

Build with OneAquaHealth

Public Digital Tools for Hackathon Innovation

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OBSERVE → UNDERSTAND → ANTICIPATE → BUILD

Today: understand the assets, then design what comes next

A guided path from existing tools to a credible Hackathon concept



You do not need to rebuild OneAquaHealth. You need to show the value of extending it.

Agenda

75–80 minutes · three tools · one hands-on design exercise

Time	Topic	Presenter
5 min	OneAquaHealth Digital Solutions & the Hackathon	George
10 min	Citizen Science App: From Citizens to Environmental Observations	Mary
10 min	Resilience Map: Explore, Compare and Use One Health Data	Symeon
10 min	Diptera App: From Environmental Data to Forecasts	Mary
10 min	Connecting the Three: From Observations to Intelligence	George, Mary
10 min	Hack with OneAquaHealth: What Can You Build?	George
10–15 min	Hands-on Challenge: Design Your OneAquaHealth Hack	George
5 min	Q&A and Hackathon Resources	George

What You Will Take Away from This Session

The session is successful if participants can move from exploration to a feasible prototype idea

- 1 Understand** What each public application already does
- 2 Reuse** Which data, outputs or functions can support a Hackathon concept
- 3 Connect** Citizen observations, resilience data and predictive modelling
- 4 Extend** With open data, EO, weather, AI/ML or new UX
- 5 Design** A prototype that adds value without duplicating existing functionality

Outcome: an initial, value-adding Hackathon concept that can be demonstrated in a basic prototype.

The Hackathon starts from working digital assets

The challenge is to extend, connect and reinterpret — not duplicate

**DON'T REBUILD ONEAQUAHEALTH.
BUILD WITH ONEAQUAHEALTH.**

ENRICH

Improve or validate
data

CONNECT

Fuse new sources

ANALYSE

Derive new
indicators or
predictions

EXPLAIN

Create meaning for
a real user

Three public applications support one data-to-intelligence pathway

Each tool contributes a distinct capability — and each can be extended independently

1 Citizen Science App

Collect structured, geolocated observations from citizens and connect local evidence with wider environmental information.

OBSERVE

2 Resilience Map

Explore, compare, combine and download resilience-related data for sites and areas covered by OneAquaHealth.

UNDERSTAND

3 Diptera App

Use environmental inputs and predictive modelling to explore anticipated Diptera presence and support scenario reasoning.

ANTICIPATE

OBSERVE

Citizen Science App

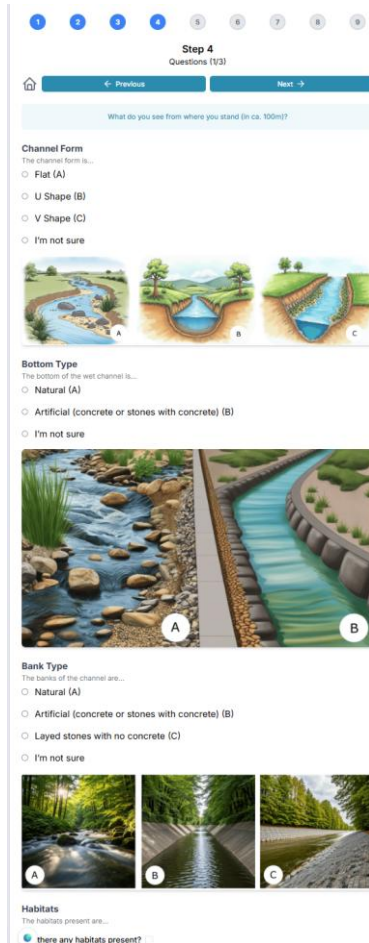
OBSERVE & CONTRIBUTE

From citizens to environmental observations: collect local, geolocated evidence and turn participation into reusable environmental records.

