

Fresh Water Quality and Riparian Vegetation Monitoring by Citizen Science Activities.

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www.osservatoriocitizenscience.org

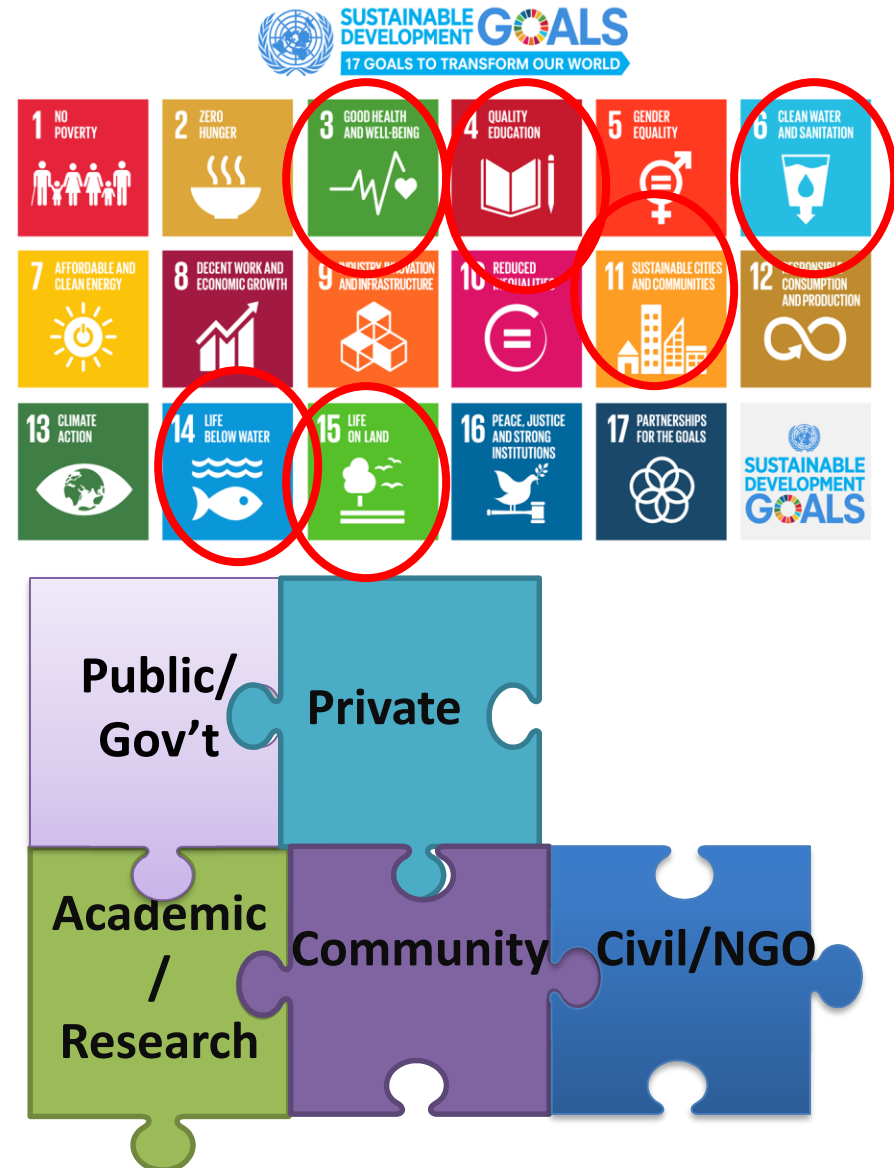


FONDAZIONE FLAMINIA
CENTRO PER L'INNOVAZIONE



CITIZEN SCIENCE - CROWDSOURCING DATA MANAGEMENT OPPORTUNITIES

- *The opportunities*
 - *Meeting global goals*
 - *Creating new partnerships*
 - *Addressing local priorities*
 - *Creating informed communities supporting policy and resource management*





MAIN AIM OF CITIZEN SCIENCE

Conservation and restoration of local territory

Science: large number of data for warning monitoring

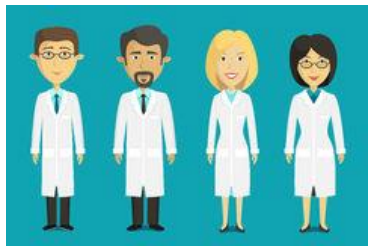
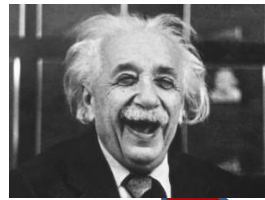
Society: more knowledge increases the correct perception of the environment and increase sustainable behavior.

