Focus on Open Science
CHAPTER XIII: TURIN

Citizen science: what's going on Italy

Andrea Sforzi

Maremma Natural History Museum

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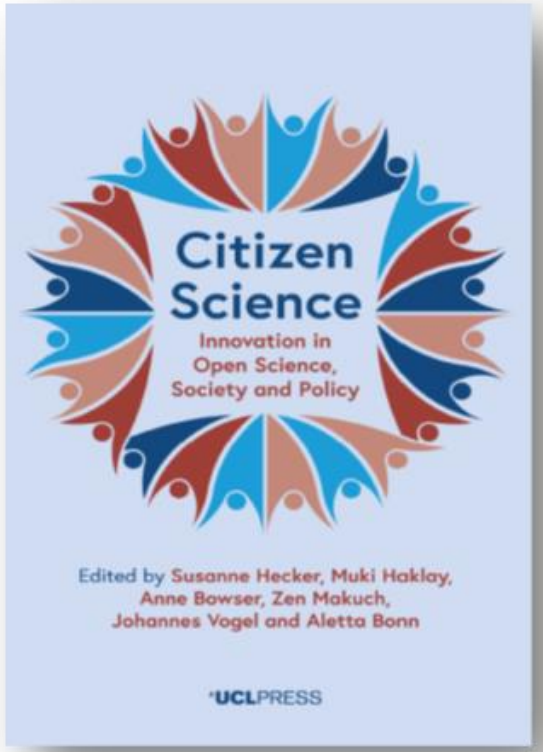
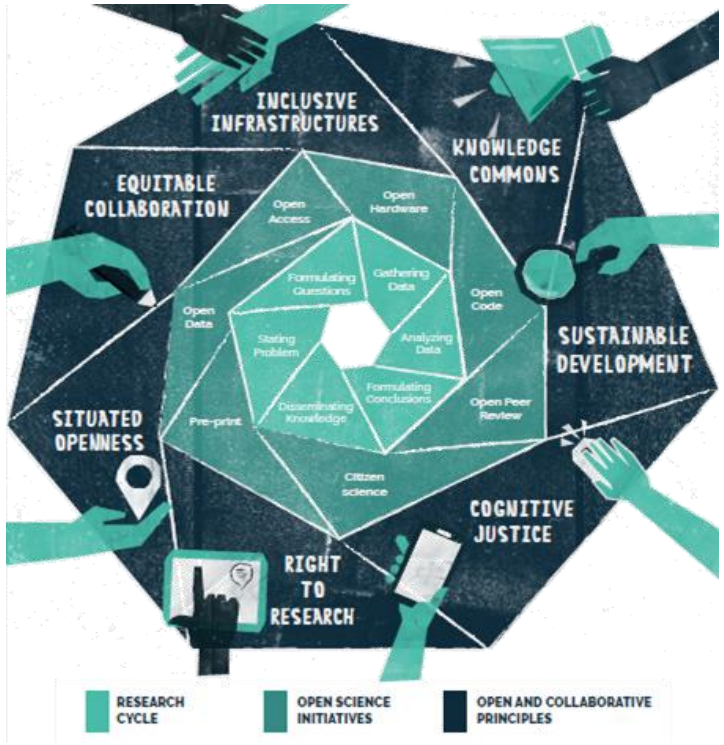
Innovation in Open Science, Society and Policy

"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".