Presenter: Mary

The Citizen Science App structures local observations

A guided workflow helps citizens describe aquatic environments consistently



The screenshot displays the 'Step 4' questionnaire within the Citizen Science App. At the top, a progress bar shows steps 1 through 9, with step 4 highlighted. Below the progress bar, navigation buttons for 'Previous' and 'Next' are visible. The main content area contains three sections: 'Channel Form', 'Bottom Type', and 'Bank Type'. Each section includes a question, a list of radio button options, and illustrative images. The 'Channel Form' section asks 'What do you see from where you stand (in ca. 100m)?' and offers options: Flat (A), U Shape (B), V Shape (C), and I'm not sure. It includes three landscape illustrations labeled A, B, and C. The 'Bottom Type' section asks 'The bottom of the wet channel is...' and offers options: Natural (A), Artificial (concrete or stones with concrete) (B), and I'm not sure. It includes two photographs of stream beds labeled A and B. The 'Bank Type' section asks 'The banks of the channel are...' and offers options: Natural (A), Artificial (concrete or stones with concrete) (B), Layed stones with no concrete (C), and I'm not sure. It includes three photographs of stream banks labeled A, B, and C. At the bottom, there is a 'Habitats' section with the question 'The habitats present are...' and a checkbox labeled 'there any habitats present?'.

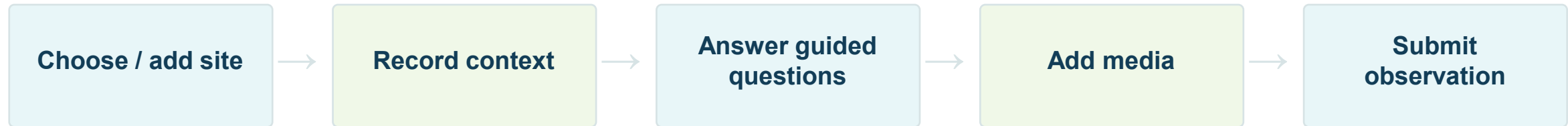
What it enables

- Create a geolocated observation at an existing or new site
- Follow a guided multi-step environmental questionnaire
- Describe channel form, substrate, banks, habitats and visible conditions
- Contribute photos and structured responses that can be reviewed and reused

Hackathon value: real-world citizen input with spatial and contextual meaning.

A guided workflow turns a visit into structured data

Participants can extend any step without rebuilding the submission process



Potential extension points

Image classification

Add intelligence while keeping participation simple and transparent.

Automated consistency checks

Add intelligence while keeping participation simple and transparent.

Confidence scoring

Add intelligence while keeping participation simple and transparent.

Contextual data enrichment

Add intelligence while keeping participation simple and transparent.

Design question: How can technology improve data quality without increasing friction for citizens?

Citizen Science: two strong Hackathon directions

Both extend existing observations with additional intelligence

1 CS1 — AI-Assisted Observation Validation

Use image recognition or other AI methods to classify or enrich uploaded observations, highlight uncertain submissions, and support human review.

Prototype focus: assistance, transparency and confidence — not automatic exclusion.

2 CS5 — Citizen–Environmental Data Fusion

Combine citizen observations with sensors, Earth Observation, weather, water-quality or other open data to validate reports and identify patterns that are not visible from one source alone.

Prototype focus: evidence fusion and added context.

Ask: what new insight becomes possible only after adding validation or external environmental evidence?



Resilience Map

EXPLORE · COMPARE · REUSE

Use maps, indicators and downloadable information to identify differences, vulnerabilities and opportunities across locations.

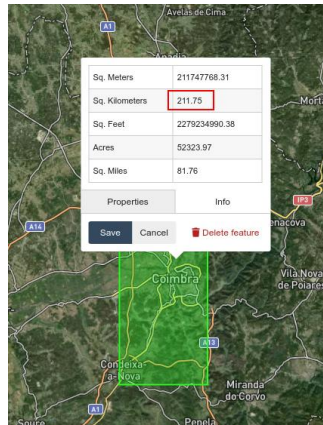
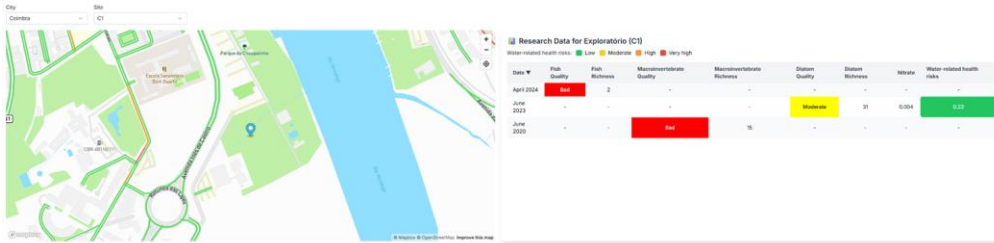
Presenter: Symeon, Mary