Moreover: Opportunity to carry out long-term monitoring



DEFINING CITIZEN SCIENCE

Active integration process self sustaining



CHALLENGES OF THE CROWDSOURCING DATA MANAGEMENT

- *The challenges*
 - *Quality control, scale and prevention*
 - *Combining multiple information streams*
 - *Continuity and engagement*



Discovery

To know your surrounding, to take part in solution processes



Collection

Collect scientific data useful for research and monitoring aims



Discussion

Starting from training, an ongoing relationship with experts

GLOBAL COMMUNITY



FWW PROJECT

FRESH WATER QUALITY MONITORING



1. TRAINING (safety, robust methods, consistency)



2. FIELD DATA COLLECTION



3. EXTERNAL and AUTOMATED QUALITY CONTROL



4. FEEDBACK and CONTINUOUS LEARNING

REGISTERED USER (ONLY)

1-TRAINING

NOT ONLY TRAINING, BUT MEETING AND KNOWLEDGE AS WELL

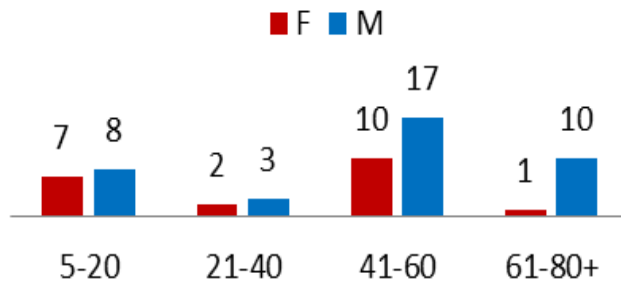
Questionnaires:

PARTICIPANTS CHARACTERIZATION

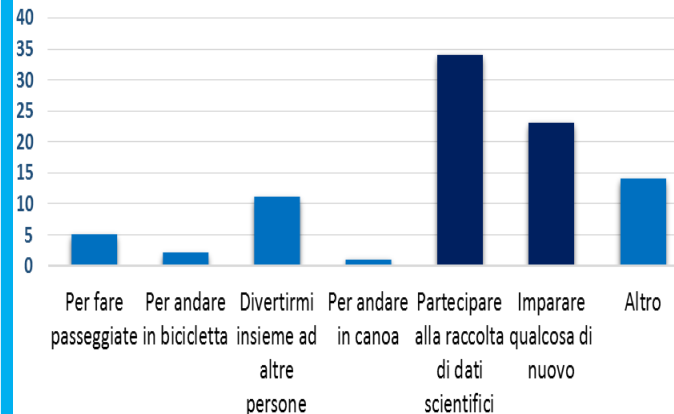
ENVIRONMENT PERCEPTION BEFORE AND AFTER



Distribuzione per classi d'età dei 58 Citizen Scientists coinvolti



Perchè hai partecipato al WaterBlitz?



2-FIELD DATA COLLECTION

Ecosystem condition/land use:

