

# Citizen science: what's going on Italy

Andrea Sforzi

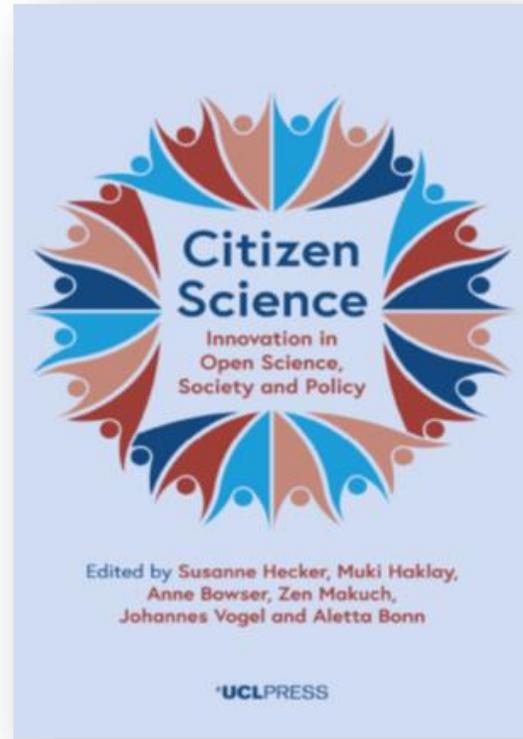
Maremma Natural History Museum

EUROPEAN CITIZEN SCIENCE ASSOCIATION

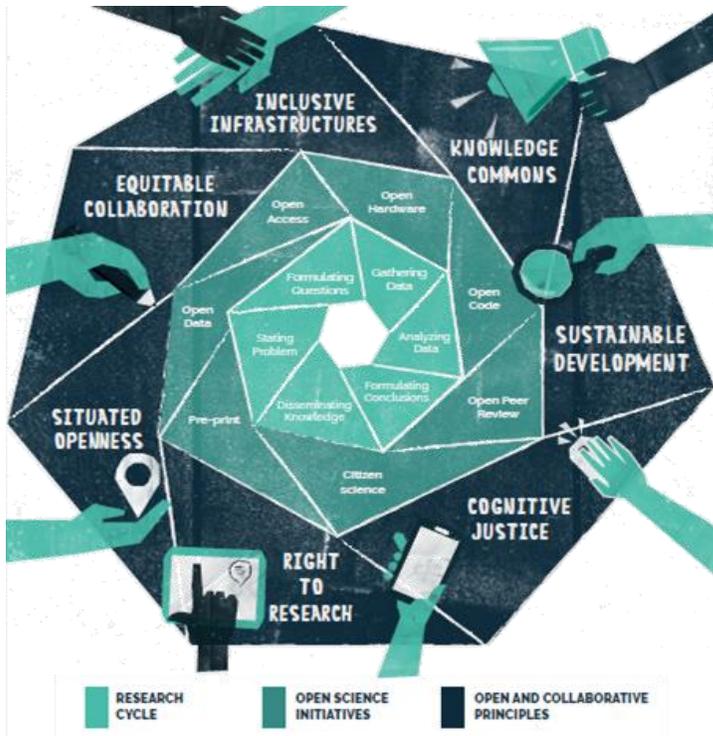


# Innovation in Open Science, Society and Policy

“Citizen science is recognised as an important element in the conceptualization of open science, which has gained importance as part of the rethinking of how science relates to wider societal goals”.

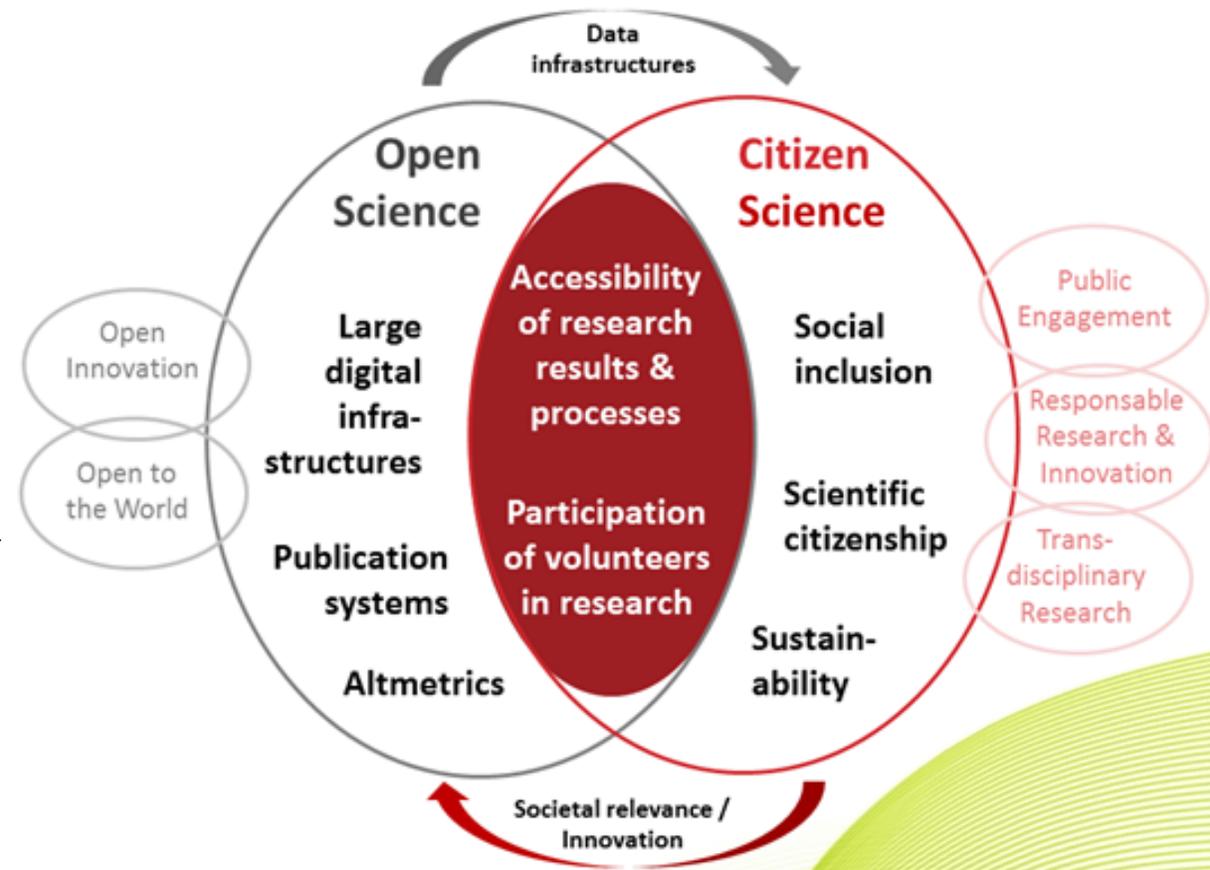


# Links between Citizen Science & Open Science



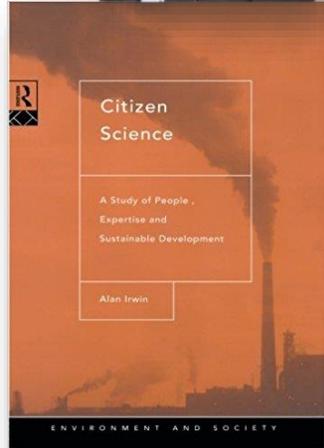
Principles of Open Collaborative Science (OCSDNet, 2017)

*...CS practices depend on opening up science; OS needs to include citizens more profoundly in order to deliver on its promises...*



OS and CS Core Concepts and Areas of Synergy (Vohland & Göbel, 2017)

# How to define “Citizen Science”?



Citizen Science has been defined as:

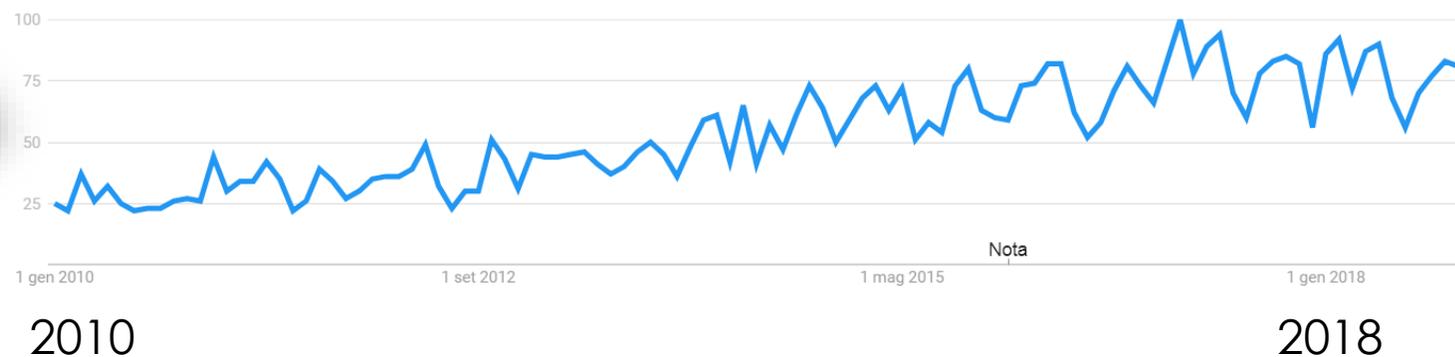
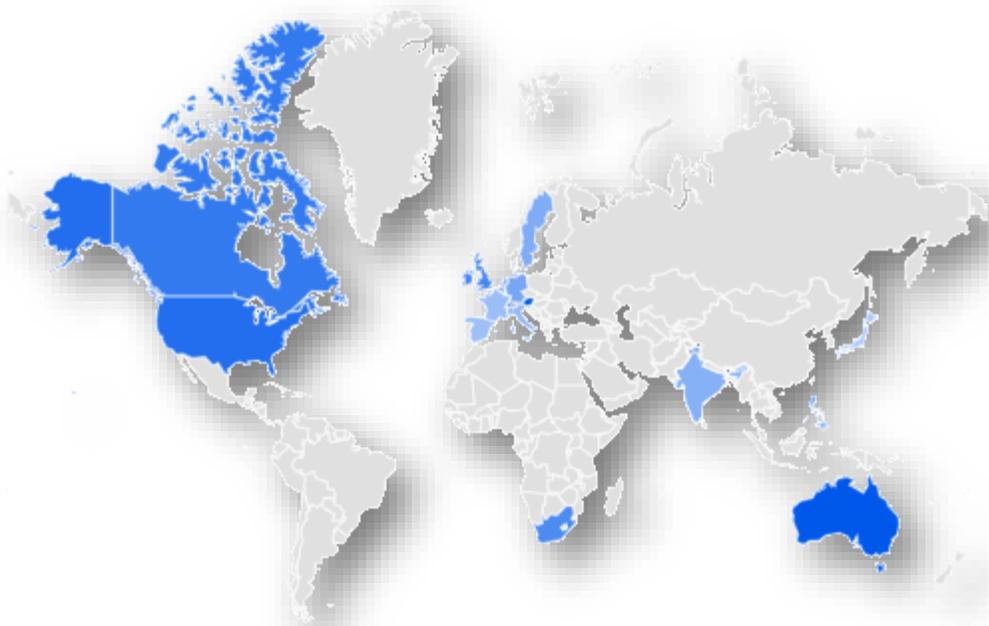
- ❑ Expertise that exists among people traditionally seen as «ignorant» (Irwin, 1995);
- ❑ Research techniques that enlist the help of members of the public to gather scientific data (Bonney, 2009);
- ❑ Involvement of volunteers in science (Roy et al., 2012).