The Resilience Map makes complex data explorable

Geography provides the common frame for comparison and reuse

Core capabilities

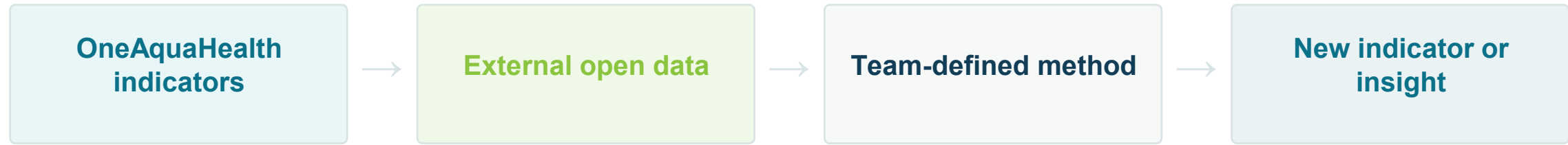
- Explore indicators geographically
- Inspect information at site level
- Compare areas and time points
- Combine selected information
- Download data for further analysis



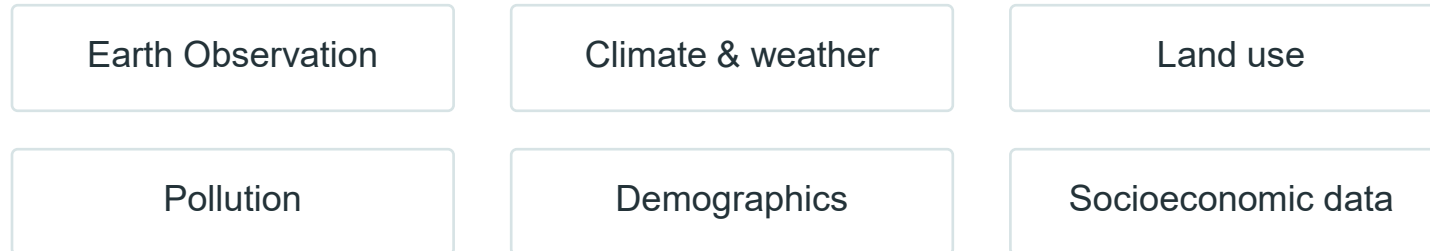
Hackathon value: an accessible entry point to place-based One Health and resilience data.

Downloaded resilience data becomes a building block

Combine it with external evidence and your own analytical logic



Potential external sources



Keep assumptions visible

Document sources, transformations, weighting and limitations so the result can be understood, reused and challenged.

Resilience Map: three Hackathon directions

Use the map as a reusable data source — not only as a visual interface

1 RM1 — Create Your Own Resilience Indicator

Combine selected indicators into a transparent composite measure. Make the normalization, weighting and assumptions explicit.

2 RM2 — Resilience + External Data Mashup

Connect downloadable OneAquaHealth data with EO, climate, weather, land-use, pollution or socioeconomic information to reveal new relationships.

3 RM3 — Compare Two Cities or Areas

Go beyond displaying differences. Explain which resilience factors contribute most strongly to the observed contrast between locations.

Best prototypes show both the result and the reasoning behind it.



Diptera App

MODEL & ANTICIPATE

Use environmental inputs and predictive modelling to explore anticipated Diptera populations and support environmental-health reasoning.