- Bank Vegetation
- Wildlife presence
- Pollution sources



NUTRIENTS

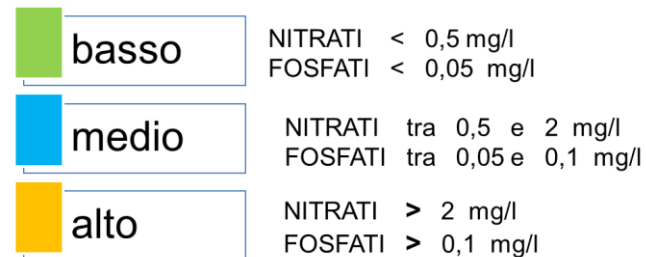
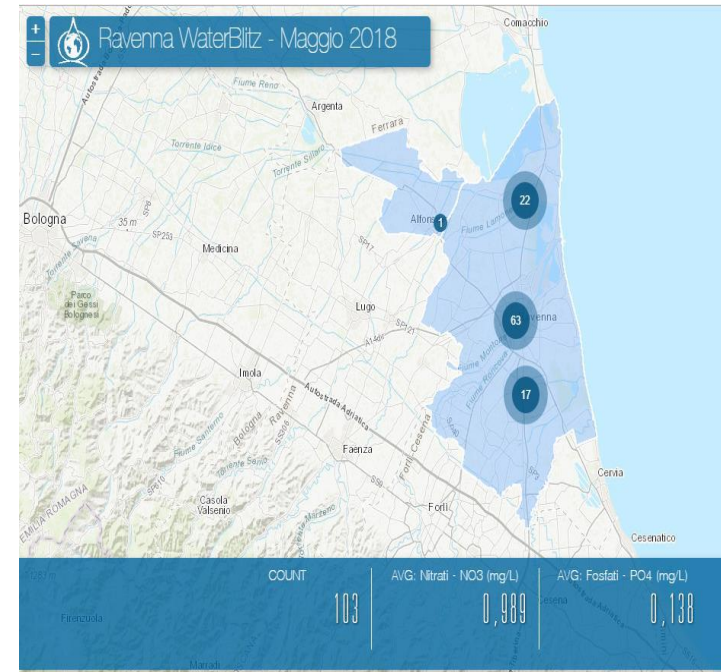
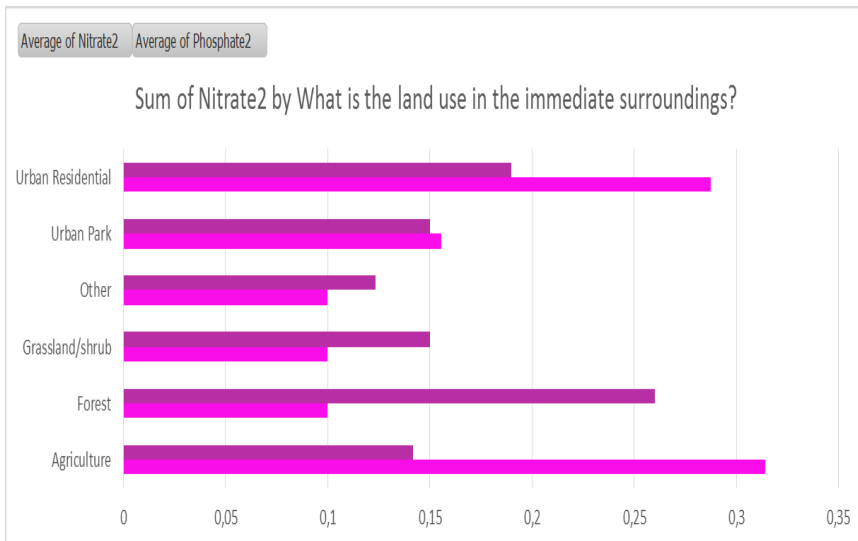
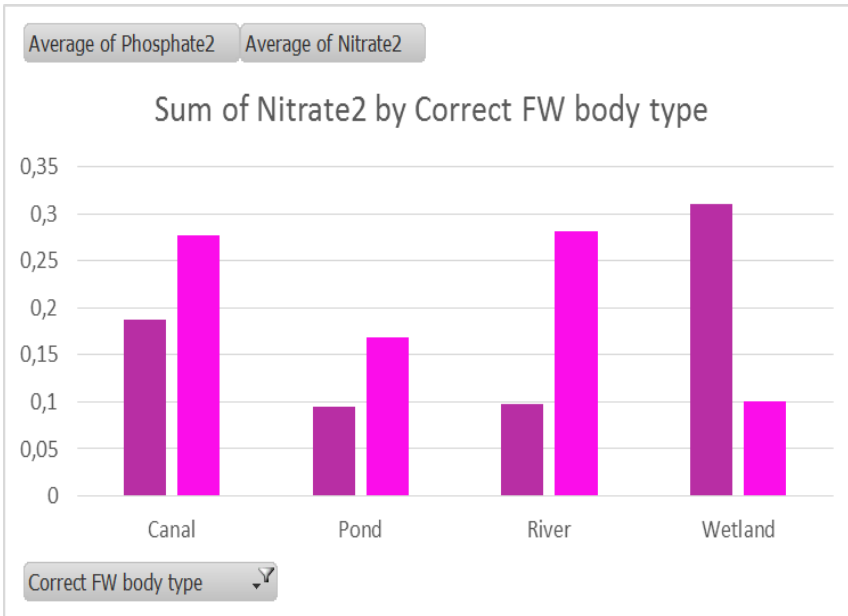
- Nitrate (NO₃)
- Phosphate (PO₄)
- Turbidity
- Algal Blooms



Water conditions

- Water Level/speed
- Water color
- Litter

3-DATA ANALYSIS AND FEEDBACK



WHY NITRATE AND PHOSPHATE?



