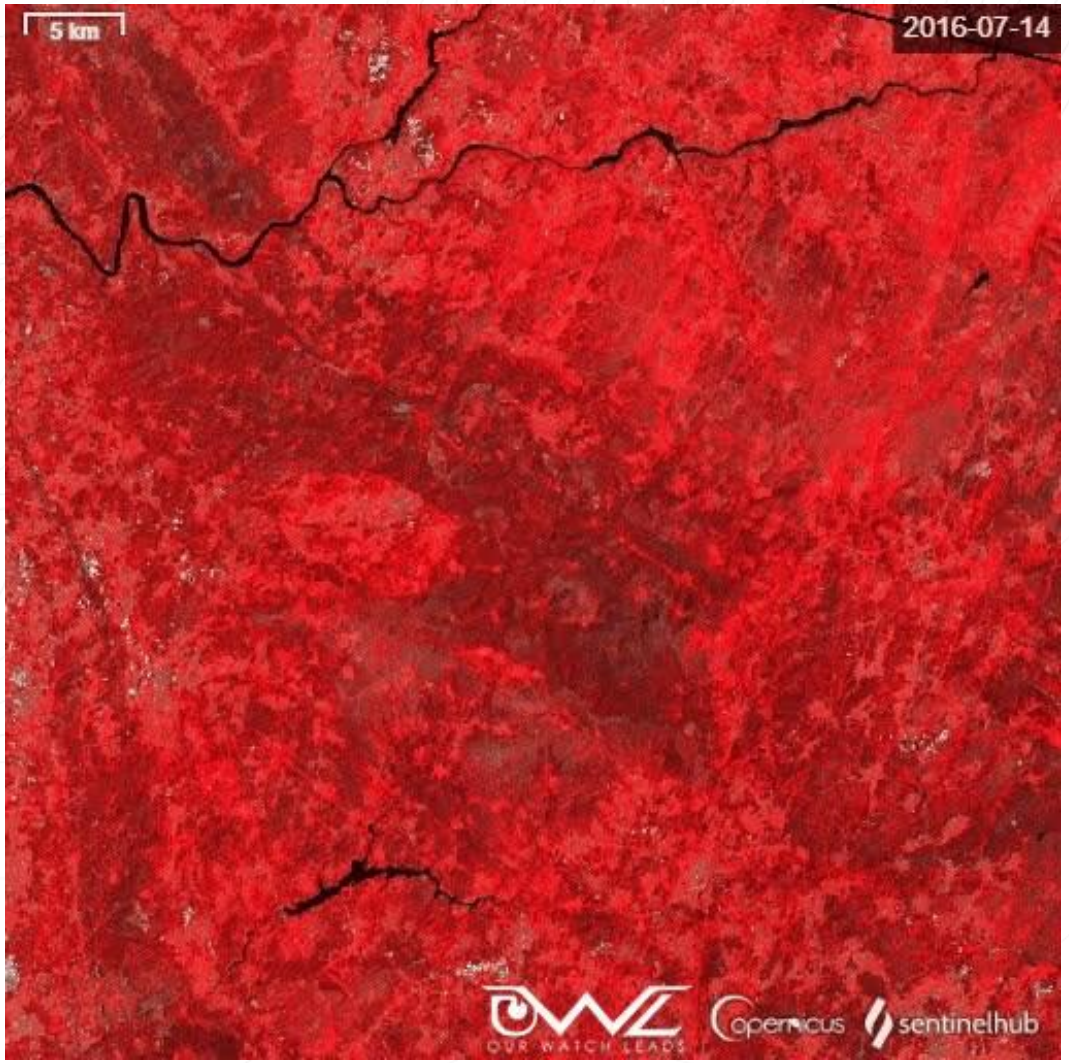
"Estimates suggest that urban areas are responsible for 70 percent of global CO2 emissions, with **transport and buildings** being among the largest contributors (IPCC, 2022)" available in: https://www.unep.org/explore-topics/resource-efficiency/what-we-do/cities-and-climate-change

Use cases

Monitor post fire regeneration in Serra da Freita 2016.

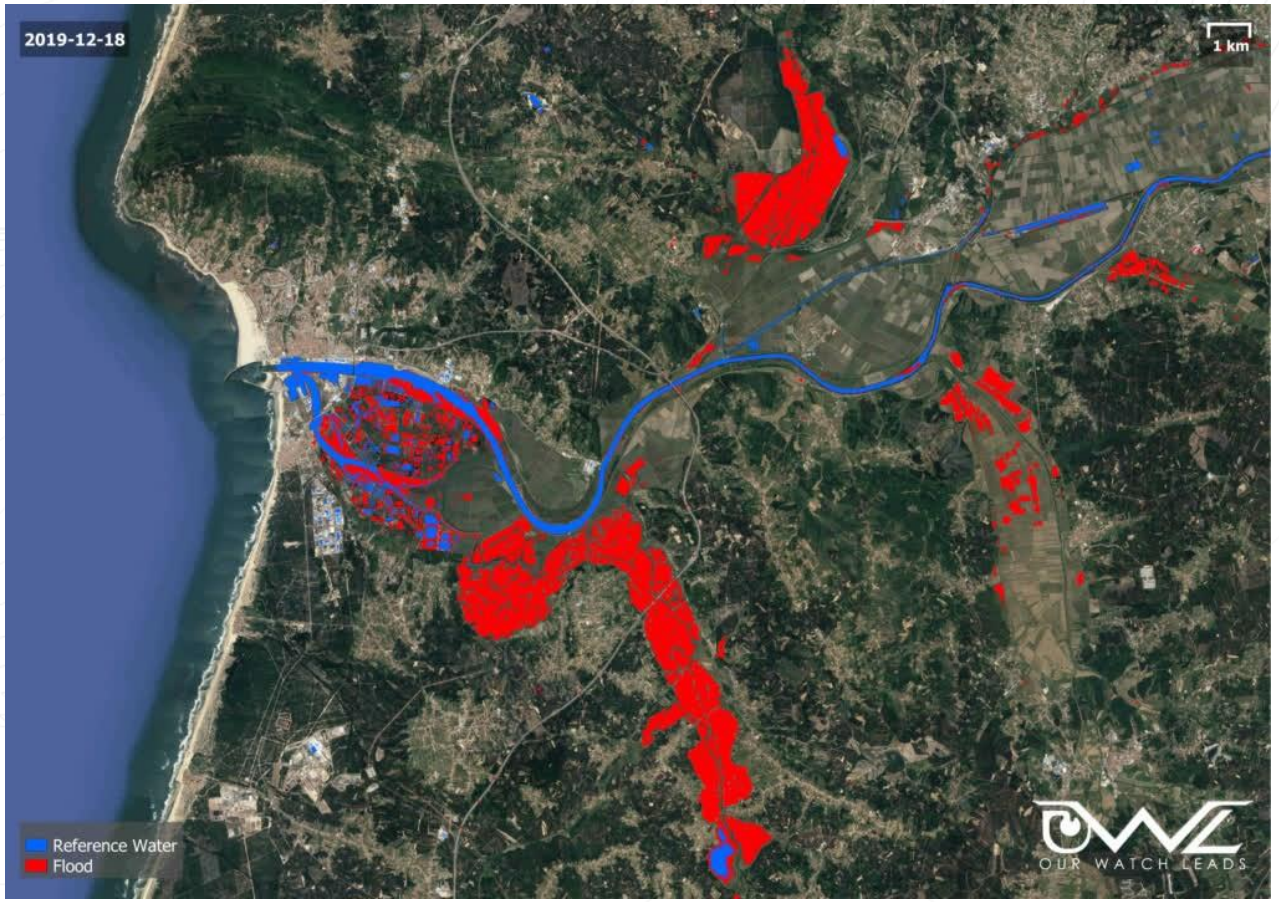
Regeneration project by Movimento Gaio.