Presenter: Mary

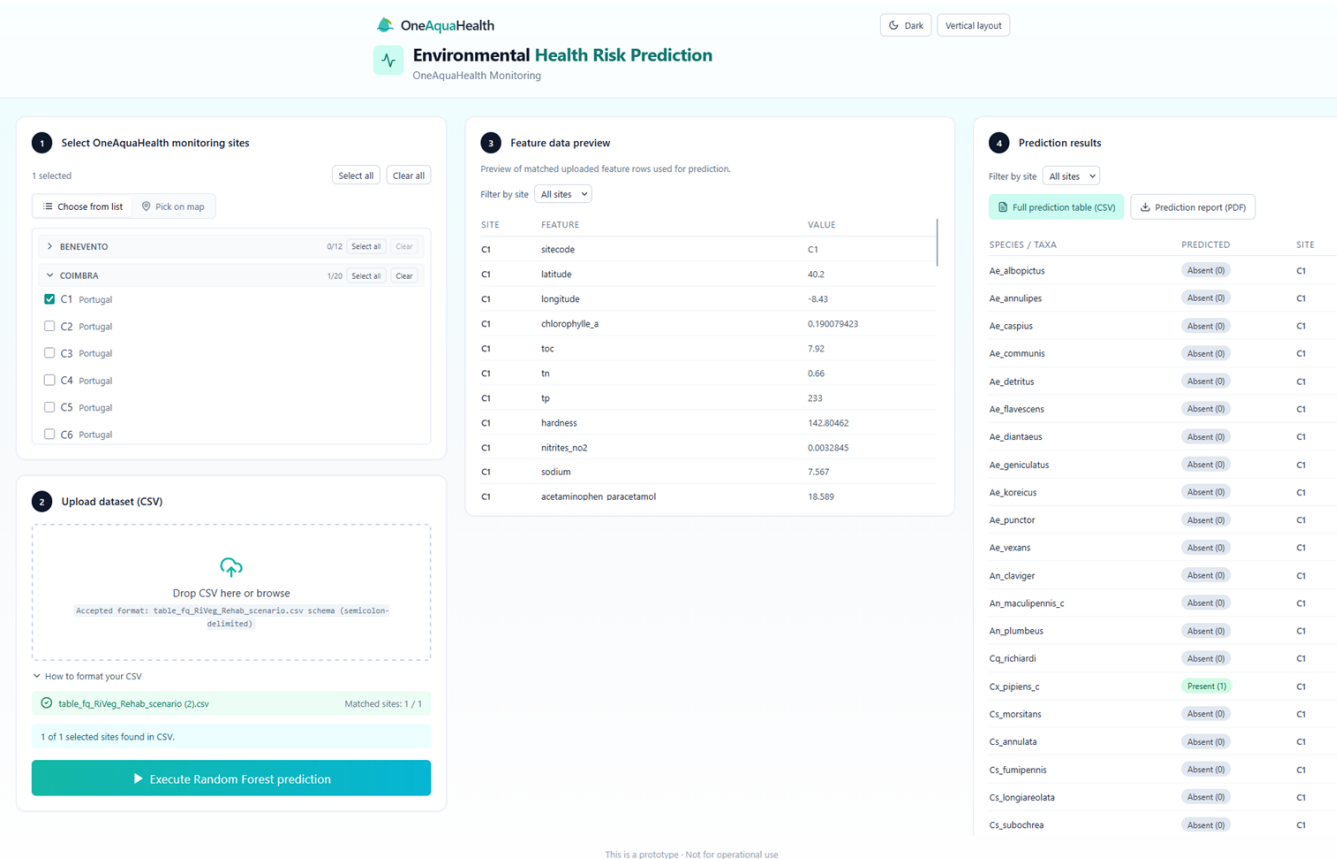
Diptera App: an end-to-end prediction workflow

Users move from site and data selection to interpretable model outputs

What the prototype provides

- Monitoring-site selection
- CSV-based environmental inputs
- Feature-data preview
- Taxa presence / absence predictions
- Downloadable results and report outputs

Experimental prototype: interpret outputs with scientific context.



The screenshot displays the OneAquaHealth Environmental Health Risk Prediction interface. It is divided into four main sections:

- Select OneAquaHealth monitoring sites:** Shows a list of sites. Under 'COIMBRA', 'C1 Portugal' is selected. Other sites listed include BENEVENTO, C2 Portugal, C3 Portugal, C4 Portugal, C5 Portugal, and C6 Portugal.
- Upload dataset (CSV):** A dashed box indicates where to drop a CSV file. Below, it shows a file named 'table_fa_RiVeg_Rehab_scenario (2).csv' is loaded, matching 1 of 1 selected sites.
- Feature data preview:** A table showing features for site C1:

SITE	FEATURE	VALUE
C1	sitecode	C1
C1	latitude	40.2
C1	longitude	-8.43
C1	chlorophylla_a	0.190079423
C1	toc	7.92
C1	tn	0.66
C1	tp	233
C1	hardness	142.80462
C1	nitrites_no2	0.0032845
C1	sodium	7.567
C1	acetaminophen paracetamol	18.589
- Prediction results:** A table showing species/taxa and their predicted status for site C1:

SPECIES / TAXA	PREDICTED	SITE
Ae_albopictus	Absent (0)	C1
Ae_annulipes	Absent (0)	C1
Ae_caspius	Absent (0)	C1
Ae_communis	Absent (0)	C1
Ae_detritus	Absent (0)	C1
Ae_flavescens	Absent (0)	C1
Ae_diantaeus	Absent (0)	C1
Ae_geniculatus	Absent (0)	C1
Ae_koreicus	Absent (0)	C1
Ae_punctor	Absent (0)	C1
Ae_vexans	Absent (0)	C1
An_claviger	Absent (0)	C1
An_maculipennis_c	Absent (0)	C1
An_plumbeus	Absent (0)	C1
Cq_richiardi	Absent (0)	C1
Cs_pipiens_c	Present (1)	C1
Cs_morsitans	Absent (0)	C1
Cs_annulata	Absent (0)	C1
Cs_fumipennis	Absent (0)	C1
Cs_longiareolata	Absent (0)	C1
Cs_subochrea	Absent (0)	C1

At the bottom, a button 'Execute Random Forest prediction' is visible. A footer note states: 'This is a prototype - Not for operational use'.

Four stages in the prediction workflow

Each stage offers a different opportunity for a Hackathon extension

1 Select sites

Choose monitoring sites from a list or map.

2 Upload CSV

Use a dataset that follows the expected schema.

3 Preview data

Check matched rows and values used by the model.

4 Run prediction

View taxa results and export outputs.

Strong prototypes can improve validation, explainability, scenario testing or communication around these stages.

Diptera: make forecasts easier to explain and explore

Focus on interpretation and scenarios rather than producing another prediction

1 D1 — Explain My Diptera Forecast

Add an explainability layer that shows which environmental variables and conditions contributed to a forecast, including uncertainty and limitations.

Key question: why this forecast?

2 D3 — Weather-to-Diptera Scenario Explorer

Combine forecasts with weather information, historical conditions or hypothetical scenarios to explore how changing environmental conditions may affect anticipated populations.

Key question: what changes under another scenario?

Useful innovation helps users interpret change, not simply produce another prediction.



Connecting the Three

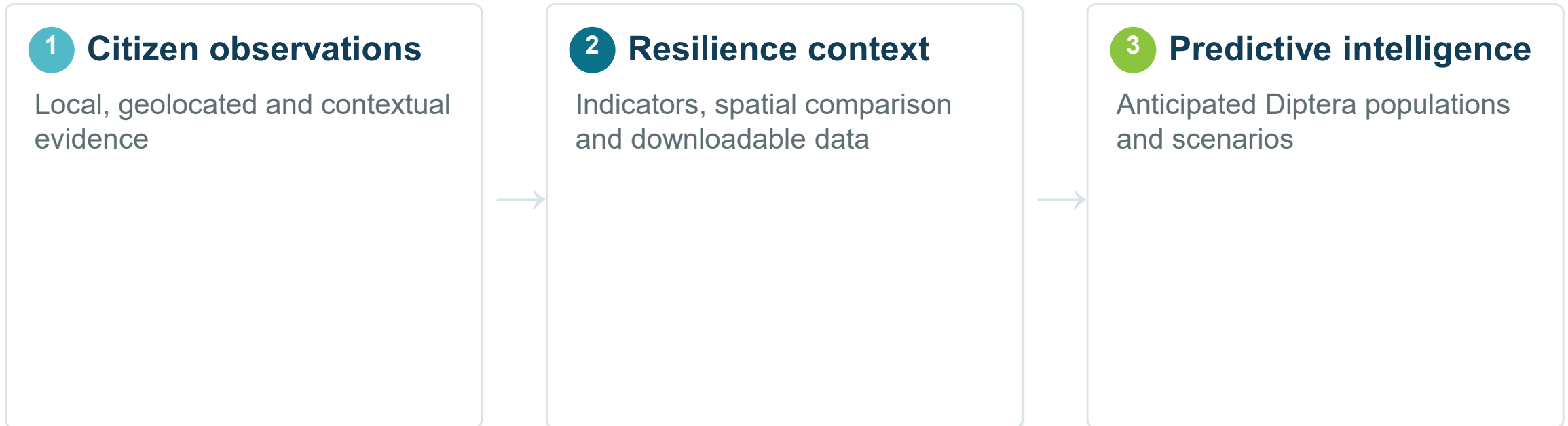
FROM OBSERVATIONS TO INTELLIGENCE

Citizen observations add local evidence, resilience data adds context, and prediction adds anticipation. A Hackathon solution can add a new link, insight or user experience.