SALUTE
PUBBLICA



EUROFIZZAZIONE



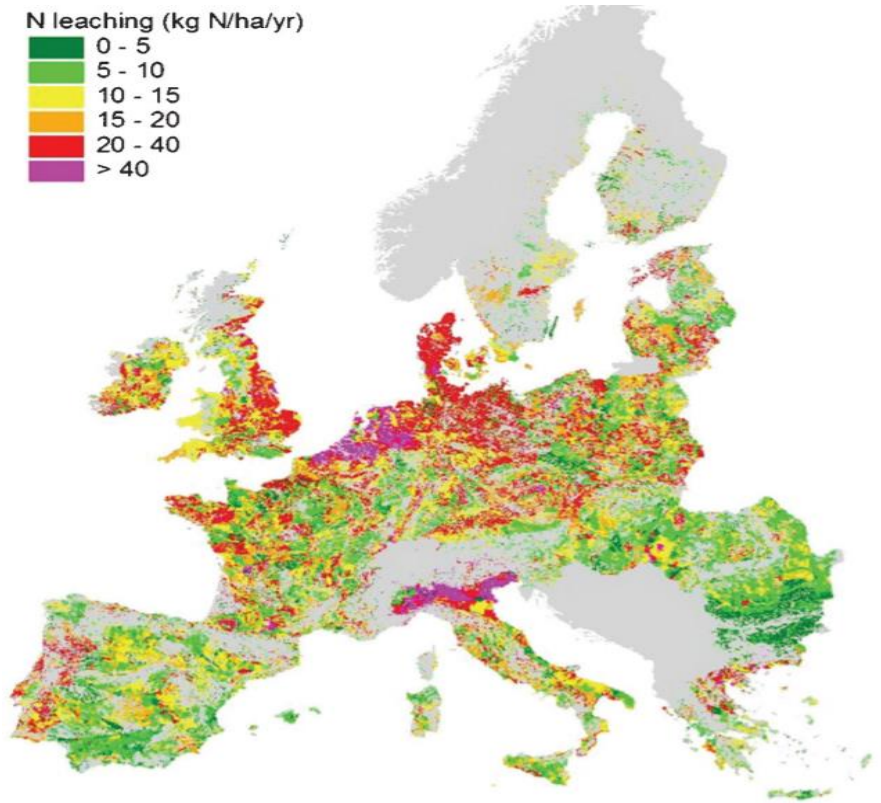
7N:1P



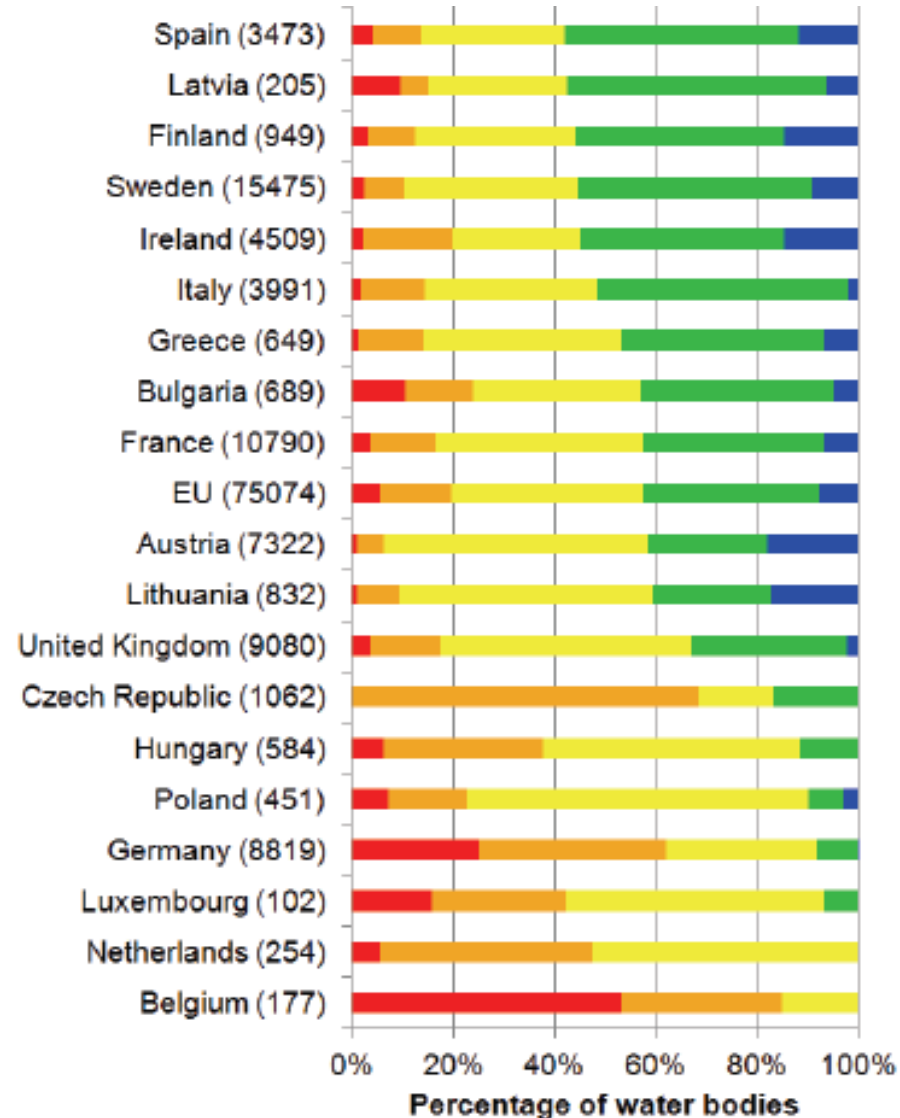
MEETING GLOBAL GOALS: WFD 2000/60

N leaching (kg N/ha/yr)

- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 40
- > 40



Getting Europe 's waters cleaner
Getting the citizens involved.