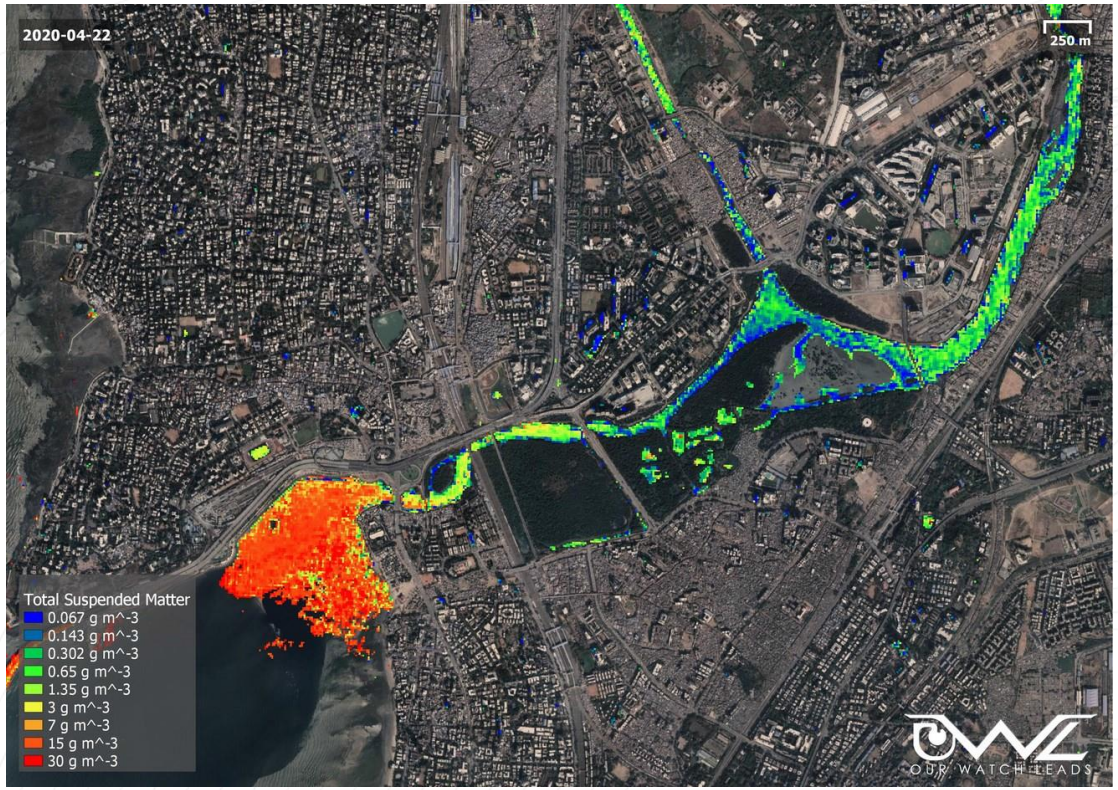
Use cases

Flood Monitoring in Mondego River

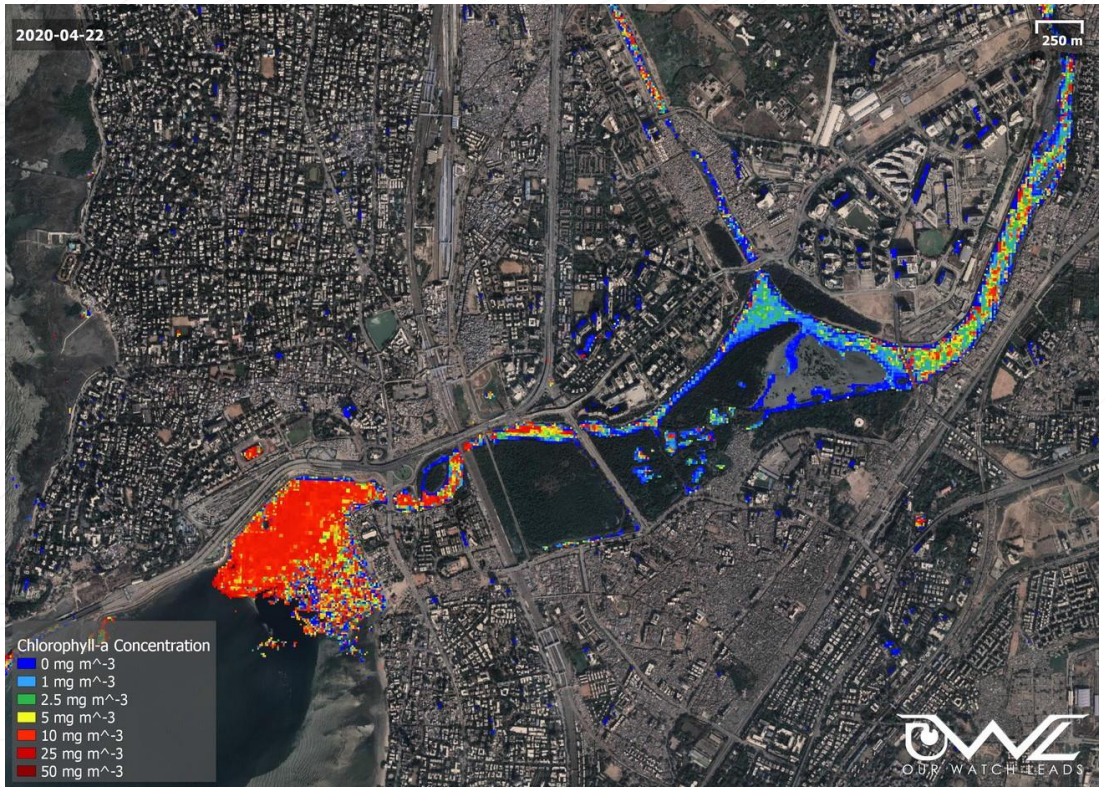


Use cases

Monitor Water Quality in Mumbai, India



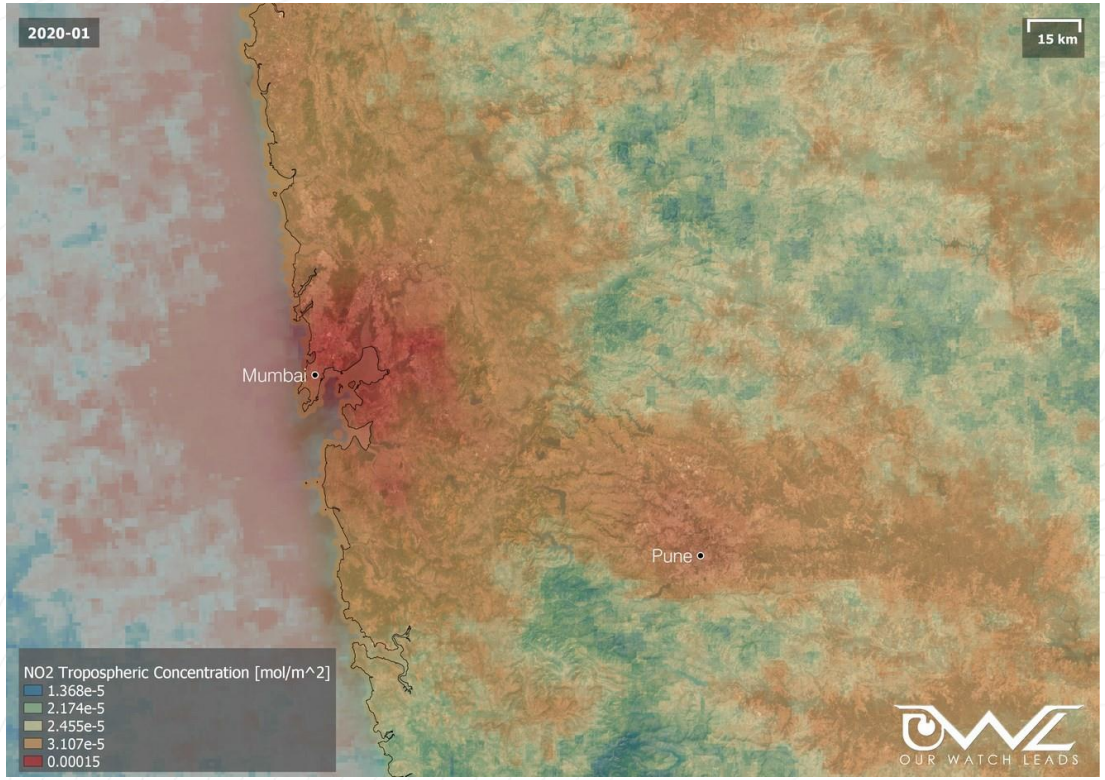
Water Quality – Chlorophyll-A Concentration
Mumbai, India 2020. 10m/pixel resolution