*«scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions»*

**Oxford English Dictionary, 2014**



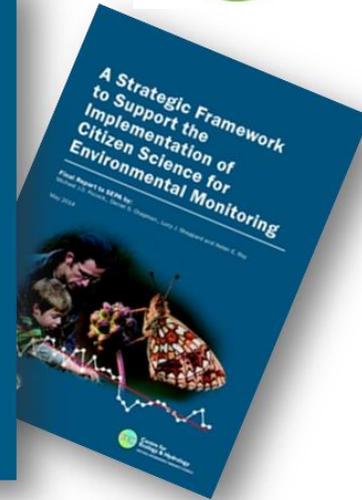
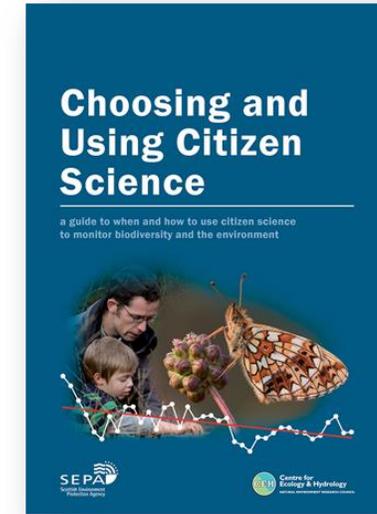
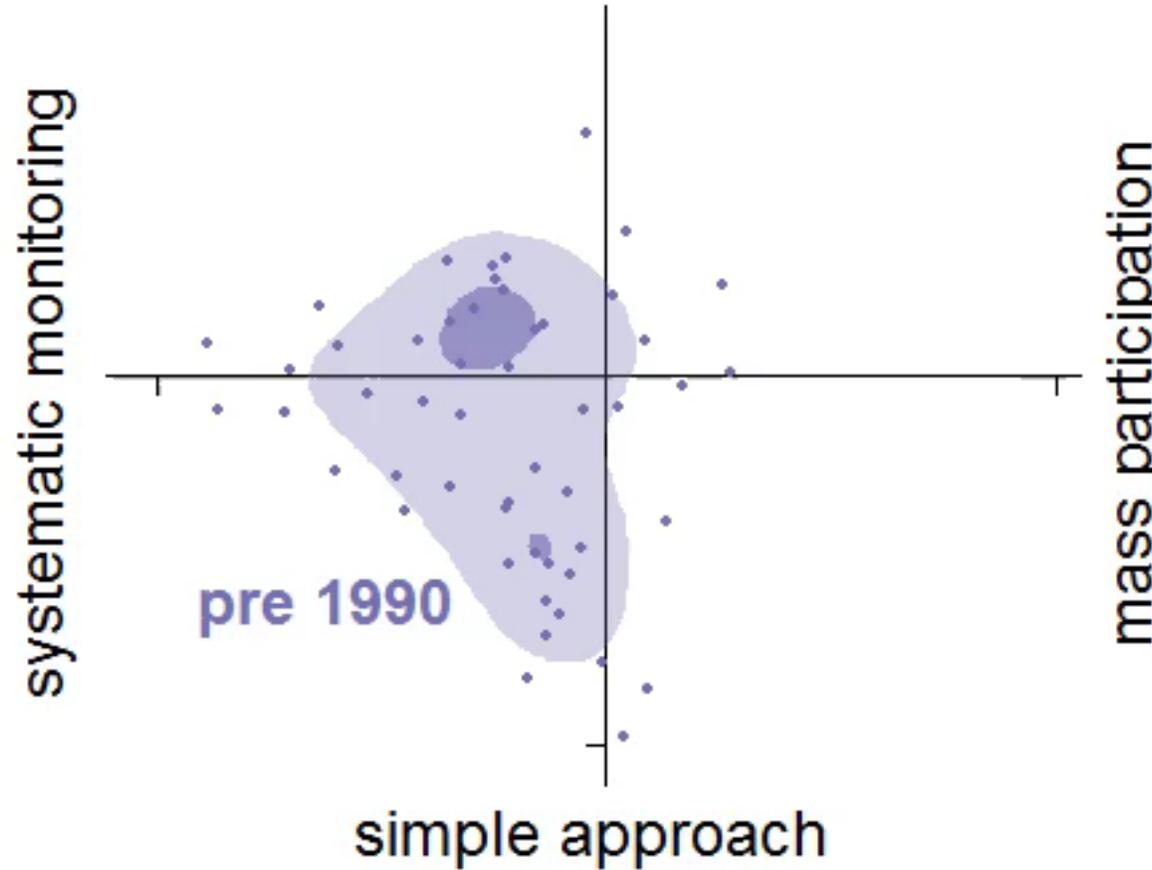
# Beyond academia



# Citizen science in ecology & the environment

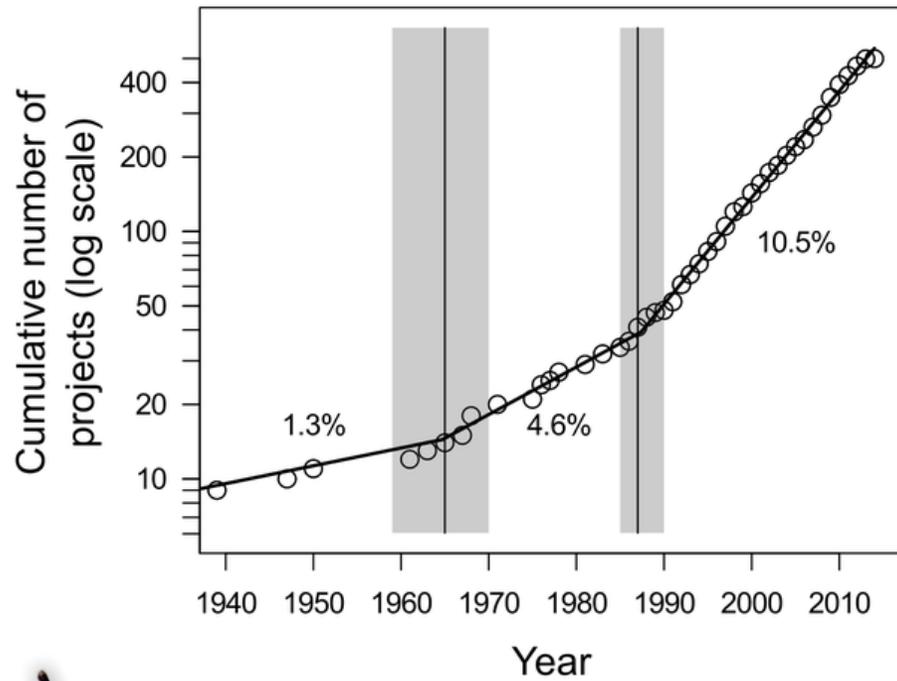
## elaborate approach

The landscape of citizen science described by a Multi-Factor Analysis (MFA) of 32 attributes of **509** citizen science projects in environmental and ecological science.

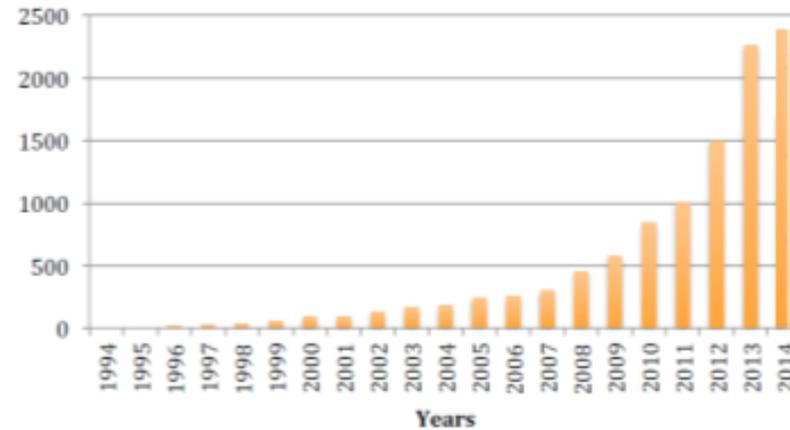


Source: Pocock *et al.* 2017. The diversity and evolution of ecological and environmental citizen science.