Ecological status of waterbodies

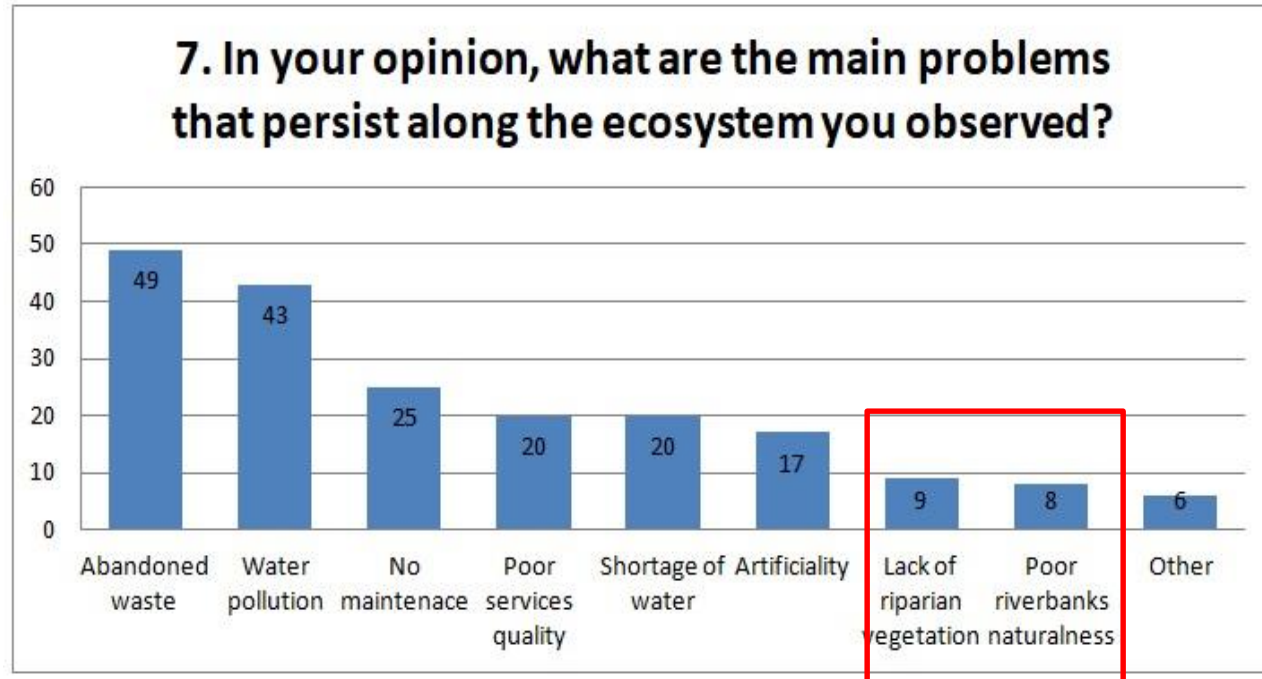
Bad Poor Moderate Good High

SOCIETY PERCEPTION



From previous experiences of Citizen Science (CS) in Italy, citizens' observations make it clear that absence of riparian vegetation and poor bank naturalness are not felt as a problem. Citizens ignore the importance of riparian vegetation and often they perceive natural vegetation near the river as dangerous and dirty.

Di Grazia 2018



walking paths



Cycle paths



OBJECTIVES



1 - Disseminate knowledge and awareness about Riparian Vegetation value in human society.

2 - From the scientific point of view, this monitoring can be integrated with remote sensing surveys by the identification of target species: not only hygrophylous but also invasive, nitrophilous, mesophilous species.

3 - Improve our knowledge on the “*riparian land drying*” process that riparian vegetation are suffering all over the world



SMARTPHONE APPLICATION CONTENTS



- **MONITORING SITE** is about 10x10 m but it is possible to change it

- **GEOGRAPHIC AREAS:**

- Plain from 0 to 150m
- Hill from 150 to 800m

- **STRUCTURE:**

- trees, shrubs, herbaceous or mix

- **THREE LAYERS:**

- Trees;
- Shrubs from 1 to 3 m;
- Herbaceous lower than 1 m.