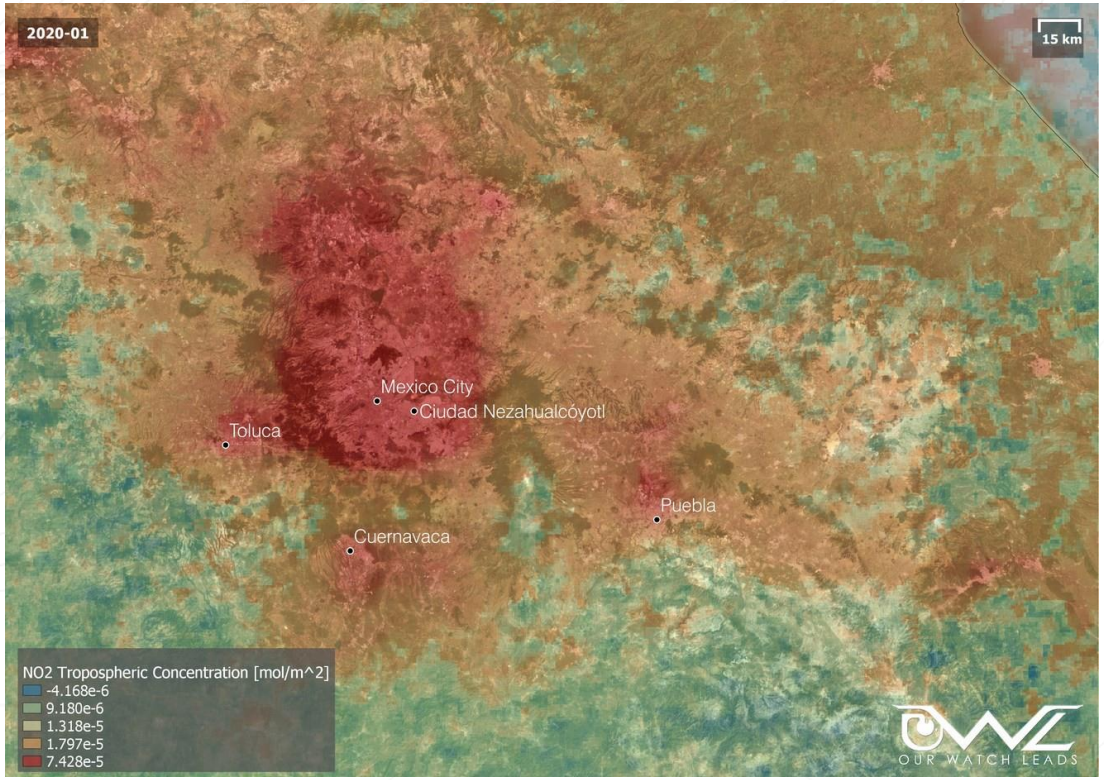
Water Quality – Chlorophyll-A Concentration
Mumbai, India 2020. 10m/pixel resolution

Use cases

Monitor Air Quality - Mumbai, India and Mexico City, Mexico



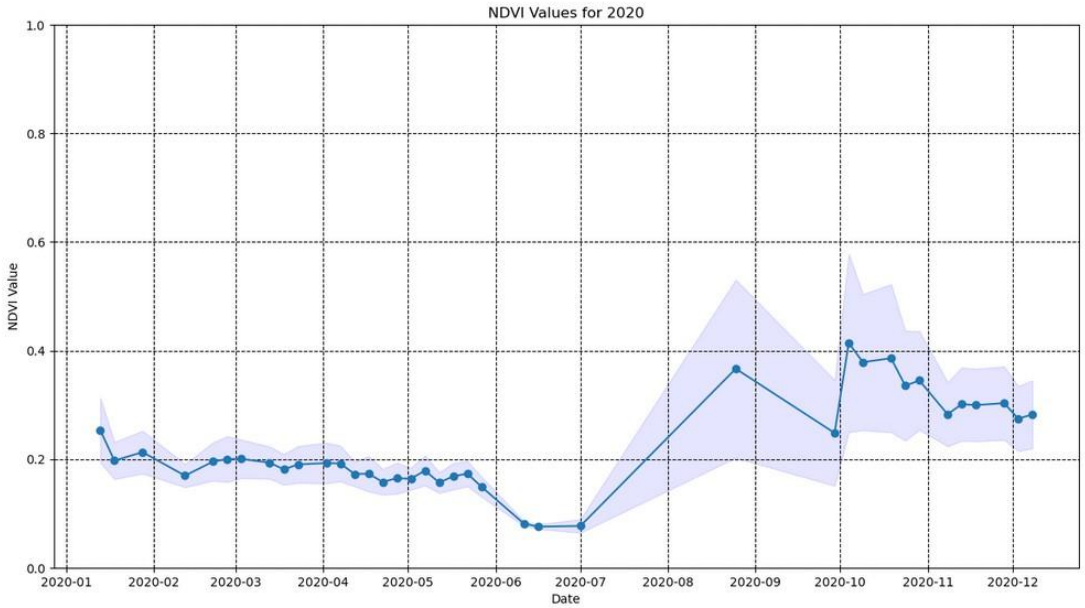
NO_2 Concentration in Mumbai, India
January 2020. 1km/pixel resolution



NO2 Concentration in Mexico City, Mexico
January 2020. 1km/pixel resolution

Use cases

Vegetation Index (NDVI) Senegal.



Traction

coimbra.pt

// Ambiente

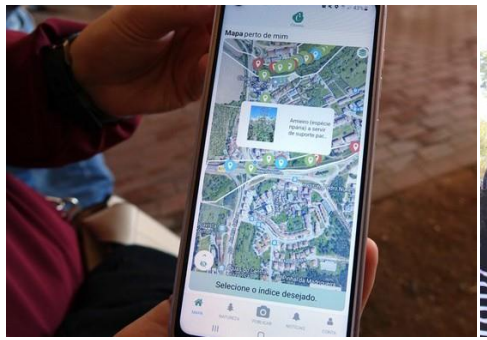
CÂMARA MUNICIPAL DE COIMBRA

Legislativas decorre este domingo na Escola Secundária de... Câmara anuncia Os Quatro e Meia nas Festas da Cidade e Matias Damás

31 Janeiro 2024

#CoimbraCityLab testa projeto piloto de mapeamento de espaços verdes e azuis em Coimbra

O projeto piloto Citizeen, desenvolvido pela empresa Our Watch Leads (OWL) e pelo Centro de Ciências do Mar e do Ambiente da Universidade de Coimbra, foi testado, hoje, dia 31 de janeiro, no Vale das Flores, em Coimbra, no âmbito do #CoimbraCitytLab, uma iniciativa da Câmara Municipal, coordenada pelo Centro de Inteligência do Departamento de Tecnologias de Informação e Inovação Digital. A solução, que passa pela utilização de uma aplicação móvel, com recurso a Tecnologia Satélite de Navegação e de Observação Terrestre, permite mapear o espaço urbano, georreferenciando zonas verdes e azuis. Permite, ainda, informar os municípios e os cidadãos sobre a localização e o respetivo estado de conservação dos referidos espaços.



https://www.coimbra.pt/2024/01/coimbracitylab-testa-projeto-piloto-de-mapeamento-de-espacos-verdes-e-azuis-em-coimbra/

Traction

https://www.coimbra.pt/2024/01/coimbracitylab-testa-projeto-piloto-de-mapeamento-de-espacos-verdes-e-azuis-em-coimbra/

Team - Why us?

Pedro Resende

Architect

Co-founder

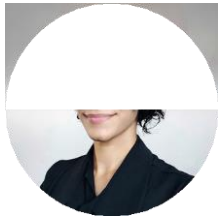
Eduardo Godinho

Aeronautical Eng.

Co-founder

Abran Idrees

Technical director



Danielle Freitas

BIM architect

Digital Twins

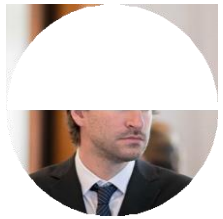
Giselle Machado

BIM architect

LCA, EPD

Diogo Carvalho

Business data scientist



José Martins

Proptech advisor

Maria Barreiros

Legal urban planning advisor

Sónia Serra

UC Advisor

Biodiversity

Maria Feio

UC Advisor

Biodiversity

Awards:

web summit top 15 startups alpha pack 2022

pharaon open call winner 2022

myEUspace COMPETITION top 4 startups track 2 geomatics 2022

Copernicus masters Top 3 in Copernicus Masters Bay Wa Challenge 2021

1st Place in CASSINI HACKATHON PT 18-20 JUNE 2021 Digitising Green Spaces

1st Place in Act in Space PT #AIS

Clients:

IMPAELAST

Sogepower

NATIONAL DISTILLERS

GLOBALBUSINESS ANGOLA

TIPOGRAFIA LOUSANENSE

riovida

casa dos frescos

METAL DESIGN

KOOL PARK

fundação da juventude

BURGER RANCH

INGLOT

Joshua's Ghuarma Grill

O BITOQUE anytime

"OWLplaces is a comprehensive solution capable of Monitoring, Reporting and Verification of Carbon and Sustainability, as well as prescribing regenerative architecture and nature-based solutions for CO2 offset."