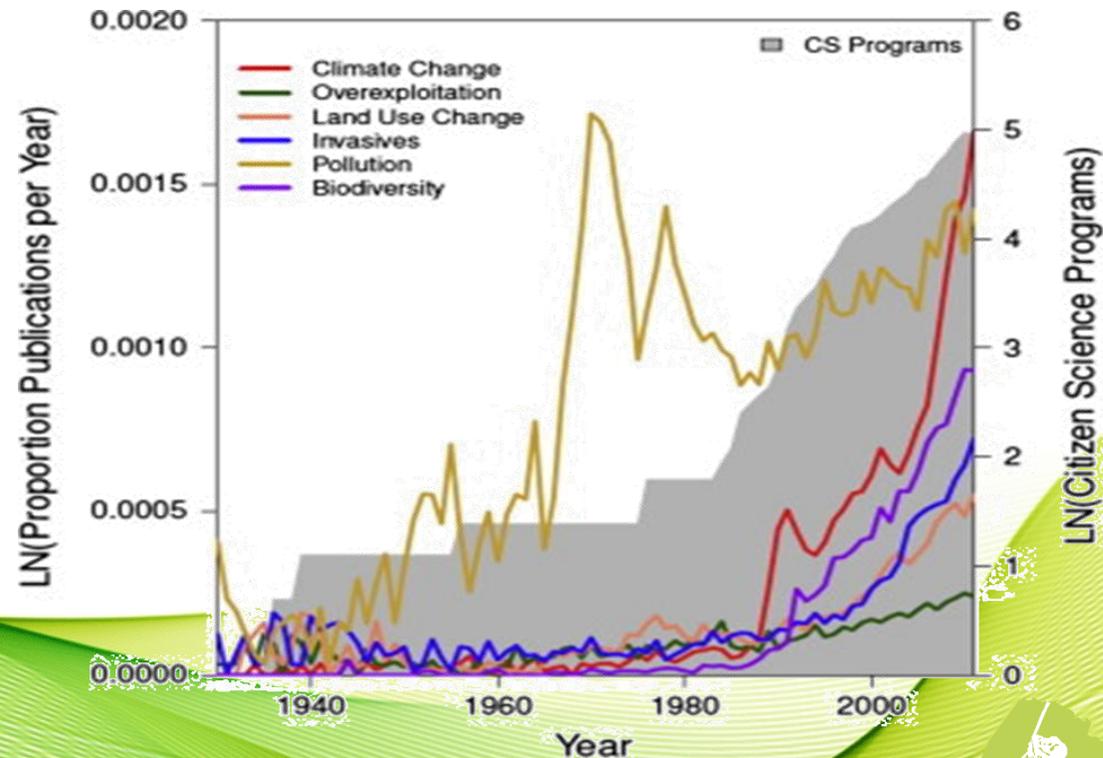
# Scientific production ...



Pocock *et al.* 2017



Citizen science publications trend, according to scholar.google.com



Theobald *et al.* (2015)



# Why citizen science is becoming so popular?



## Excellent engagement

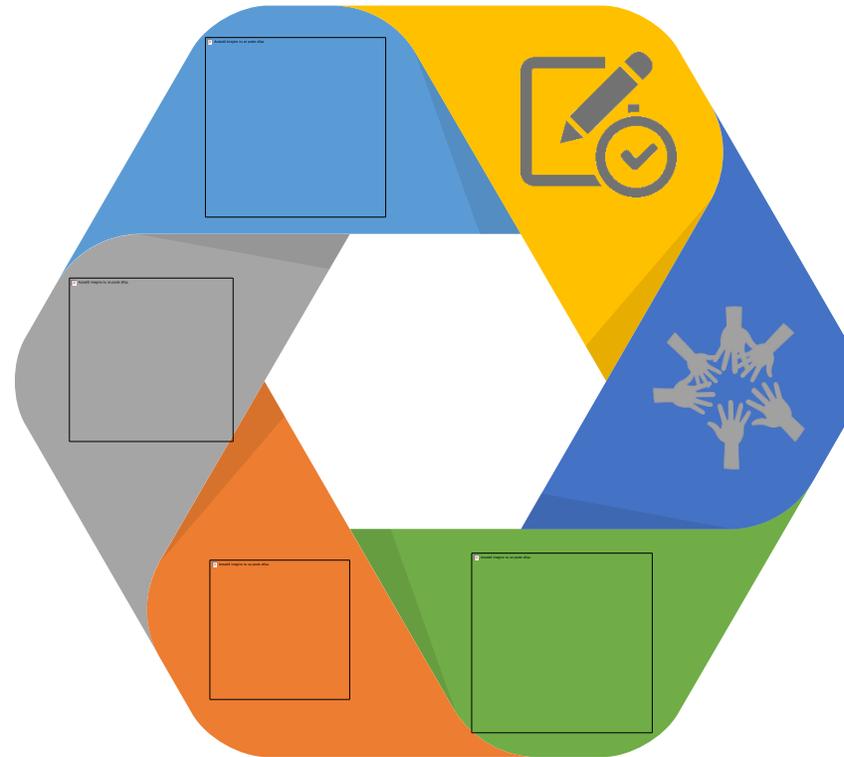
Providing a way for people to engage with science and their environment. Participants often describe CS as fun and providing a way to contribute to something important and valuable.

## 👍 Cost-effective data collection

Citizen science provides the potential to collect data at much larger spatial and temporal extents and much finer resolution than would otherwise be possible. It can be a cost-effective way of collecting data.

## 🧠 Technology

Over the past decade, advances in technology have made it easy to set-up and promote CS projects (data collection via website or apps; rapid and easy feedback).



## Data can be trusted



Increasingly, the important step of data validation is taken in CS projects, to provide data of known quality. Results are increasingly published in the scientific literature.

## Volunteer involvement



Volunteer involvement in science has a long history. We can learn from the successes of past activities in developing current projects.

## Diversity of approaches



Different types of citizen science appeal to different people, e.g. expert volunteers, interested community stakeholders or members of the general public.

# Many declinations...

- **Passive sensing** (e.g. smartphones)
- **Participatory sensing**
- **Community science**
- **Volunteered computing**
- **Volunteered thinking** (citizens + scientists)
- **Environmental monitoring** (e.g. pollution, biodiversity...)



# What is the value of citizen science?



The value of citizen science is dependent on the quality of data collected. Citizen science projects can be split into two types depending on the quality assurance methods employed:

- verified citizen science, in which observations are checked by experts;
- direct citizen science, in which observations are submitted without verification



## Scientific



## Societal



Citizen science has the potential to bring society closer to science and to nature, bringing about a sense of ownership and helping create the kind of society that works to protect its natural environment.



## Policy making

Citizen science can serve policy makers by:

- raising awareness about an environmental issue
- providing evidence



## Educational

The educational benefits of citizen science are found in formal education (mostly children and young people) or as part of informal learning (adults and children).

Citizen cyberscience increases opportunities for mass participation and potentially learning, but there is a risk that the lack of contact decreases engagement.

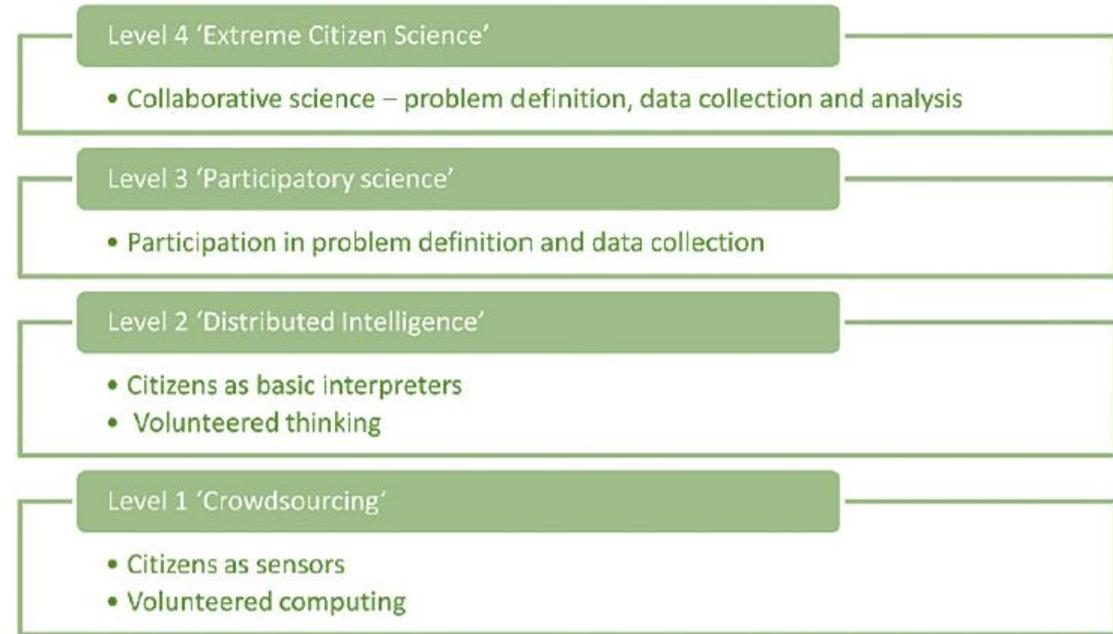


# Different approaches / levels of participation

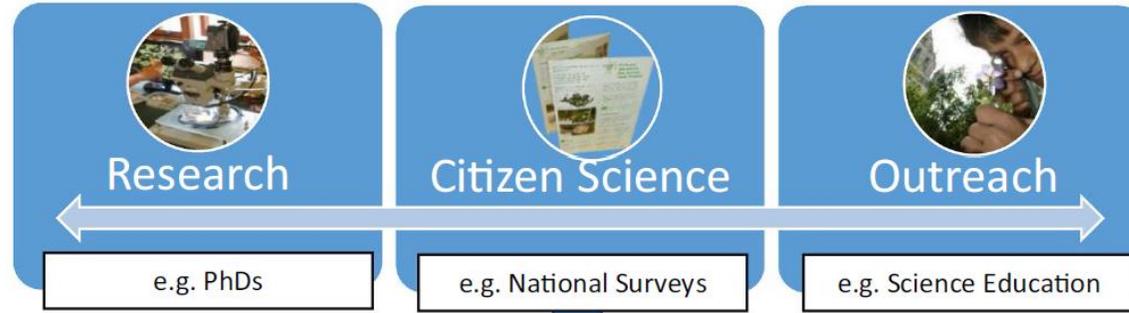


	CONTRIBUTORY	COLLABORATIVE	CO-CREATED
Define a Question/Issue			✓
Gather Information			✓
Develop Explanations		✓	✓
Design Data Collection Methods	✓	✓	✓
Collect Samples	✓	✓	✓
Analyze Samples	✓	✓	✓
Analyze Data	✓	✓	✓
Interpret Data/Conclude			✓
Disseminate Conclusions			✓
Discuss Results/Inquire Further			✓