- **VEGETATION COVER**



App developed using Survey123 for Arcgis standard XLS forms

The APP was developed by Cristian di Stefano (ISPRA)



SMARTPHONE APPLICATION CONTENTS



- **EACH LAYER:**

average tree height, coverage;

- **SPECIES TARGET EASY TO IDENTIFY** and 4 class of coverage

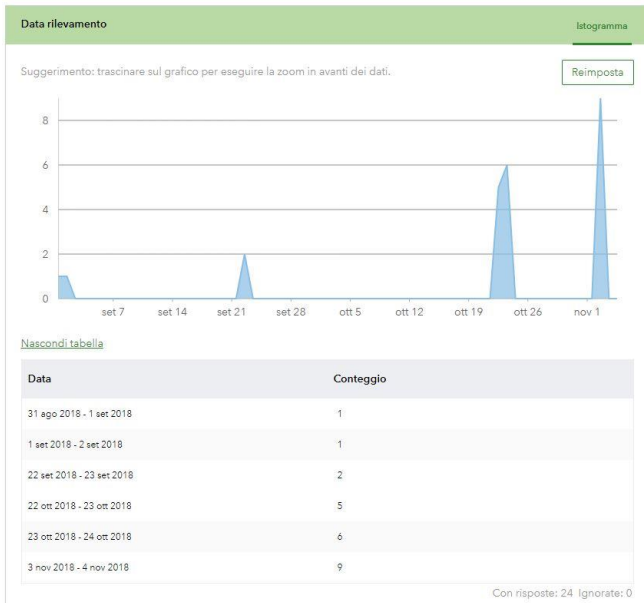
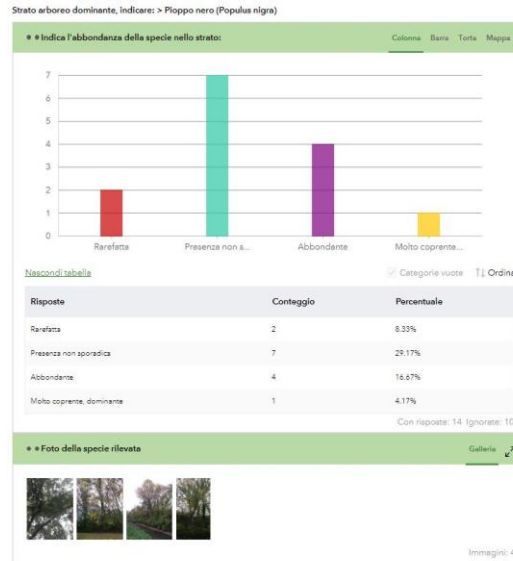
- hygrophilous, (*Populus nigra*, *Populus alba*, *Salix alba*, *Alnus glutinosa*);

- invasive species (*Robinia pseudoacacia*, *Ailanthus altissima*, *Amorpha fruticosa*, *Rubus* sp.);

- good indicators (ex. Nitrophilus or mesophilus): *Urtica* sp., *Fraxinus ornus*, *Quercus* sp.

- **Confidence:** yes, not (if not why?)

DATA ANALYSIS OUTPUT



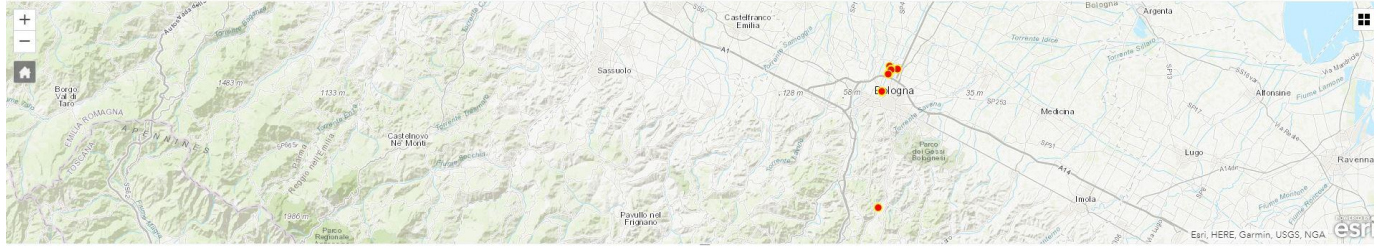
DATA ANALYSIS OUTPUT



Vegetazione riparia CS

Panoramica Progetta Collabora Analizza **Dati** Impostazioni

01/09/18 - 15/11/18 Filtro Report (Beta) Esporta Apri nel map viewer Mostra risposta singola 24/24



Vegetazione_riparia_CS (Feature: 24, selezionate: 0)