The success factors of INVASORAS.PT

an information and citizen science platform on invasive plants in Portugal

Elizabete Marchante[1] and Hélia Marchante[2]

[1] CENTRE FOR FUNCTIONAL ECOLOGY – SCIENCE FOR PEOPLE & THE PLANET; 1 2 9 0 FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE D COIMBRA; DEPARTAMENTO DE CIÊNCIAS DA VIDA; TERRA

[2] Escola Superior Agrária, Politécnico de Coimbra; CERNAS – Centro de Estudos de Recursos Naturais, Ambiente e Sociedade

GLOBALLY


ipbes
Assessment Report on Invasive Alien Species and their Control
www.ipbes.net
The Intergovernmental Science-Policy Platform on Biodiversity & Ecosystem Services
#InvasiveAlienSpecies Assessment
UN environment programme
unesco
Food and Agriculture Organization of the United Nations
UNDP

Invasive alien species are one of the 5 major drivers of biodiversity loss

Alien species are animals, plants, and other organisms that have been introduced by human activities to new regions

Invasive alien species are a subset of alien species, known to have established and spread with negative impacts on nature.
Many invasive alien species also have impacts on people

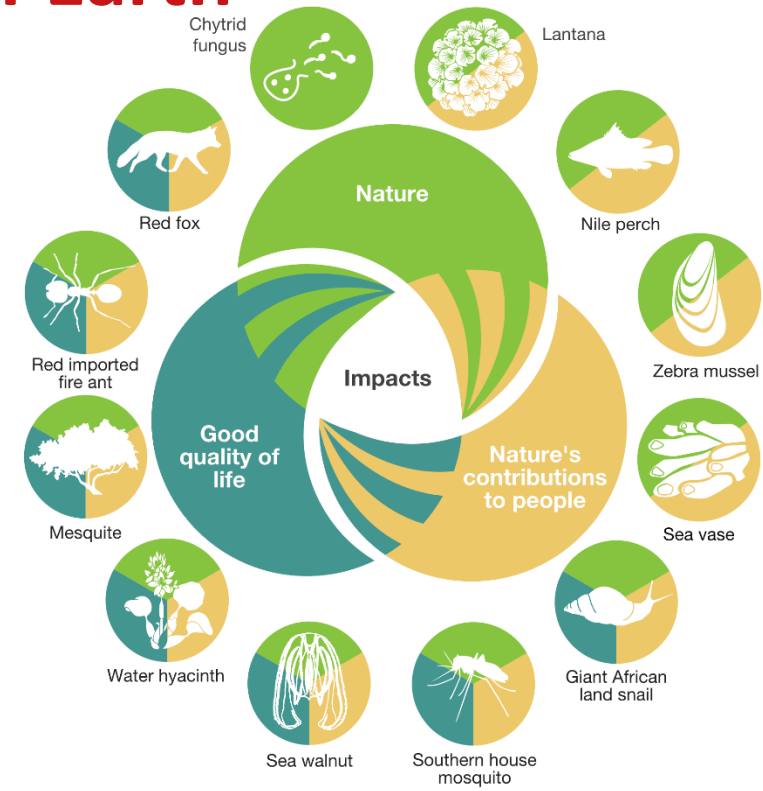
IPBES 2023. #InvasiveAlienSpecies Assessment

People and nature are threatened by invasive alien species in all regions of Earth

37,000 established alien species have been introduced by human activities worldwide

200 new alien species every year

3,500 invasive alien species, with negative impacts on nature, and also on people



IPBES 2023. #InvasiveAlienSpecies Assessment

A few numbers on impacts (very short!)

60%

of global species extinctions have been caused, solely or alongside other drivers, by invasive alien species

>$423 billion

is the estimated global annual costs of biological invasions in 2019.

85%

of impacts on nature and good quality of life are negative

IPBES 2023. #InvasiveAlienSpecies Assessment

Management of biological invasions

1. Prevention (→ raising awareness)
2. Early-detection & rapid-reponse
3. Control and containment at long-term (EU Regulation nº 1143/2014; Decreto-Lei nº 92/2019)

Citizen involvement and knowing where invasive species are is essential for all 3 levels! → Citizen science can make an important contribution!

Citizen science with alien and invasive species

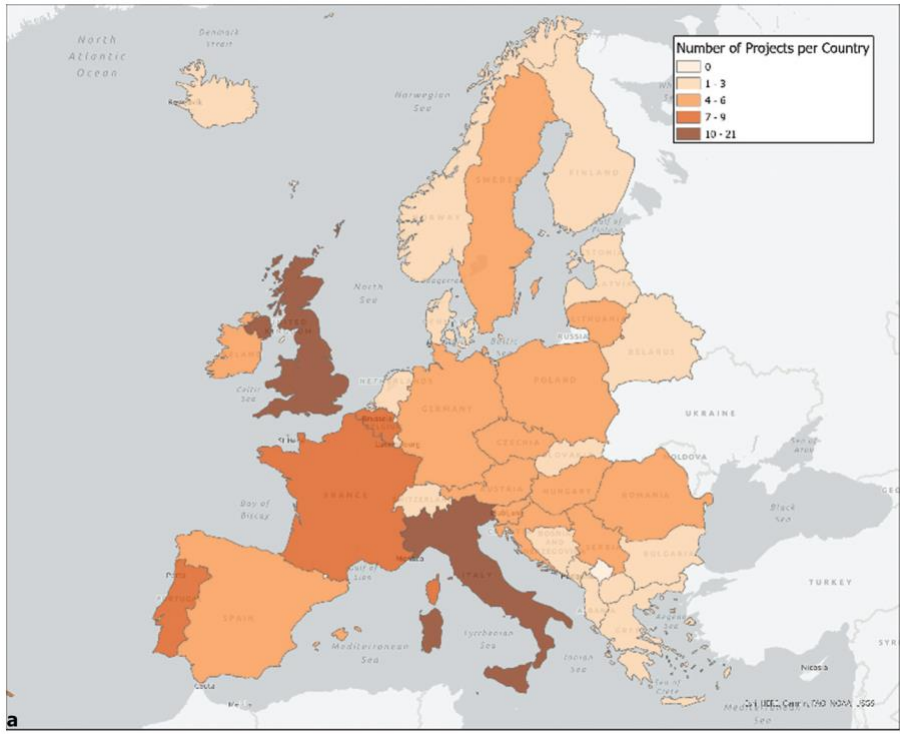
Benefits:

- Collection of observations is valuable for science and management
- Raises awareness of Invasive Alien Species (IAS) and their impacts among the public and specific stakeholders
- Supports the identification of IAS, e.g., with identification guides or automatic algorithms embedded in smartphone Apps
- **Citizen science increases large-scale data collection by engaging large audiences on large spatial and/or temporal scales**

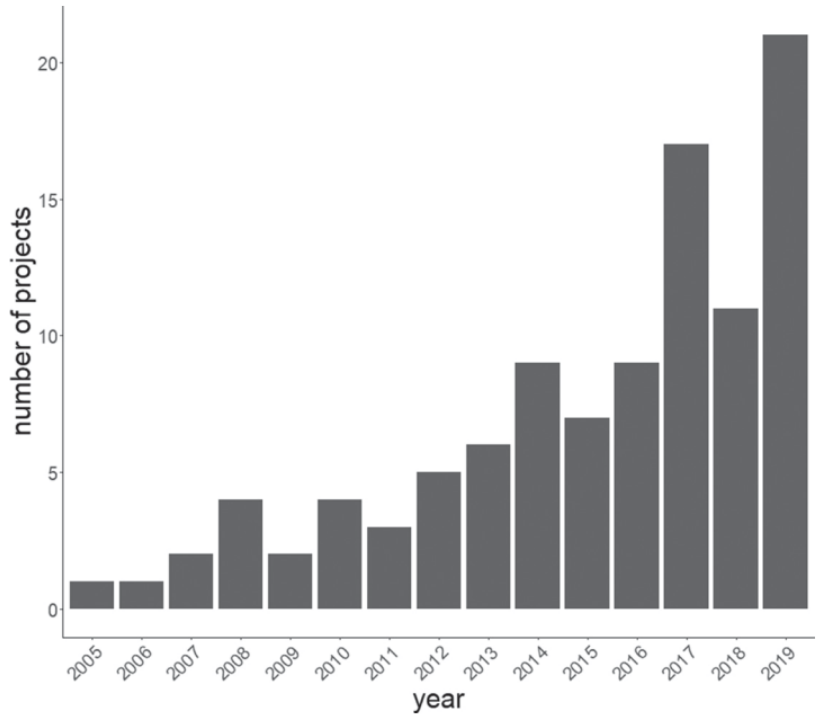
Citizen science with alien and invasive species

Europe (2019)

Projects per country



Projects over time



Price-Jones *et al*. 2022. NeoBiota 78: 1–24; doi: 10.3897/neobiota.78.81476

Citizen science platform INVASORAS.PT

Platform INVASORAS.PT

- Start: 2013
- Description: Platform on **invasive alien plants (IAP)** in Portugal, including various information and educational materials and a **citizen-science platform**.
- Main goal: Raise awareness of biological invasions, publicize invasive plants and involve the public in their mapping, control and dissemination.