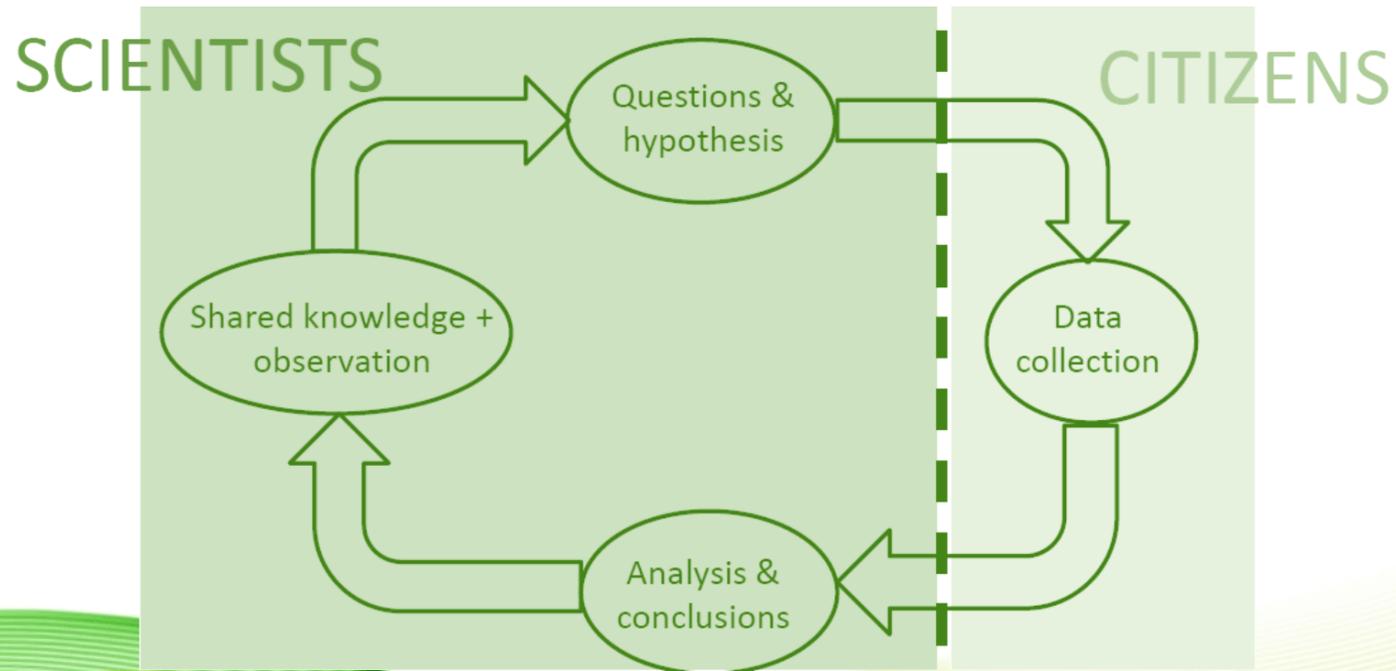
Source: Bonney *et al.* (2009)



Participatory levels of citizen science. Source: Haklay (2012).



Source: Lakeman-Fraser et al. BMC Ecol 2016, 16(Suppl 1):S16



# Different types of citizen science projects



Source: Haklay, Mazumdar & Wardlaw, 2018. Citizen Science for Observing and Understanding the Earth. *Earth Observation, Open Science and Innovation*

# Our experience: from the museum galleries to the field ... and back!



Maremma Natural History Museum



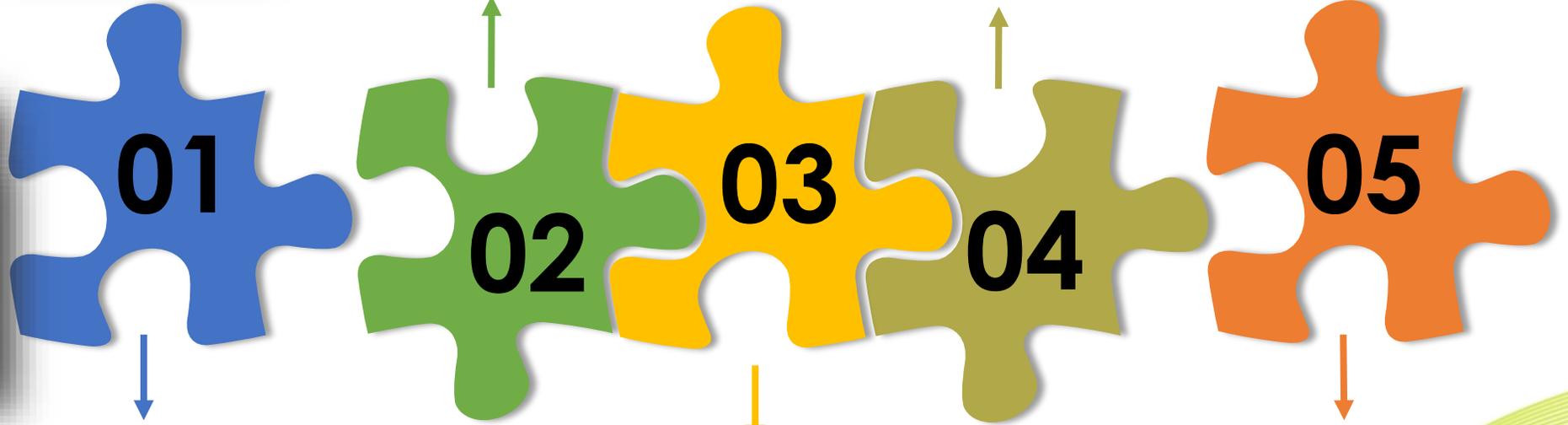
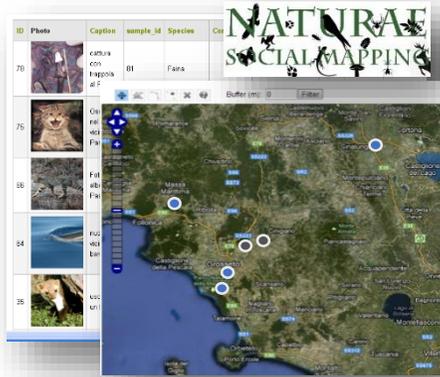
MNHM Citizen Science activities



Training courses



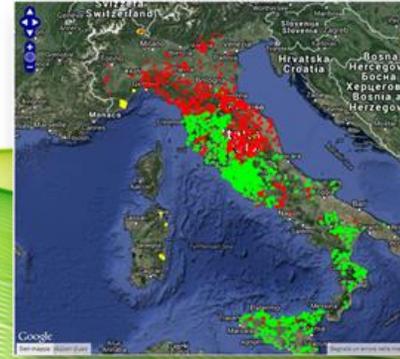
Bioblitzes



Recording site

National surveys

Other projects



# Bioblitzes

Aims:

- raise awareness of biodiversity and the importance of biological recording
- generate a biodiversity inventory for a given site



On average, 30 different surveys were carried out in each BioBlitz; over 1,500 participants contributing over the last 6 years.



About 77,4% participants declared that they are looking forward and ready for the next Bb!



# Examples of activities carried out at our Bioblitzes

Light trapping (insects)



Entomological umbrella



Amphibians monitoring



Fishing (nets)



Botanical excursions



Lichens sampling





# Citizens collect plastic and data to protect Europe's marine environment

SCROLL DOWN ▾

## An estimated 8 million tons of plastic waste enter the world's oceans each year.

Submitted by UNEP on Mon, 10/16/2017 - 15:18

As well as being unpleasant and unsightly, this is bad news for the economy: **clean-up costs are high** and valuable **materials are not recycled**. **Plastic also damages the marine environment** and negatively affects the health of **ocean habitats**.