Delimita un'area di 10 m lungo il fiume in cui fare la tua osservazione, l'app registrerà le coordinate esatte e la data; IMPORTANTE: Scatta MINIMO una foto d'insieme dell'area osservata. Individua le specie presenti che appartengono alla lista qui riportata; fai una stima della loro copertura: Non presente, Raro(70%). Se trovi una pianta di difficile identificazione, guarda la checklist dettagliata delle specie con le informazioni utili per	Data Rilevamento	Ti trovi in pianura (da 0 a 150m) o in collina (da 150 a 800m)?	Indica l'ampiezza (a scelta) dell'area osservata, trasversale al fiume, e la lunghezza (minimo 10 metri)	Indica la struttura vegetazionale	Altezza media in metri	Copertura della chioma dello strato arboreo in %	Diametro medio dei tronchi sotto forma di intervallo (es: da 15cm a 3cm)	Alto da 10 a 30m e ampio fino a 6-8m; portamento eretto variabile, talvolta piramidato o colonnare. Le foglie rossastre al gemmogliamento possono assumere un colore verde scuro. Spesso cresce lungo i fiumi. Predilige la luce solare, si adatta ad ogni temperatura.	Indica l'abbondanza della specie nello strato:	È alto fino a 30-40 metri, con una chioma arrotondata ampia. La corteccia grigio chiaro è simile a quella della betulla. La pagina fogliare superiore è lucida, di colore verde scuro, mentre quella inferiore è ricoperta da una fitta peluria biancastra (da qui il nome della specie). Vive principalmente su terreni umidi e suoli incoerenti (limosi-argillosi).	Indica l'abbondanza della specie nello strato:	Alto fino a 25' dalla chioma a e i rami sottili, flessibili e tenaci; foglie sono lanceolate-acuminatae, quadulte hanno i pagina inferior densa peluria conferisce una colorazione argentea. Corroni luoghi umidi lungo i corsi d'acqua.
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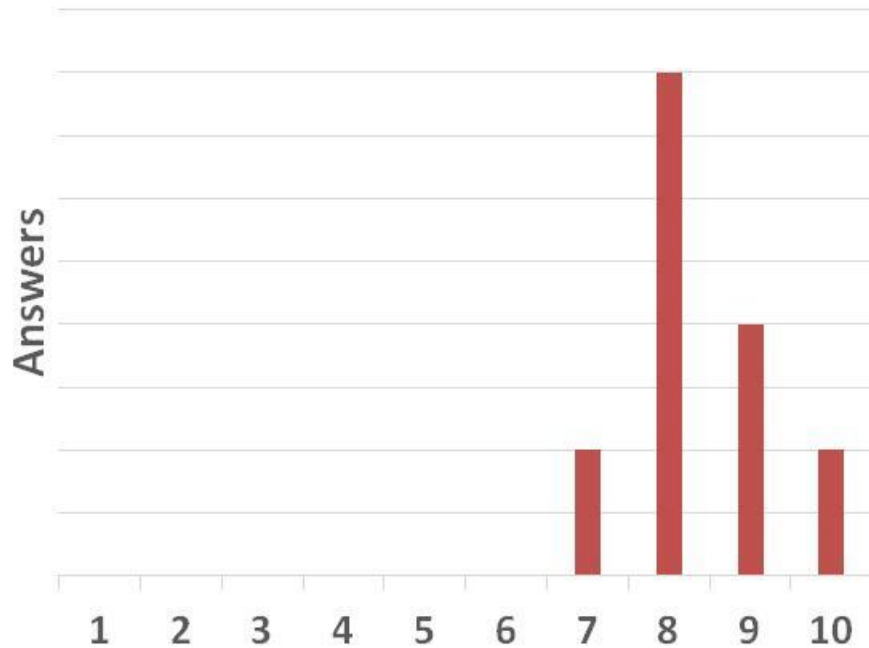
After the testing phase, collected data will be available on the National Network on Biodiversity managed by ISPRA (www.nnb.isprambiente.it).

Data will be downloadable in various formats (CSV, Shapefile, geodatabase, kml, ...)

FROM QUESTIONNAIRES



On a scale of 1 to 10, how easy is the smartphone app?