Marchante *et al*. 2017. Transactions in GIS, 2017, 21(2): 238–252; doi: 10.1111/tgis.12198

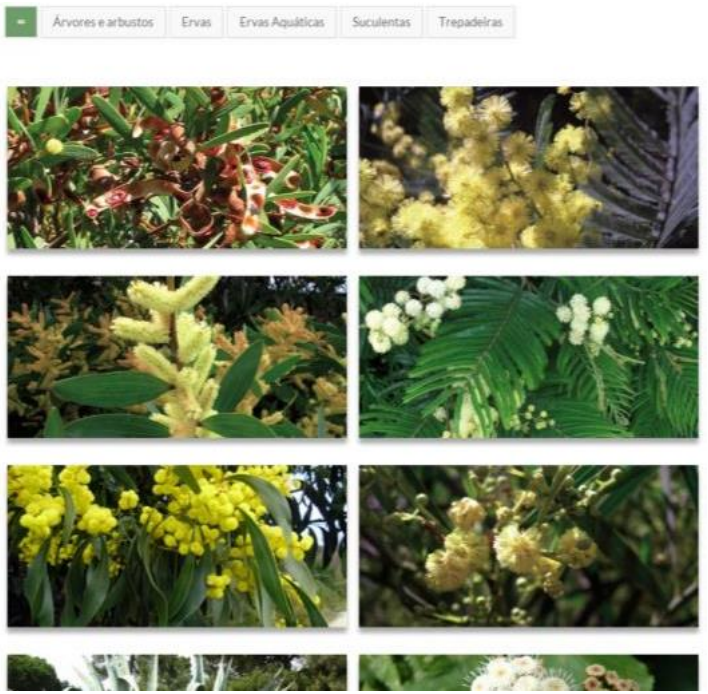
Platform INVASORAS.PT

Initially, dedicated web, Android and iOS app (up to July 2023) -
Detect and map IAP with the help of citizens

Platform INVASORAS.PT

Engaging citizens and raising awareness

- Challenge: Learn to recognize IAP
  - Website (2013) and field guide - help clarify, identify and control



Platform INVASORAS.PT

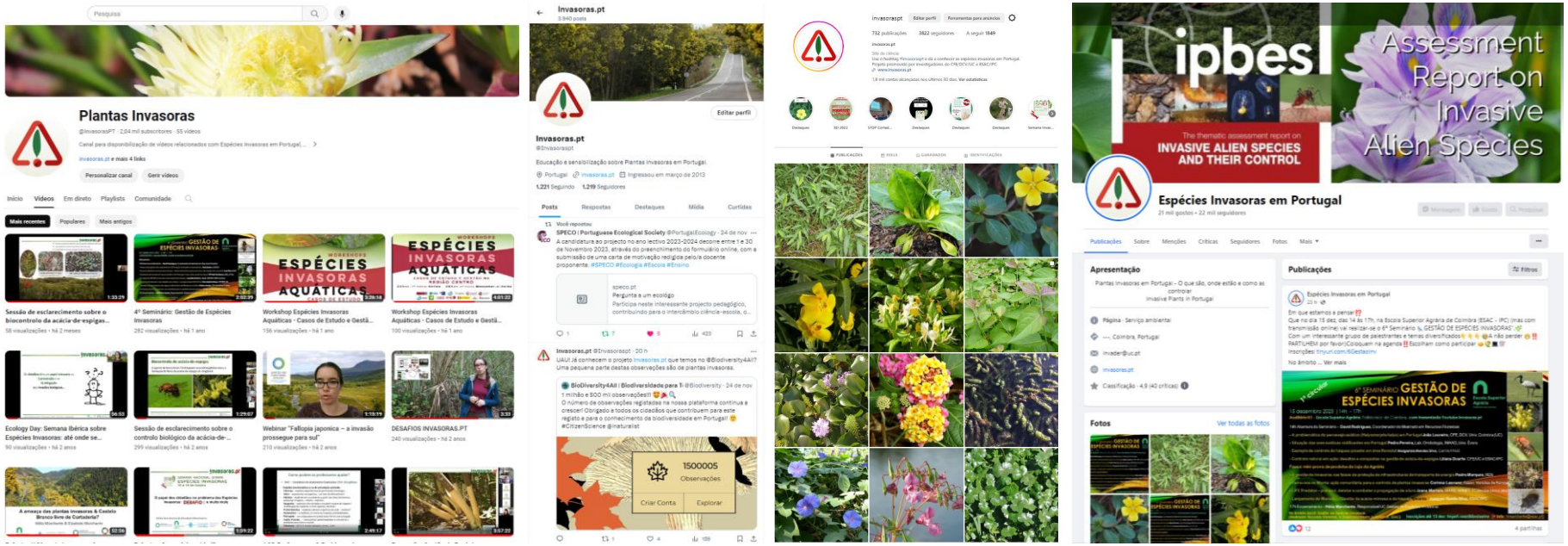
Engaging citizens and raising awareness

- Challenge: Learn to recognize & record IAP, publicize the platform
  - Training, workshops, talks, field actions, etc. since 2005 - helping to clarify, identify and control

Platform INVASORAS.PT

Engaging citizens and raising awareness

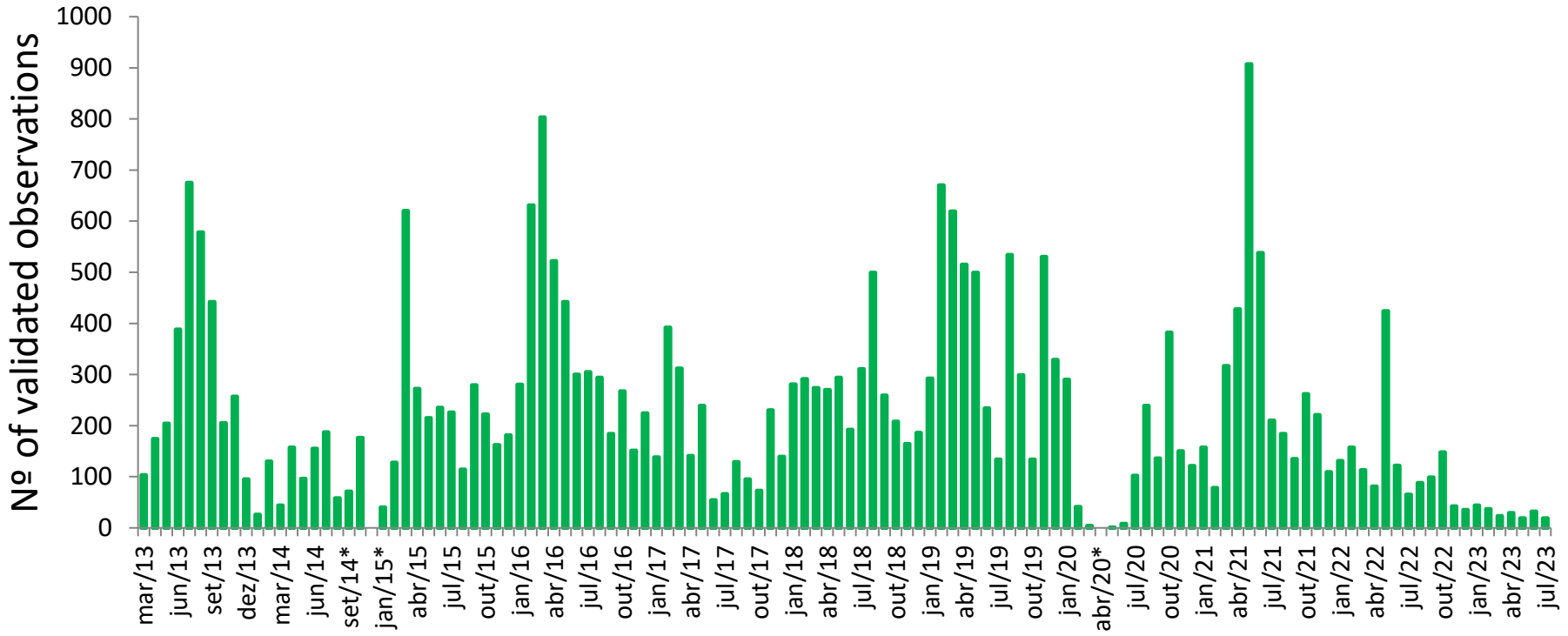
- Challenge: Publicize the platform, learn to recognize & record IAP
  - *Facebook* (23 314), *Instagram* (4 107), *YouTube* (2 190, 756 105 views), *X* (*Twitter*) (1 258), *Slideshare* (3 382 views 2022) since 2013