### Marine LitterWatch

European Environment Agency Strumenti

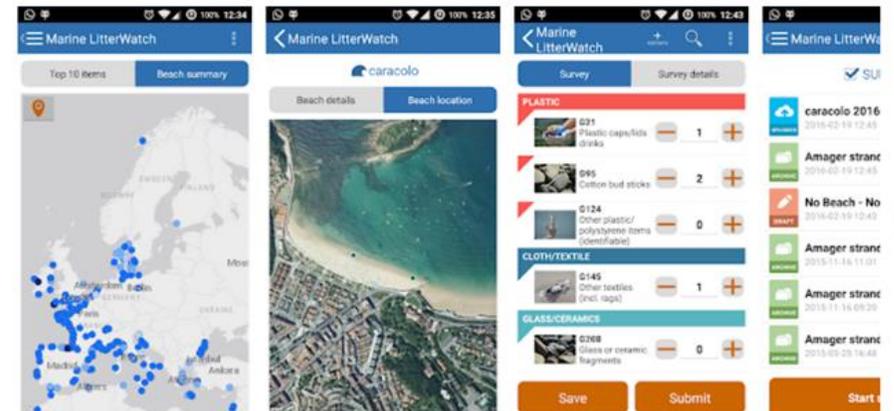
★★★★★ 25

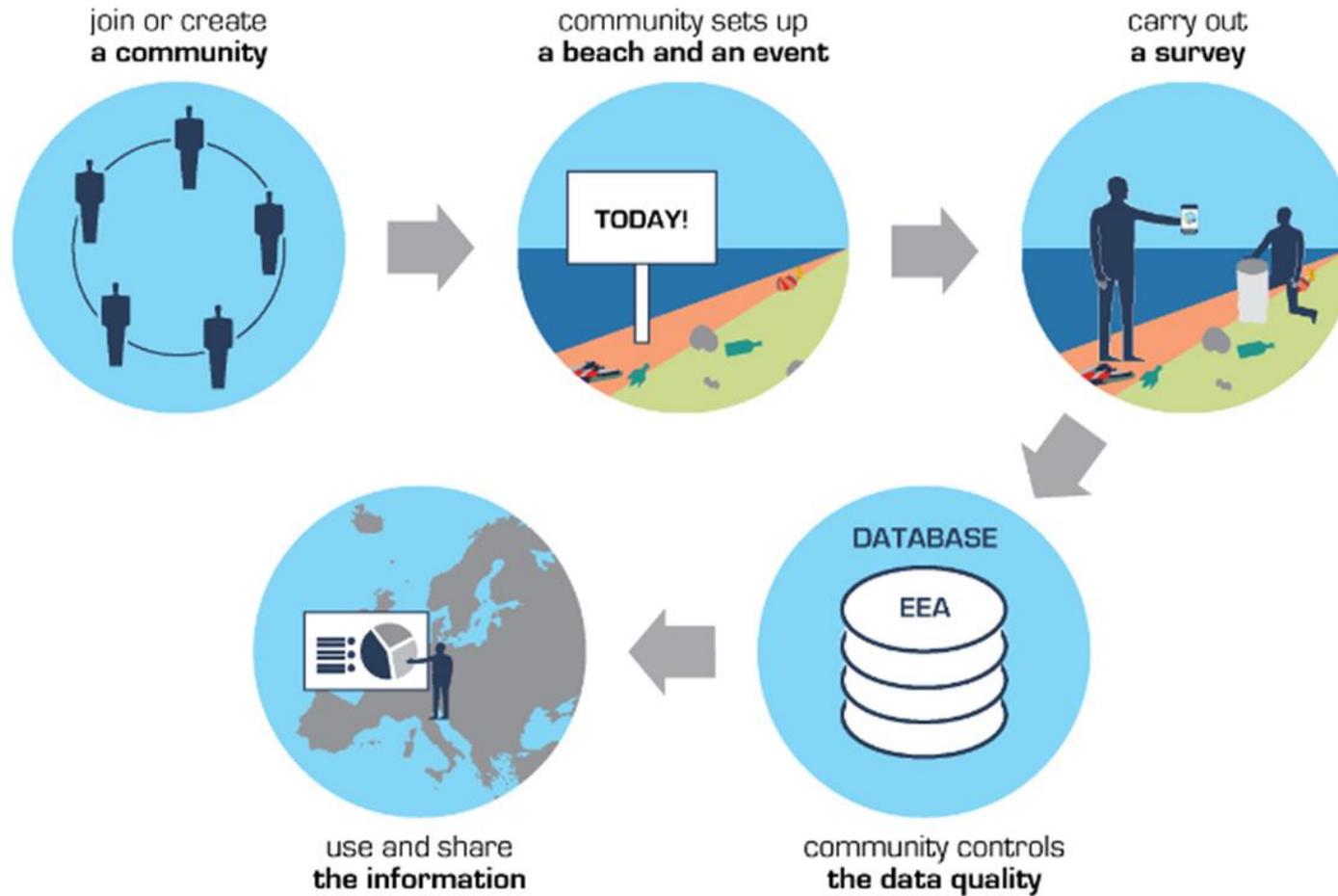
PEGI 3

L'app è compatibile con tutti i tuoi dispositivi.

Aggiungi alla lista desideri

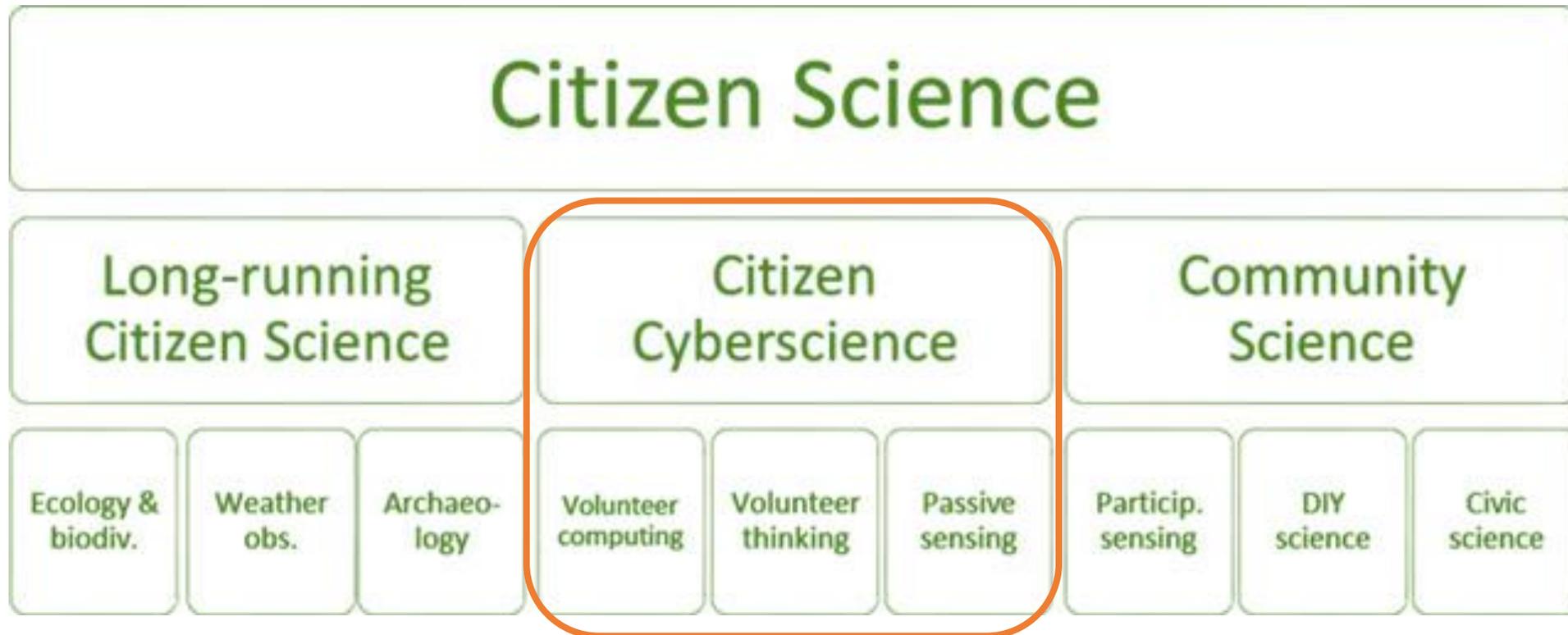
Installa





Data collected are used to better understand the problem, and help to support a policy response as formulated in the European Marine Strategy Framework Directive.

# Different types of citizen science projects



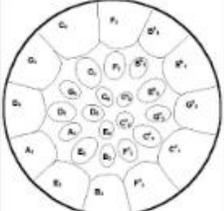
Source: Haklay, Mazumdar & Wardlaw, 2018. Citizen Science for Observing and Understanding the Earth. *Earth Observation, Open Science and Innovation*

# WELCOME TO THE ZOONIVERSE

## People-powered research

 ARTS	 BIOLOGY	 CLIMATE	 HISTORY
 LANGUAGE	 LITERATURE	 MEDICINE	 NATURE
 PHYSICS	 SOCIAL SCIENCE	 SPACE	

421.690.238  
CLASSIFICATIONS SO FAR,  
MADE BY 1.764.101  
REGISTERED VOLUNTEERS

 ROLL THE CREDITS	 PROJECT PLUMAGE	 FLOATING FORESTS	 IDENTIFY NEW ZEALAND ANIMALS	 PAROCHIAL ARCHIVE PROJECT IN ROME
 THE COMMUNITY SEAGRASS INITIATIVE -	 LEAGUE OF NATIONS IN THE DIGITAL AGE	 CHEETAHS OF CENTRAL NAMIBIA	 PARASITE SAFARI	 WEATHER RESCUE
 TREEVERSITY	 SEABIRDWATCH	 SOLAR STORMWATCH II	 WEATHER RESCUE BEN NEVIS	 STEELPAN VIBRATIONS
 SCRIBES OF THE CAIRO GENIZA	 WILDWATCH KENYA	 WEDDELL SEAL COUNT	 WILDCAM DARIÉN	 FOSSIL ATMOSPHERES



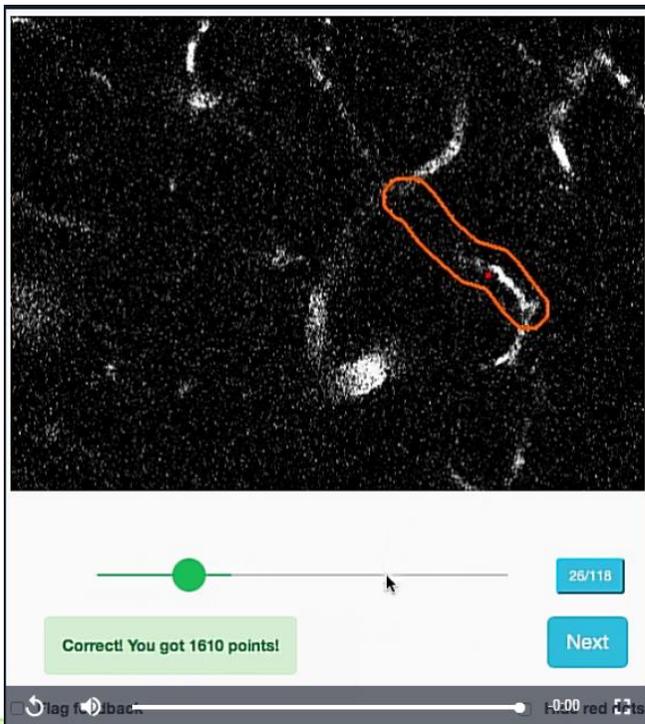
Scientists at Cornell University have discovered links between stalls - clogged blood vessels in the brain, & Alzheimer's.

Stalls can reduce overall blood flow in the brain by 30% - similar to a headrush when standing up too quickly

If we could prevent or remove stalls we could find the first ever Alzheimer's treatment.



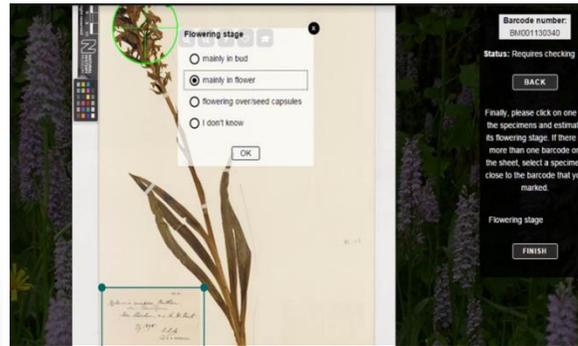
Working together, stall catchers can do in one hour what takes researchers one week in the lab!