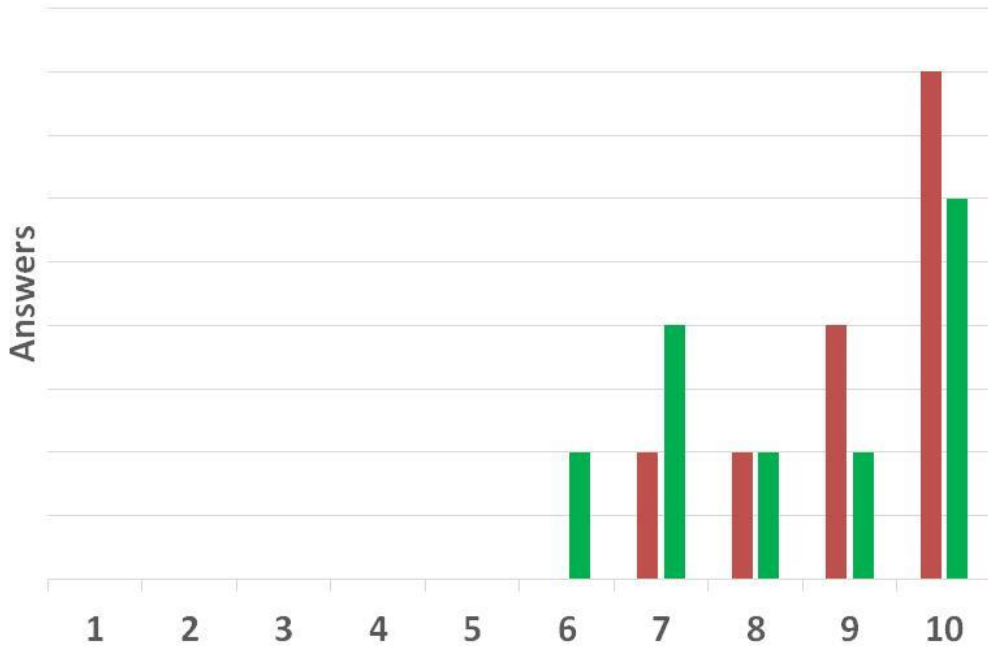
Francesca Tassi



FROM QUESTIONNAIRES



What's best for species identification: **photos** or **explanatory notes**?



Conclusions



Though there are still improvements to be made, the Citizens' response was positive and they are able to use it independently after a short training

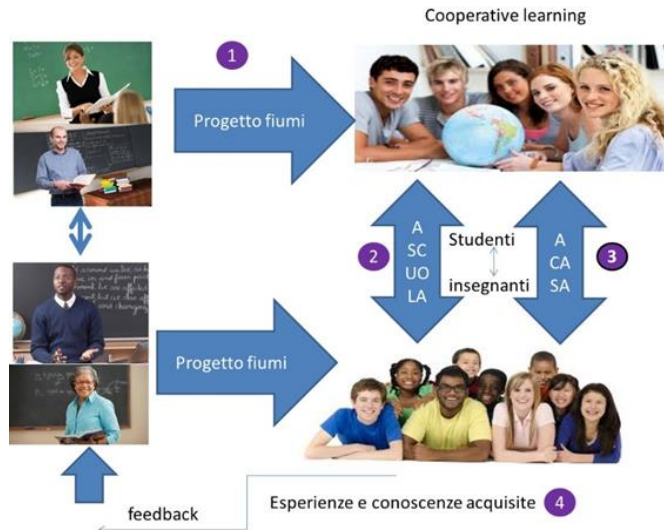
Are you willing to do this kind of activity during recreational activities such as a walk?

The answer was an enthusiastic YES!

The big challenge is that this CS activity can play a role in the riparian vegetation monitoring program on a European scale.



SCHOOL EDUCATION



Ecological category (Condition)	River category	
	Sandy Type	Rocky Type
Unmodified (NATURAL condition)	> 6.9	> 7.9
Largely natural/few modifications (GOOD condition)	5.8 to 6.9	6.8 to 7.9
Moderately modified (FAIR condition)	4.9 to 5.8	6.1 to 6.8
Largely modified (POOR condition)	4.3 to 4.9	5.1 to 6.1
Seriously/critically modified (VERY POOR condition)	< 4.3	< 5.1

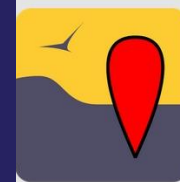
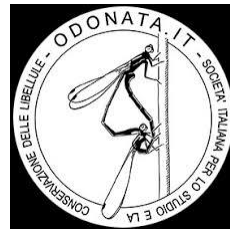


NEW OPPORTUNITIES

- Water quality suitability for bathing
- Macrolitter
- Microlitter
- Macroinvertebrate Mini SASS
- Biodiversity: alien species ...



iNaturalist



CITTADINI CONSAPEVOLI E PREPARATI

La democrazia non può basarsi sull'ignoranza dei problemi, perché uno dei suoi grandi obiettivi è proprio quello di rendere i cittadini responsabili e consapevoli, in modo che possano esercitare i loro diritti utilizzando meglio la loro capacità di capire (Piero Angela).



GRAZIE