Platform INVASORAS.PT – outcomes

- 28,072 validated observations
- A lot of variation over time

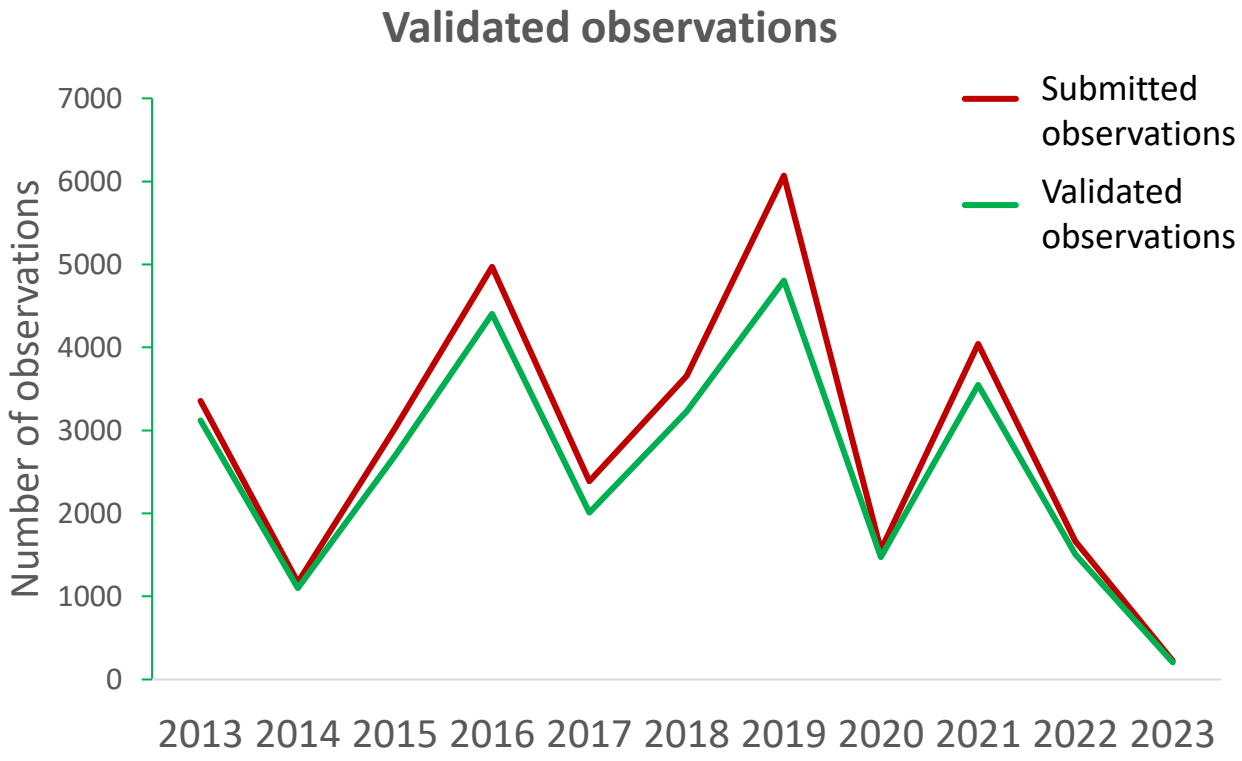
Validated observations (up to July 2023)



* Site *offline* or with problems

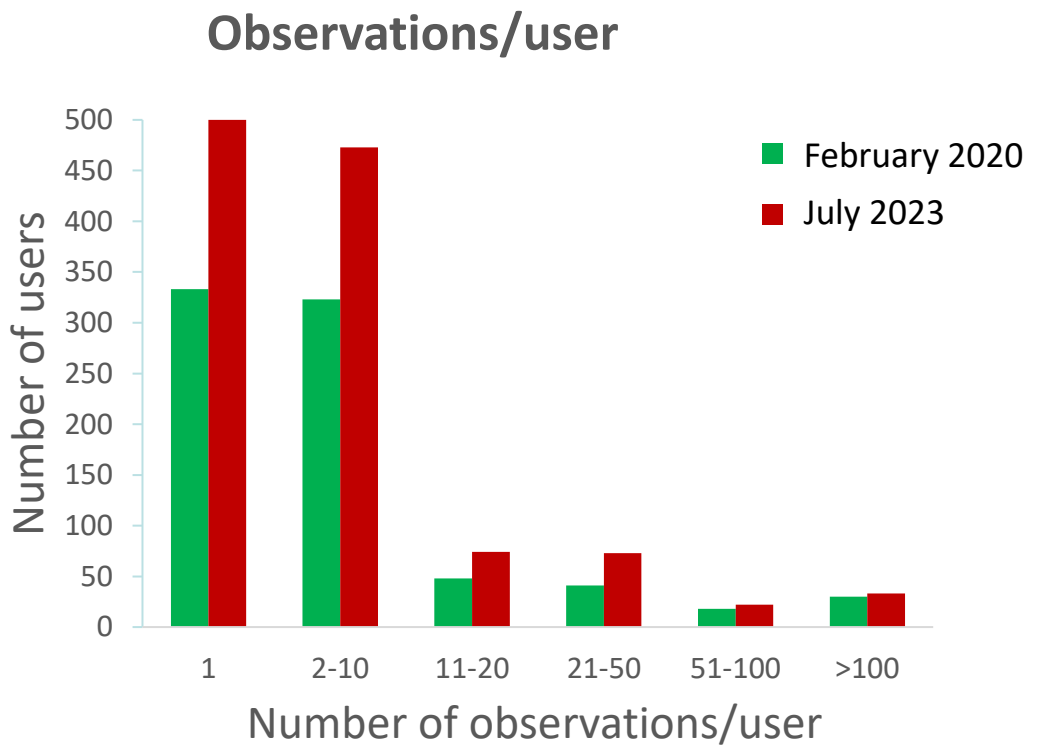
Platform INVASORAS.PT – outcomes

- > 80% of validated observations (average 89.1%)



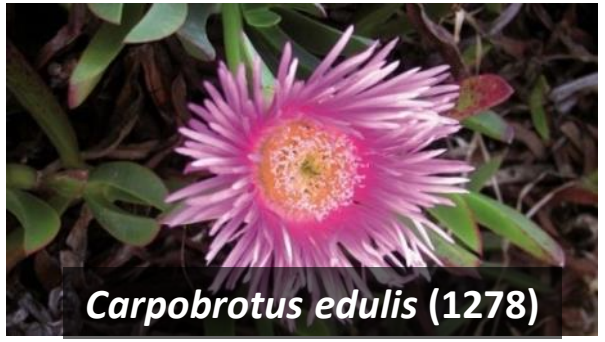
Platform INVASORAS.PT – outcomes

- 1175 active users (5017 registered)
- Most users participate occasionally



Platform INVASORAS.PT – outcomes

Most recorded species (2013 – July 2023; dedicated Apps)



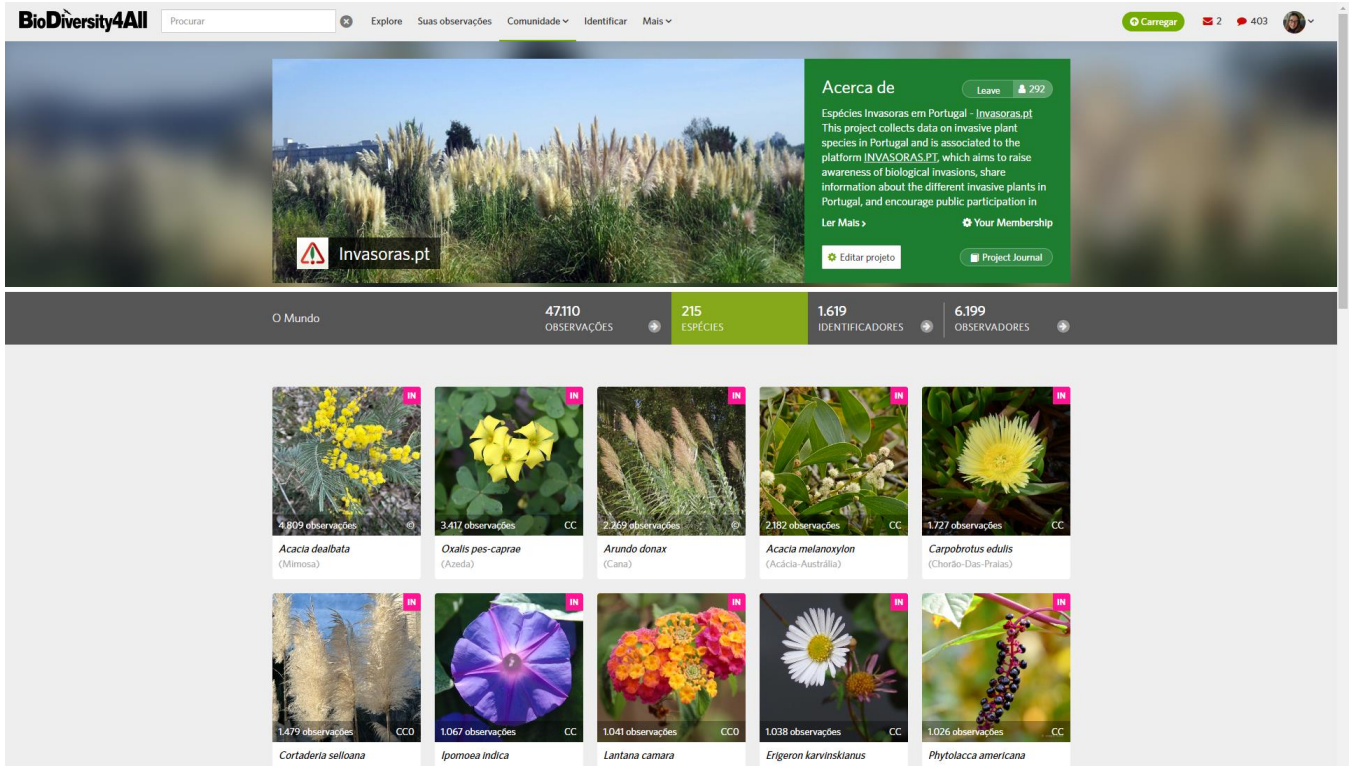
Platform INVASORAS.PT

But, it was difficult to maintain the platform, to have enough financial and human resources for:

- Maintenance
- Updates
- Validation of observations
- Etc.