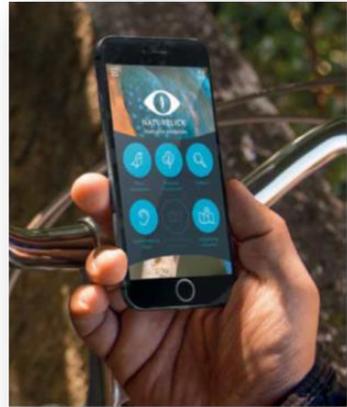
# Digital technology-mediated cs projects

museum für  
naturkunde  
berlin

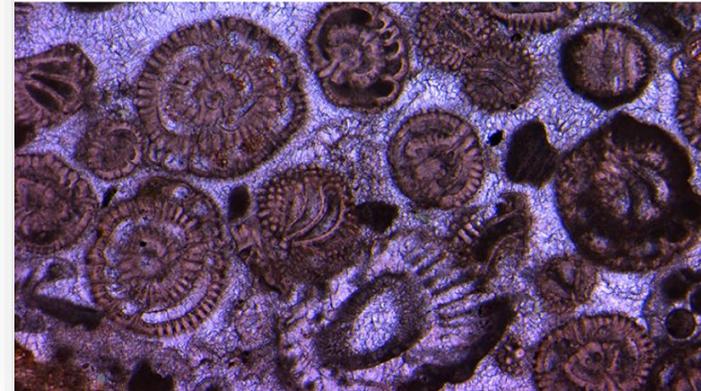
Leibniz  
Leibniz-Gemeinschaft



Online crowdsourcing



## Miniature Fossils Magnified



At a glance

Transcribe microscope slide labels.

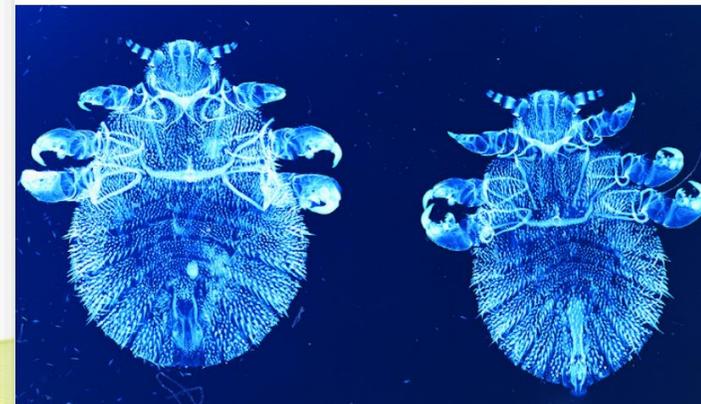
Type of activity: Online

Who can take part? Adults and students (Key Stage 4+)

When? Any time

How long will it take? Two minutes per slide

## Miniature Lives Magnified



At a glance

Transcribe microscope slide labels.

Type of activity: Online

Who can take part? Adults and students (Key Stage 4+)

When? Any time

How long will it take? Two minutes per slide

# Digital technology-mediated cs projects



**GBOL**  
German Barcode of Life

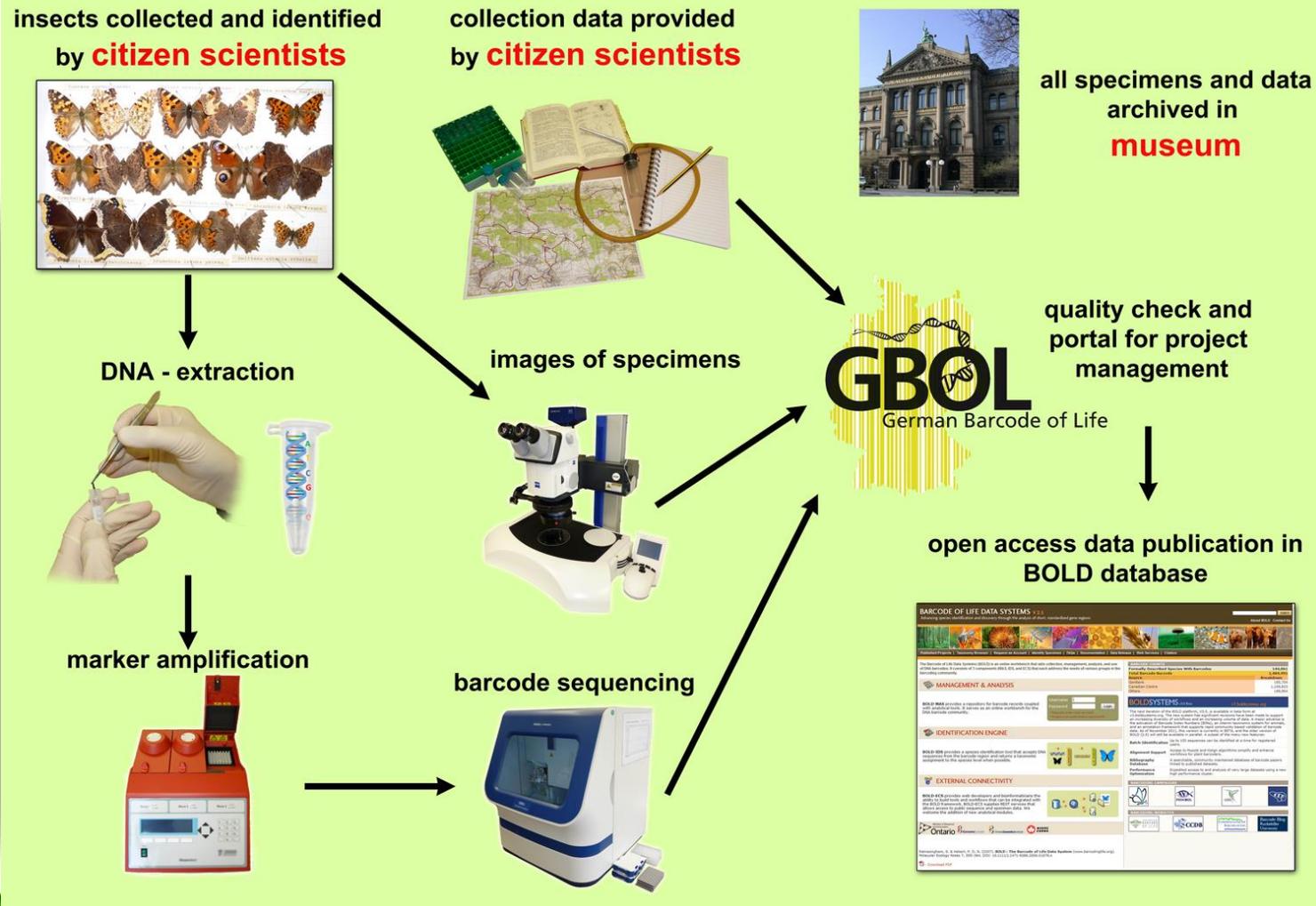
Germany's animals and plants in a unique genetic library.

The Project | DNA-Barcoding | The Team | The Results! | Get Involved! | News & Publications | Links | Contact | Register | Login

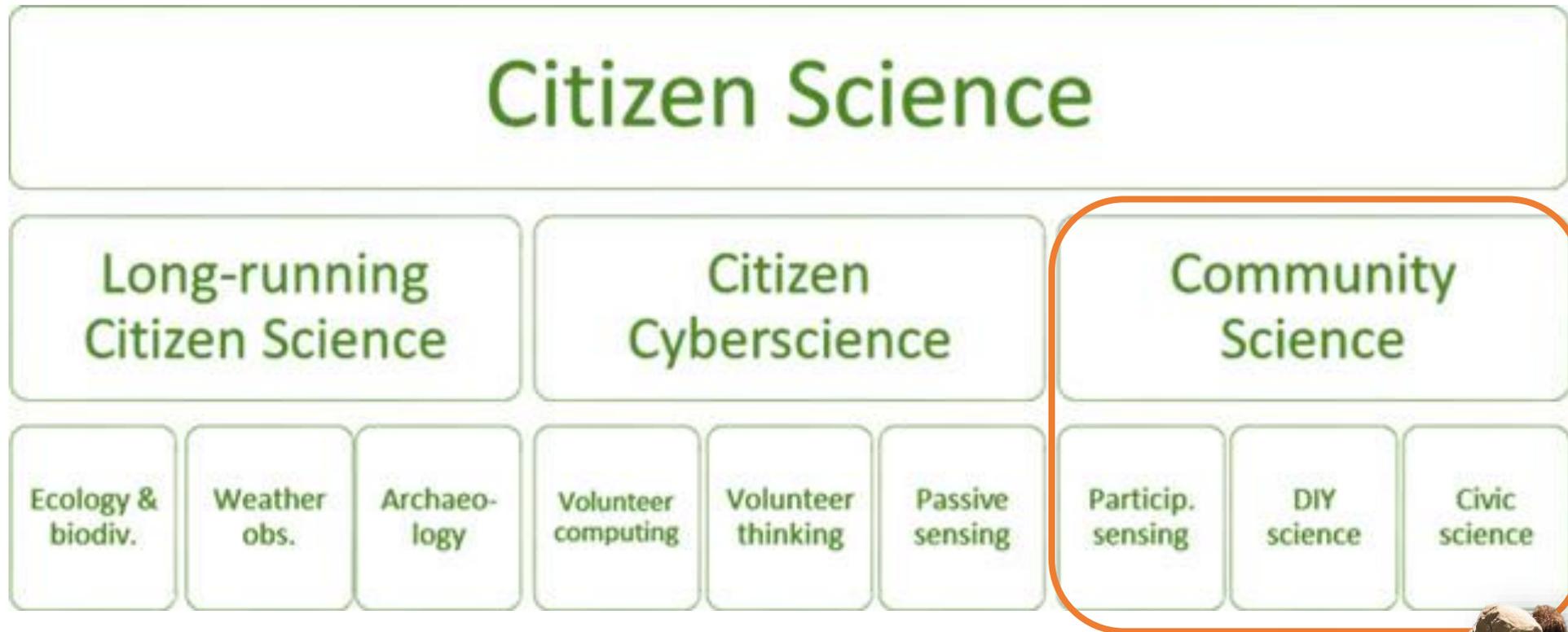
**Biodiversity - all species count!**

What if we could determine any animal, any fungi and any plant in an accurate and quick way?

More Information



# Different types of citizen science projects



Source: Haklay, Mazumdar & Wardlaw, 2018. Citizen Science for Observing and Understanding the Earth. *Earth Observation, Open Science and Innovation*



# Community science

Questions »

## Topics

air-quality agriculture balloon-mapping legal microplastics mining noise oil-and-gas particulate matter sensors stormwater waste water-quality

More topics...