Presenter: George

A Hackathon solution can connect evidence across the pathway

The prototype should add a new link, insight or user experience



NEW ANALYTICS • NEW EXPLANATIONS • NEW USER-ORIENTED FUNCTIONALITY

External data and AI can enrich every stage

Choose combinations that answer a concrete user problem

Citizen Science + AI

Image validation, classification, uncertainty flags

Resilience Map + Open Data

Composite indicators, city comparisons, vulnerability patterns

Diptera + Weather

Short-term scenarios, changing conditions, explanation

All three + UX

Narratives, alerts, dashboards and role-specific views

Start from the user need. Add technology only when it strengthens the answer.

BUILD

Hack with OneAquaHealth

WHAT CAN YOU BUILD?

Start with a user need, choose the right OneAquaHealth asset, and add one convincing new capability that creates measurable value.

Presenter: George

Four directions can turn an existing asset into a new prototype

Teams may combine more than one direction when the user problem requires it



ENRICH

Improve or validate
data



CONNECT

Fuse new sources



ANALYSE

Derive indicators or
predictions



EXPLAIN

Create user-
oriented meaning

The prototype does not need to be large. It needs to demonstrate a valuable new capability.

Seven example Hackathon challenges

Use these prompts for inspiration — they do not restrict team ideas

CS1**AI-Assisted Observation
Validation****CS5****Citizen–Environmental Data
Fusion****RM1****Create Your Own Resilience
Indicator****RM2****Resilience + External Data Mashup****RM3****Compare Two Cities or Areas****D1****Explain My Diptera Forecast****D3****Weather-to-Diptera Scenario
Explorer**

Choose one challenge — or define your own — then make the extension and its value explicit.

A credible prototype is focused, transparent and reusable

Use these guardrails to keep the concept feasible

User first

Name the person or group who will use the result.

Asset first

Identify the OneAquaHealth capability you are extending.

Explain the data

State sources, transformations and assumptions.

Show the value

Describe the decision, action or understanding improved.

Keep scope feasible

Demonstrate one convincing workflow or capability.

Respect uncertainty

Avoid presenting model output as certainty.

DESIGN

Hands-on Challenge

DESIGN YOUR ONEAQUAHEALTH HACK

Choose one application, add data or technology, define the innovation, and prepare a short pitch explaining the expected value.

Presenter: George

Use one framework to shape the concept

Six decisions connect a real problem to expected value



**Problem → Target User → OneAquaHealth Asset → Additional Data/Technology
→ Innovation → Expected Value**

Keep every element specific enough to test in a prototype.

Work in five short steps

Use the framework and prepare a one-minute concept pitch

- 1 Choose an application** Citizen Science · Resilience Map · Diptera App
- 2 Name the problem and user** Who needs what, and why?
- 3 Add data or technology** Open data · EO · weather · AI/ML · new UX
- 4 Define the innovation** What changes compared with the existing asset?
- 5 State the expected value** What becomes easier, clearer or more actionable?

Worked example: Resilience Map + heat exposure

A simple extension can still demonstrate clear new value

Problem

Urban areas differ in heat exposure, but resilience indicators alone do not explain the full picture.

Target user

Municipality / urban planner

OAH asset

Resilience Map downloadable indicators

Additional data

Copernicus / open heat or land-surface-temperature data

Innovation

Create a heat-resilience comparison for two areas and explain which factors drive the difference.

Expected value

A transparent comparison that helps prioritise where further investigation or adaptation action may be needed.

This is enough for a Hackathon concept: one asset, one extension, one explainable value proposition.

A one-minute pitch should answer five questions

Clarity matters more than technical detail at this stage

- 1 What problem are you solving?
- 2 Who is the target user?
- 3 Which OneAquaHealth asset are you building on?
- 4 What new data, technology or functionality are you adding?
- 5 What value will the prototype demonstrate?

DEFINE YOUR VALUE IN ONE SENTENCE

**We help [user] address
[problem] by extending
[OAH asset] with
[data/technology], creating
[value].**

Use the public tools and supporting resources

Explore the applications, understand what you reuse, and document your sources

Open Information Hub

<https://www.oneaquahealth.eu/>

Citizen Science App

<https://apps.oneaquahealth.eu/citizens/submission>

Resilience Map

<https://apps.oneaquahealth.eu/resmap/>

DipteraCast App

<https://mosq-forecast.vercel.app/>

Diptera prototype access and datasets: use the link and guidelines supplied in the Hackathon session materials.

Questions & Answers

Choose one asset. Extend it. Explain the value. Build the prototype.

George Koutalieris · Symeon Symeonidis · Iphigenia Kapsomenaki · Maria Papoutsoglou
ENORA Innovation

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