Platform INVASORAS.PT & BioDiversity4All/iNaturalist

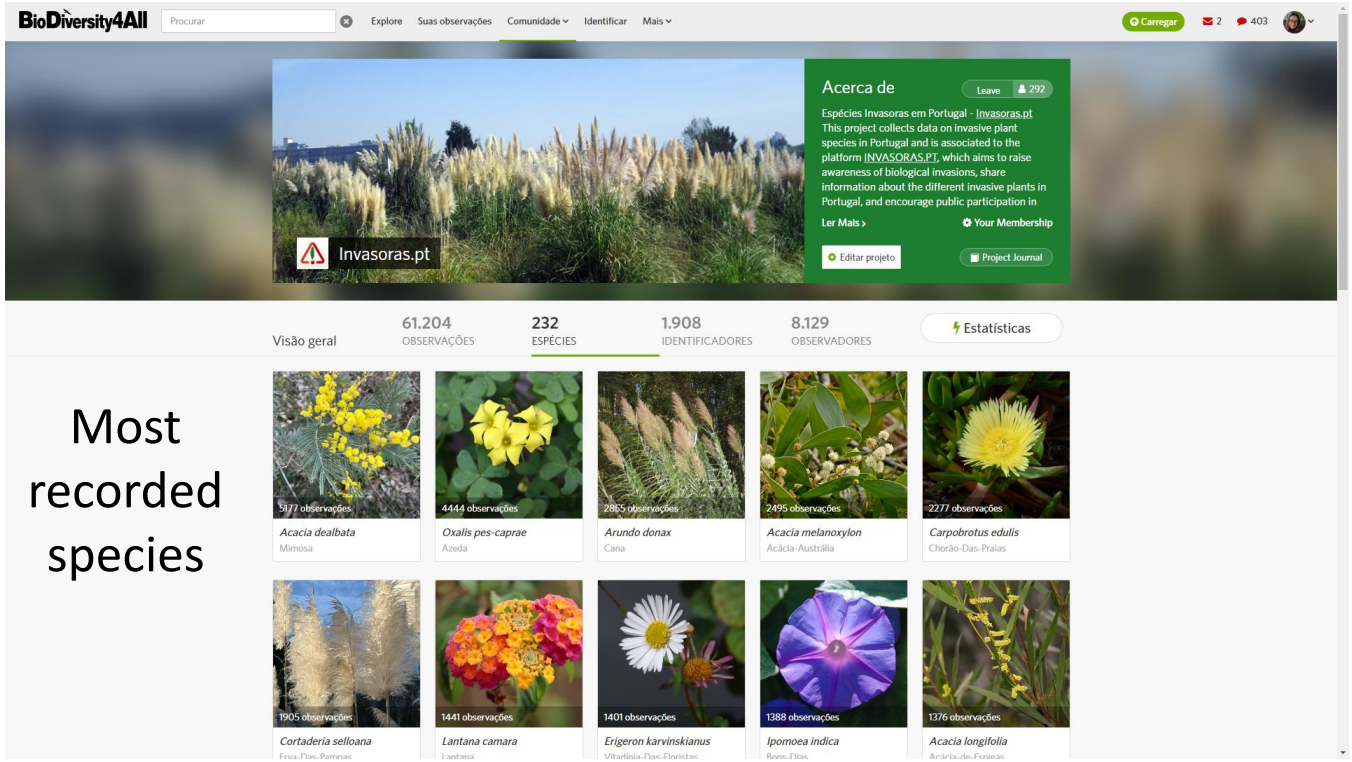
New registration tool: since October 2019 and exclusively since July 2023 - project **Invasoras.pt at BioDiversity4All/iNaturalist**



Maintaining the other features of the INVASORAS.PT platform

Platform INVASORAS.PT & BioDiversity4All/iNaturalist

New registration tool: since October 2019 and exclusively since July 2023 - project **Invasoras.pt at BioDiversity4All/iNaturalist**



Maintaining the other features of the INVASORAS.PT platform

Platform INVASORAS.PT & BioDiversity4All/iNaturalist

Despite some disadvantages:

- Less visibility
- Less information on species

This change has brought **several improvements:**

- Freedom to register any alien and invasive alien species, without a predefined list
- Algorithm to help identify species
- Collaborative validation process
- Possibility of automatically downloading records
- Greater reach
- Guaranteed maintenance (+)
- Less ‘dispersion’ of platforms

10 years platform INVASORAS.PT – results

- Increased early detection and mapping of IAP
- Contribution to greater awareness of IAP among the general public
- Strong involvement with different audiences (forestry, conservation, municipal technicians, school communities, etc.)
- 28,072 (dedicated Apps INVASORAS.PT) + 61,204 (Inaturalist/BioDiversity4All) observations of IAP, shared in open access with GBIF* and EASIN**; many used in scientific publications or management (317 citations from GBIF, and several dedicated publications)
- **Citizen Science is making an important contribution to the science and management** (including the implementation of legislation) **of biological invasions in Portugal!**

* Global Biodiversity Information Facility; **European Alien Species Information Network;

Platform INVASORAS.PT

How/why keep going despite the challenges?

- Support from the ‘mother’ institutions (CFE/DCV/UC; CERNAS/ESAC/IPC)
- We're always looking for funding so we don't give up
- We rely on citizen scientists and volunteers
- We believe in the benefits
- Lots of ‘fun’ and volunteerism
- We believe it's part of our ‘mission’ because it contributes to better management of biological invasions!

Funding and acknowledgments

Maria Morais, Jael Palhas, Francisco López-Núñez, Liliana Duarte, Mónica Almeida, Sílvia Martins, Ana Nunes, Helena Freitas, **citizen-scientists** ☺ etc.

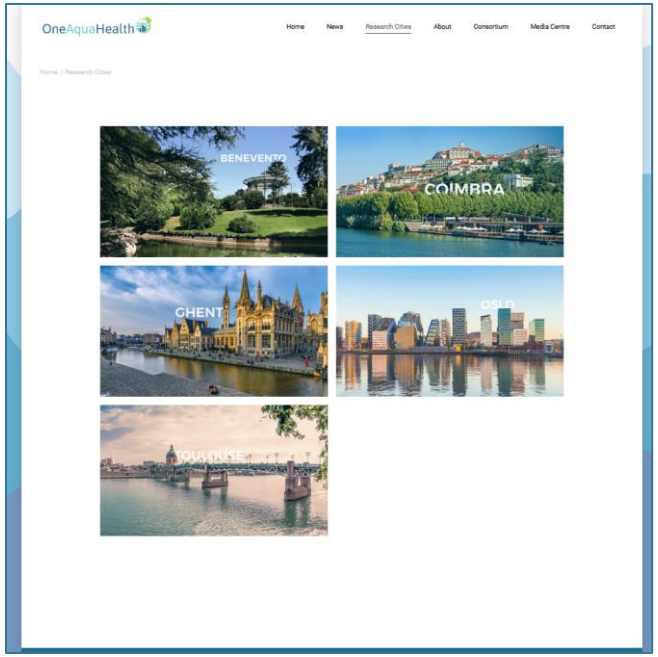
OBRIGADA! Questions?

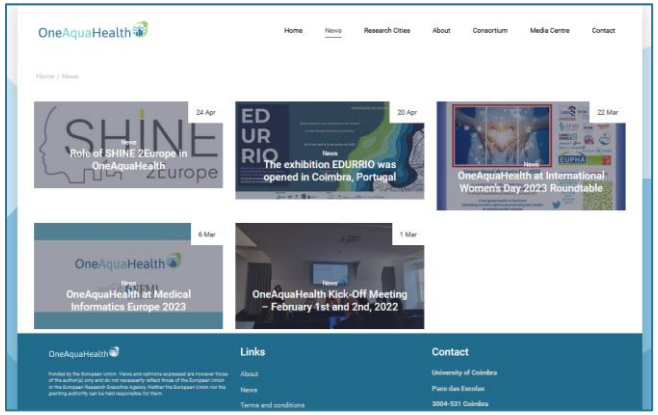
emarchante@uc.pt | http://invasoras.pt/ | https://www.facebook.com/InvasorasPt