Join Open Call



Community Microscope Kits  
Reserve a kit today »



Community Science Oil and Gas Fellowship



I. The Problem



II. The Collaboration



III. The Solution



UNEP Year Book 2014 emerging issues update  
Realizing the Potential of Citizen Science

But also...



Nature  
at NHMLA

Take the  
City  
Nature  
Challenge  
2019  
April 26–29



## Why Community Science?



Although "citizen" often means simply the resident of a place, it can also be defined as a person who is a legally recognized subject of a place. Because this latter definition has nothing to do with our program, and may potentially discourage the participation of some members of our community, we have decided to replace the word "**citizen**" in the title of our program with the more naturally inclusive word "**community**."

# ECSA, the European Citizen Science Association



**Mission:** Connecting citizens and science through fostering active participation



~ **260** Members  
Over **30** Countries

**Vision:** Citizens in Europe are valued and empowered as key actors in advancing knowledge and innovation, supporting a sustainable development of our world.



# Partnerships

MoUs:



CITIZEN SCIENCE  
ASSOCIATION

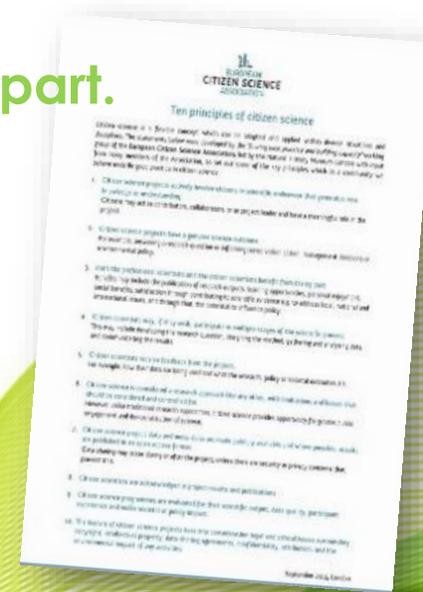


中国公众科学项目平台  
China Citizen Science



# Ten principles of citizen science

- 1. Citizen science projects actively involve citizens in scientific endeavour that generates new knowledge or understanding. Citizens may act as contributors, collaborators, or as project leader and have a meaningful role in the project.**
- 2. Citizen science projects have a genuine science outcome.** For example, answering a research question or informing conservation action, management decisions or environmental policy.
- 3. Both the professional scientists and the citizen scientists benefit from taking part.** Benefits may include the publication of research outputs, learning opportunities, personal enjoyment, social benefits, satisfaction through contributing to scientific evidence e.g. to address local, national and international issues, and through that, the potential to influence policy.



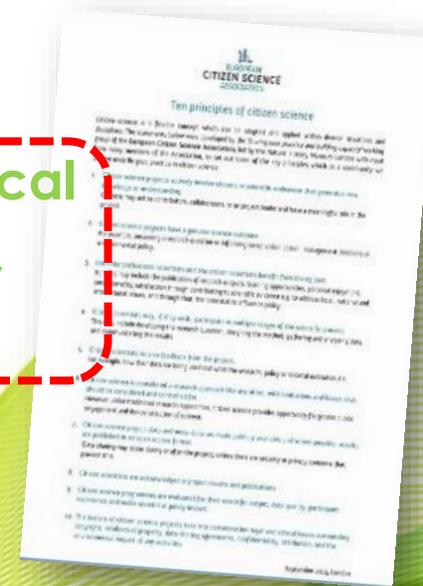
# Ten principles of citizen science

**4. Citizen science project data and meta-data are made publicly available and where possible, results are published in an open access format.** Data sharing may occur during or after the project, unless there are security or privacy concerns that prevent this.

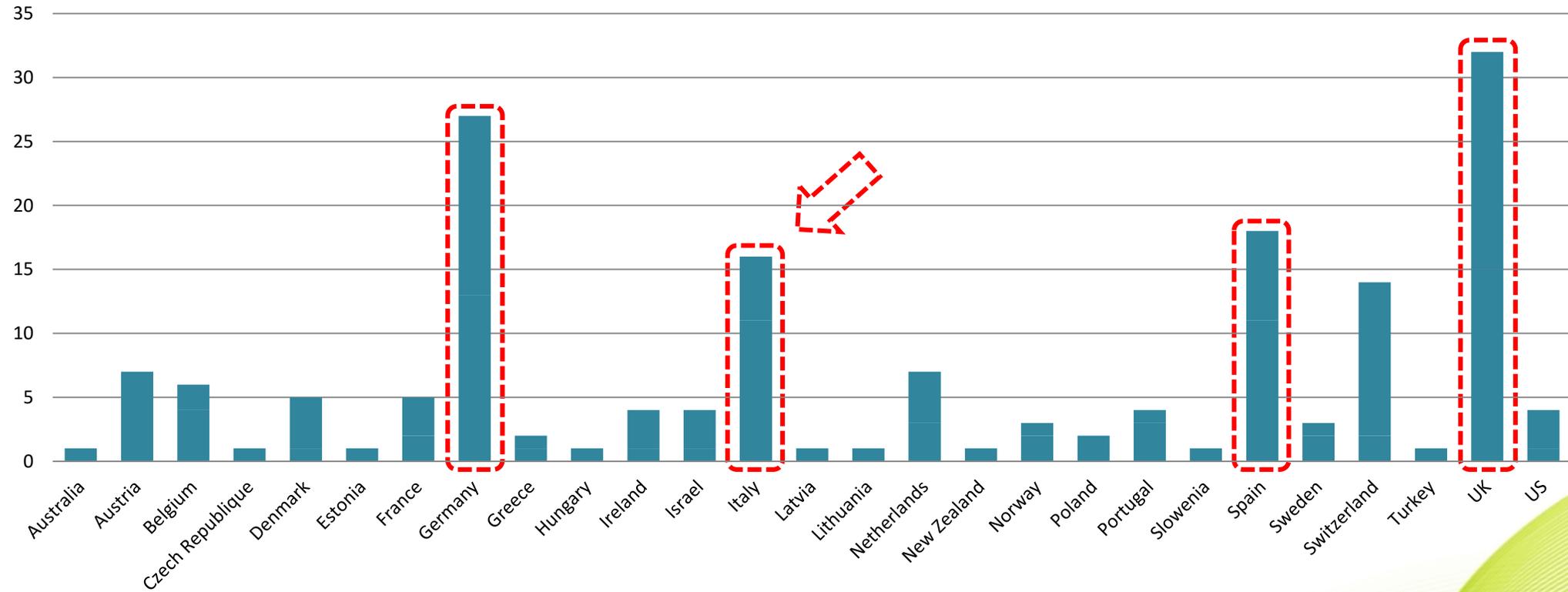
**5. Citizen scientists are acknowledged in project results and publications.**

**6. Citizen science programmes are evaluated for their scientific output, data quality, participant experience and wider societal or policy impact.**

**7. The leaders of citizen science projects take into consideration legal and ethical issues surrounding copyright, intellectual property, data sharing agreements, confidentiality, attribution, and the environmental impact of any activities.**



# What's going on in Italy?



# The Italian CS landscape

## CS projects in Italy (Bartoccioni et al., 2015)

### Italian citizen science landscape



Flavia Bartoccioni  
University of Rome "Tor Vergata"

123

104

43

### Members of CSI

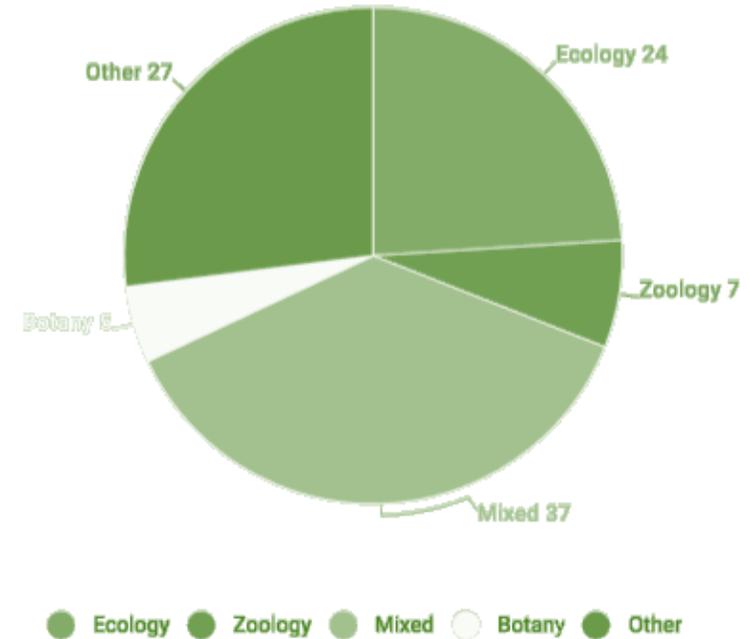
Citizen Science Italia

AD AP AS AB AD AL AMV BC BC CG CC CI Add/remove people

Campfire	To-dos	Schedule
<p>Andrea Mord 5:45pm Ciao a tutti! Oggi ho caricat...</p> <p>Andrea Mord 5:42pm Prendetevi un po' di tempo...</p> <p>Andrea Mord 5:43pm Benvenuti ai buoni lavori!!!</p>	<p>Attività per inventario Iniziativa di CS in Italia</p> <p><input type="checkbox"/> fornire una definizione di CS valida per censire adeguatamente le iniziative di CS italiane. <span>Mar 1, 2016</span></p> <p><input type="checkbox"/> attività di Citizen Science sulle acque dolci. <span>7 Mar...</span></p>	<p>There are no upcoming events on the Schedule, but you've got <b>3 overdue to-dos</b></p>
Automatic Check-ins	Docs & Files	Message Board

### Stakeholders

Ministries of environment and research, Universities, scientific museums, CNR, ISPRA, INGV, WWF



**Other:** air quality, seismology, hydrogeological risks, epidemiology, etc.

# A growing, lively interest



UNIVERSITÀ  
DEGLI STUDI  
DI TORINO



ETTORE MAJORANA FOUNDATION AND  
CENTRE FOR SCIENTIFIC CULTURE

TO PAY A PERMANENT TRIBUTE TO GALILEO GALILEI, FOUNDER OF MODERN SCIENCE  
AND TO ENRICO FERMI, "THE ITALIAN NAVIGATOR", FATHER OF THE WEAK FORCES



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DI PARMA



Associazione  
Teriologica  
Italiana

XI CONGRESSO  
ITALIANO  
TERIOLOGIA



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DI SIENA  
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DEGLI STUDI  
FIRENZE



UNIVERSITÀ DI PISA



Sistema Nazionale  
per la Protezione  
dell'Ambiente



EU-Citizen.Science



POLLI:BRIGHT



EUROPEAN  
CITIZEN SCIENCE  
ASSOCIATION



FONDAZIONE  
GROSSETO CULTURA

Museo di Storia Naturale della Maremma

# National research institutions and Ministries



SNPA, the Italian National System for the Protection of Environment, has recently set up a permanent WG on Citizen Science.