Questions & Answers

DISSIMINATION & COMMUNICATION

Open Information Hub | www.oneaquahealth.eu





Scan Me

DISSIMINATION & COMMUNICATION

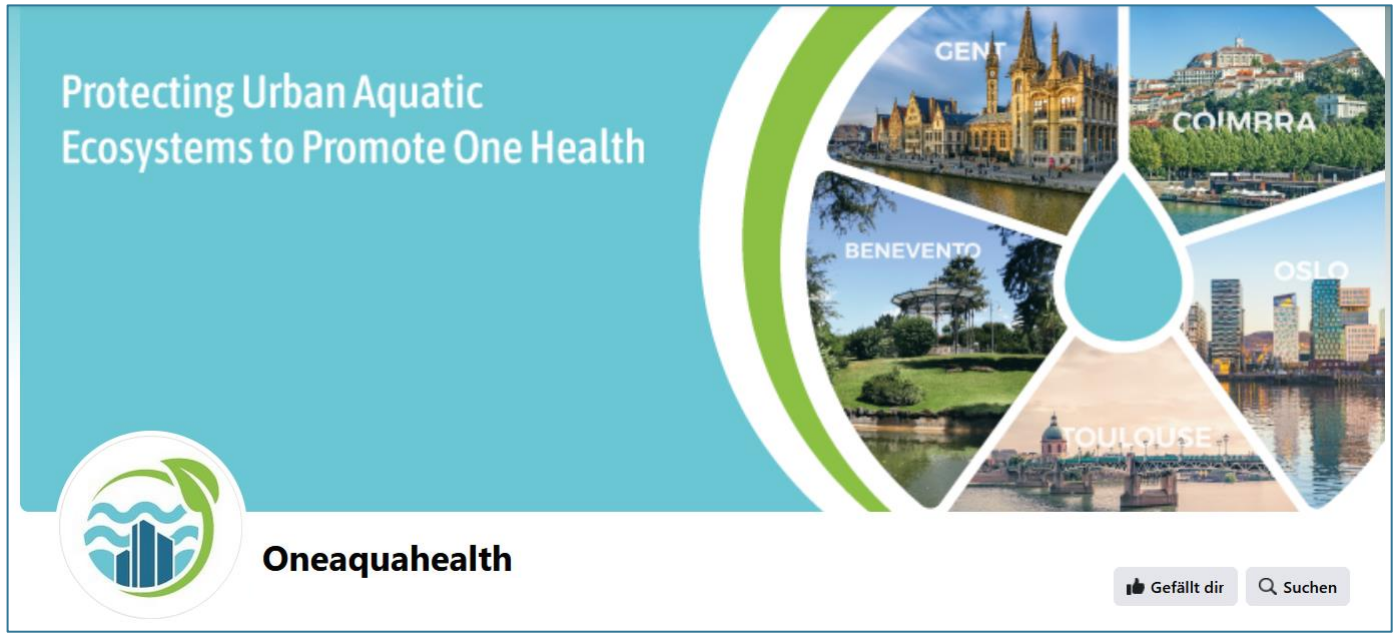
OneAquaHealth

Twitter account| https://twitter.com/OneAquaHealth

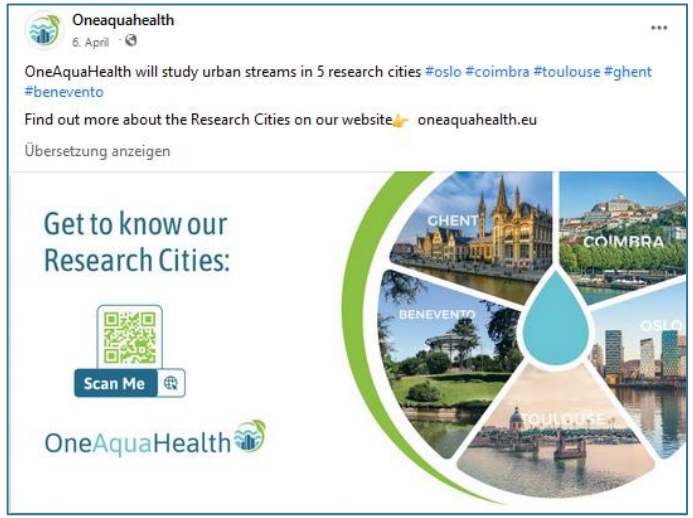
Scan Me

DISSIMINATION & COMMUNICATION

Facebook account| https://www.facebook.com/OneAquaHealth/



Scan Me

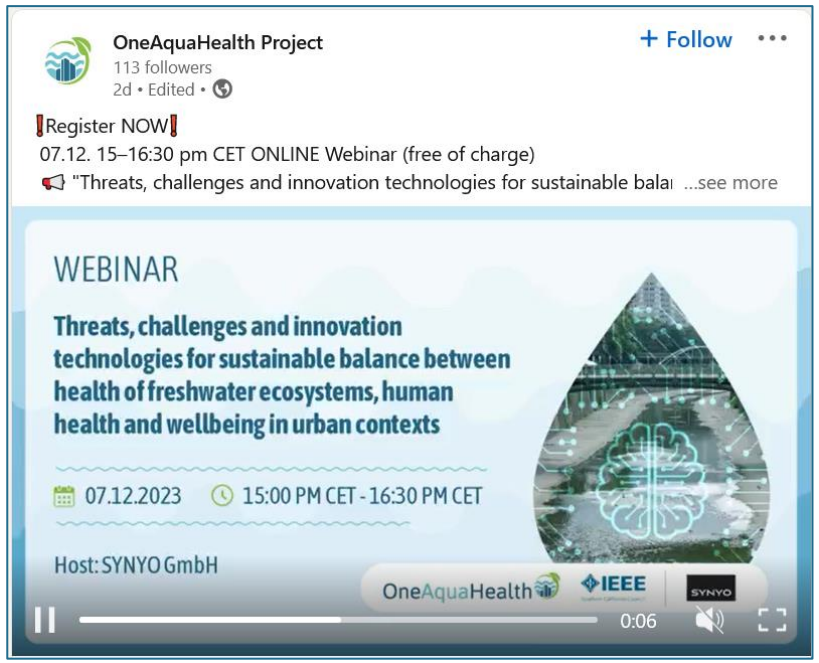


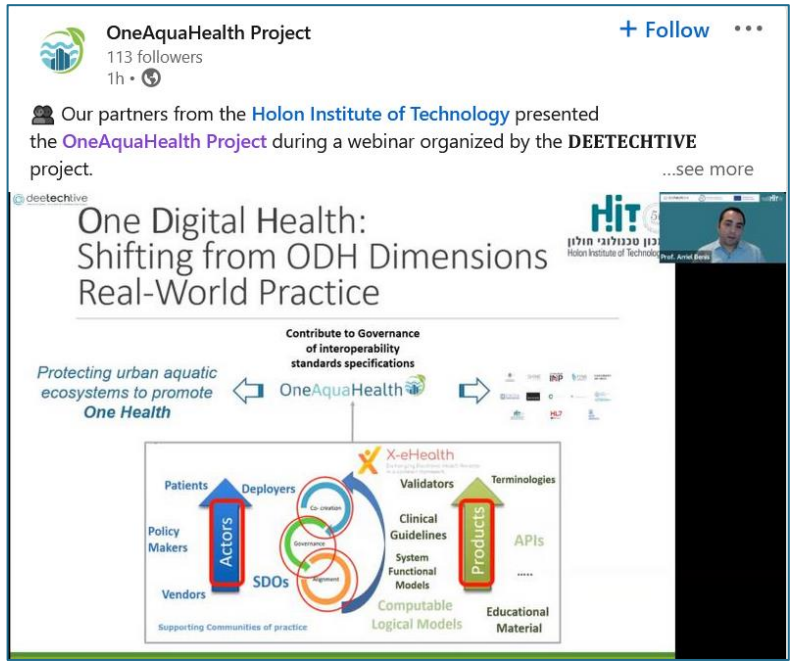
DISSIMINATION & COMMUNICATION

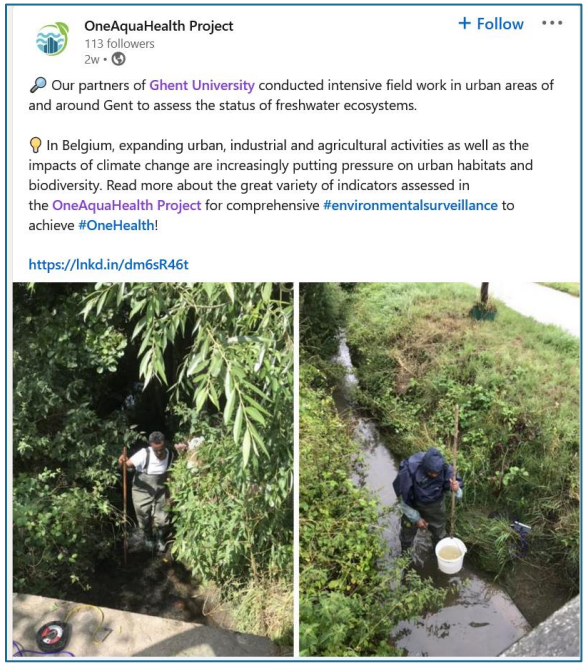
OneAquaHealth

LinkedIn account|https://www.linkedin.com/company/oneaquahealth/

Scan Me







Thank you for your attention!
Contact us, get involved, stay updated:

office@oneaquahealth.eu

www.oneaquahealth.eu

@OneAquaHealth

Oneaquahealth