MINISTERO DELL'AMBIENTE  
E DELLA TUTELA DEL TERRITORIO E DEL MARE



The Italian Ministry of Environment, in the framework of the National Biodiversity Network, is providing facilities to include Citizen Science data in their database.



# Building up a citizen science community in Italy



MINISTERO DELL'AMBIENTE  
E DELLA TUTELA DEL TERRITORIO E DEL MARE



## Citizen Science Italia



### Campfire

- Andrea Sforzi** 5:41pm  
Ciao a tutti! Oggi ho caricat...
- Andrea Sforzi** 5:42pm  
Prendetevi un po' di tempo ...
- Andrea Sforzi** 5:43pm  
Benvenuti e buon lavoro!!!

### To-dos

#### Attività per inventario Iniziative di CS in Italia

- fornire una definizione di CS valida per censire adeguatamente le iniziative di CS italiane Mar 7, 2016
- Alessandro O. alessandro c.
- Flavia B. Alba L. Angela B.
- Carla C. Tania D. Fabio C.
- Stefano D.
- attività di Citizen Science sulle acque dolci Ma...

### Schedule



There are no upcoming events on the Schedule, but you've got **3 overdue to-dos**

### Automatic Check-ins

### Docs & Files

### Message Board

# Toward a citizen science strategy in Italy



## Tavola rotonda “Verso una strategia condivisa per la citizen science in Italia”

5 - 6 Aprile 2018



Report “Toward a shared strategy for citizen science in Italy”  
(Agnello G., Sforzi A. & A. Berditchevskaia, 2018)

# Toward a citizen science strategy in Italy

## Aims:

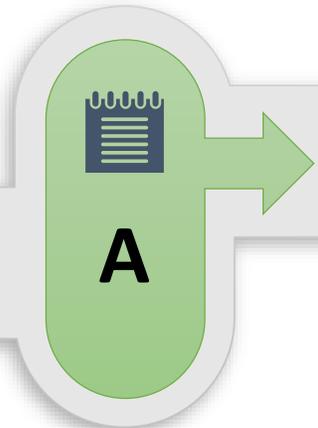
- ✓ Make the CS recognized as a strategic element in the development of future national policies in the scientific, social and educational fields;
- ✓ Consolidate the existing national network;
- ✓ Create a national coordination for the CS;
- ✓ Develop a common vision and proposals for new national CS projects.



# Participatory process

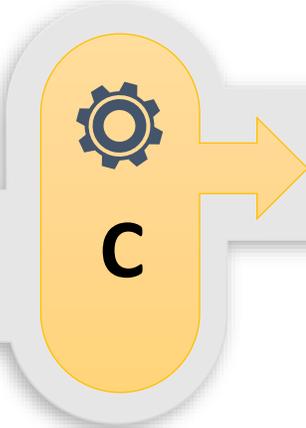
## A - Planning meetings

Development of a participatory process for the identification of macro-topics



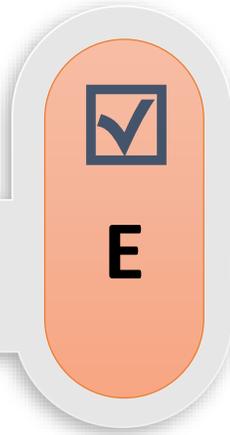
## C - Preliminary draft

Inclusion of the results of the working groups in a preliminary draft



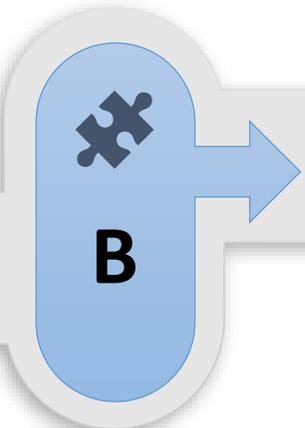
## E - Guidelines

Creation of the final document under the form of "Policy brief"



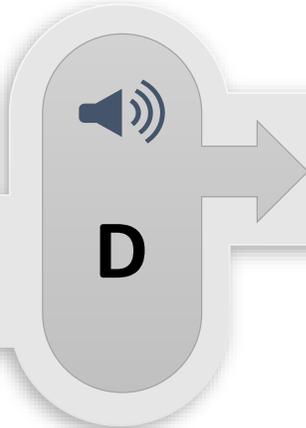
## B - Working groups

In-depth analysis through thematic focus groups; identification of the most effective form for the guidelines



## D - Comments and integrations

Sharing of ideas with the stakeholders to collect comments and integrations



# Guidelines for CS in Italy

The guidelines are identified as a "policy brief": a summary document of the main aspects relevant to the development of the Citizen Science in Italy.

It is intended for Ministries, public bodies and administrations and aims to offer recommendations for a structural recognition of Citizen Science in scientific research processes at national and regional level.



**Verso una strategia nazionale condivisa: Linee guida per lo sviluppo della Citizen Science in Italia**

**Sintesi**

La Citizen Science (CS) e' il coinvolgimento attivo dei cittadini nella raccolta, analisi e interpretazione di dati a fini scientifici. Per sua stessa natura, essa svolge un ruolo a livello sociale, scientifico, educativo e politico, contribuendo alla formazione di persone maggiormente coscienti e consapevoli. Per questo, al pari di quanto e' avvenuto in molti paesi, e' sempre piu' importante tradurre i principi della CS in politiche locali e nazionali. E' altresì importante fornire strumenti e modalità operative capaci di supportare il coinvolgimento più ampio possibile della società. Questo documento è una sintesi dei principali aspetti necessari per lo sviluppo della CS in Italia. E' destinato a Ministri, enti e amministrazioni pubbliche e si propone di offrire linee guida e raccomandazioni per un riconoscimento strutturale della CS, sia attraverso l'inserimento in strumenti normativi e di programmazione esistenti, sia con lo sviluppo di una specifica strategia. Il testo è il risultato di un processo partecipativo svolto sotto il patrocinio della Accademia Nazionale delle Scienze, nell'ambito del progetto Horizon 2020 "Doing It Together Science" (DITOs) e coordinato dalla Associazione Europea di Citizen Science (ECSA) e dal Museo di Storia Naturale della Maremma. Complessivamente sono stati coinvolti oltre cinquanta esperti di università, centri di ricerca, musei scientifici, associazioni, enti pubblici italiani con vari livelli di esperienza nel settore della CS, con lo scopo di consolidare la rete nazionale di CS in Italia e promuovere collaborazione con la pubblica amministrazione. Per le modalità operative ed i risultati conseguiti, questa esperienza può essere un utile riferimento per lo sviluppo di simili azioni in altri contesti nazionali.

**Riconoscimenti internazionali della Citizen Science**

I progetti di CS includono un'ampia varietà di attività, in quasi tutte le discipline scientifiche, con un livello variabile di coinvolgimento dei cittadini. Tra il 2013 e il 2014 sono state fondate associazioni internazionali con sede negli Stati Uniti (CSA), in Europa (ECSA) ed Australia (ACSA), che promuovono networking, il coinvolgimento dei responsabili decisionali e politici e lo scambio di buone pratiche. ECSA, in particolare, ha elaborato alcuni principi chiave della CS, condivisi successivamente dalla comunità internazionale e tradotti in 26 lingue. In alcuni paesi europei si sono inoltre stabilite delle reti di coordinamento nazionale. Nel 2014 in Austria, la piattaforma online Österreich forsch! viene attivata su base volontaria ed ospitata presso l'Università BOKU a Vienna. Un'altra piattaforma, Zentrum für Citizen Science, è stata istituita dal Ministero dell'Istruzione, Scienza e Ricerca e funge da centro di informazione ed assistenza. Nel 2016 in Germania, nell'ambito del programma GEWISS- sostenuto dal Ministero federale tedesco dell'Istruzione e della Ricerca, è stato pubblicato il Green Paper che delinea la "Strategia di Citizen Science 2020 per la Germania". Seguendo le raccomandazioni del Green Paper, lo stesso Ministero tedesco ha presentato una linea di finanziamento dedicata. La Commissione Europea ha riconosciuto l'importanza di coinvolgere la società nella ricerca scientifica creando due linee di finanziamento Horizon 2020, denominate Science With and For Society (SwafS 15 e 17): mirate a promuovere la CS. Anche altri strumenti di finanziamento a livello europeo, come LIFE e COST Action, hanno contribuito a sostenere numerosi progetti. Un importante esempio di supporto politico a livello nazionale è il Federal Crowdsourcing & Citizen Science Act degli Stati Uniti, tradotto in legge come parte della American Innovation and Competitiveness Act nel Gennaio 2017. Il testo afferma che il crowdsourcing e la CS sono in grado di portare numerosi vantaggi per il governo e per i cittadini. Per sostenere la CS, l'Amministrazione del governo degli Stati Uniti ha lanciato CitizenScience.gov, che riunisce tutti i progetti finanziati a livello federale e promuove il suo "Toolkit" per la CS.

\*Linee guida per la Citizen Science in Italia\* DITOs Policy Brief #6 - March 2019

# Guidelines: final recommendations

- ✓ **Integrate Citizen Science into national and regional strategic planning tools.**
- ✓ **Develop Citizen Science strategies in different domains** (e.g. nature conservation, sustainable development, education, cultural heritage, public health, agriculture...).
- ✓ **Adopt a participatory process** for the implementation of the actions described above, drawing inspiration from values of inclusiveness and recognition of existing competences and best practices.
- ✓ **Create opportunities for national funding** to strengthen and support over time the Italian community of Citizen Science, with particular reference to young researchers and allow the development of capacities and infrastructures in line with what is happening in other international contexts.



# Work in progress...



# Thank you for your attention!

Questions?



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