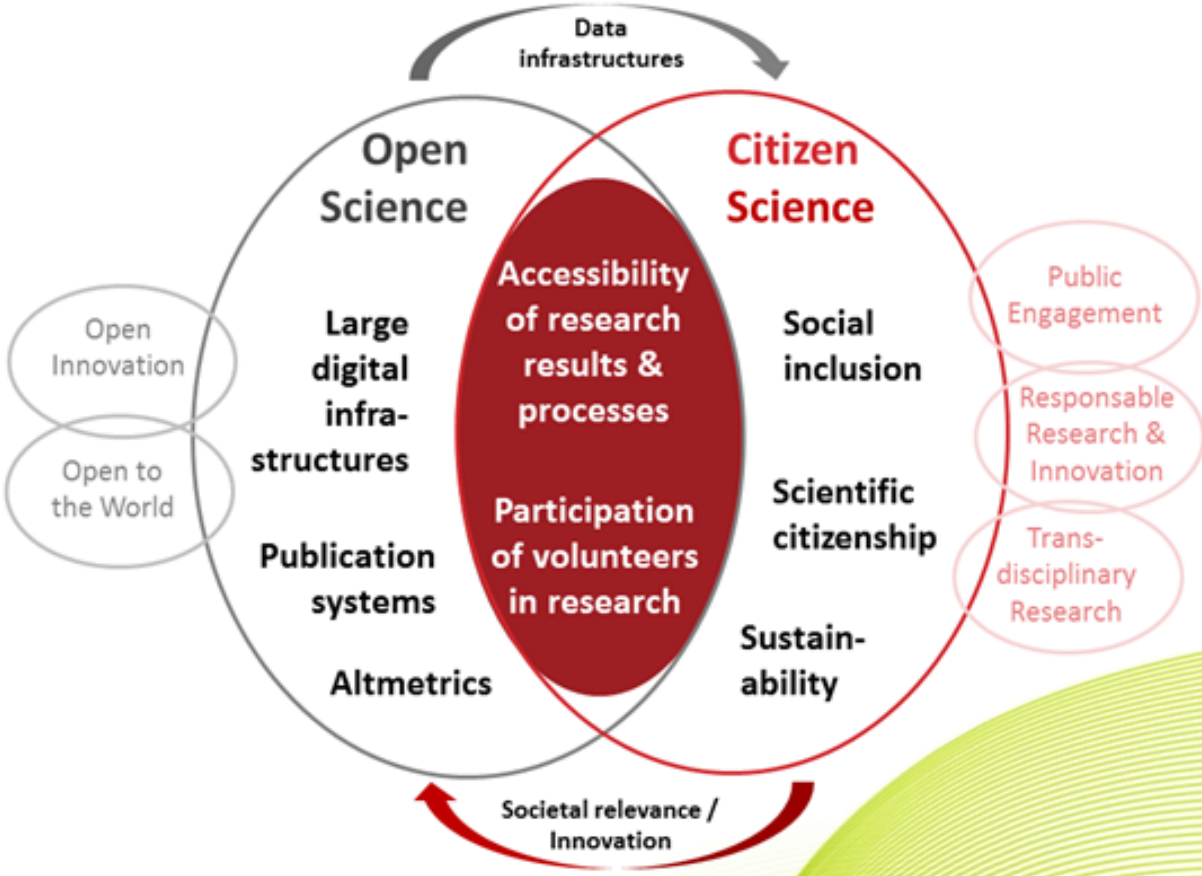


Links between Citizen Science & Open Science



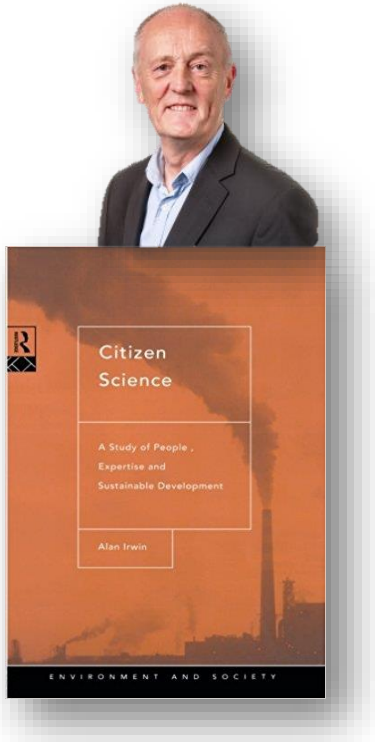
Principles of Open Collaborative Science (OCSDNet, 2017)

…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:

- Expertize 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

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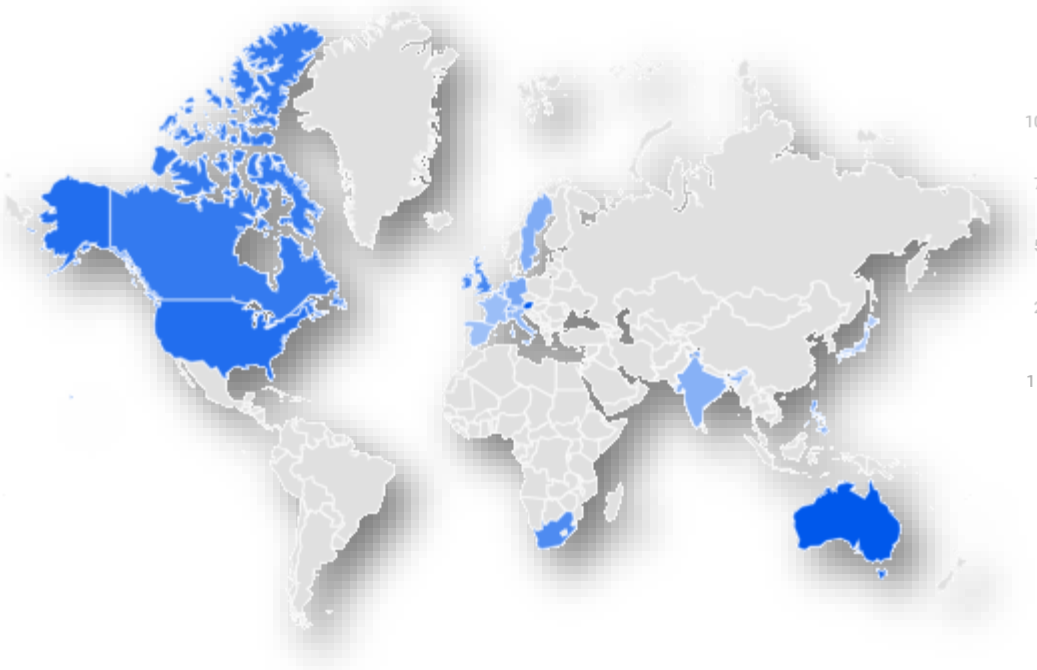
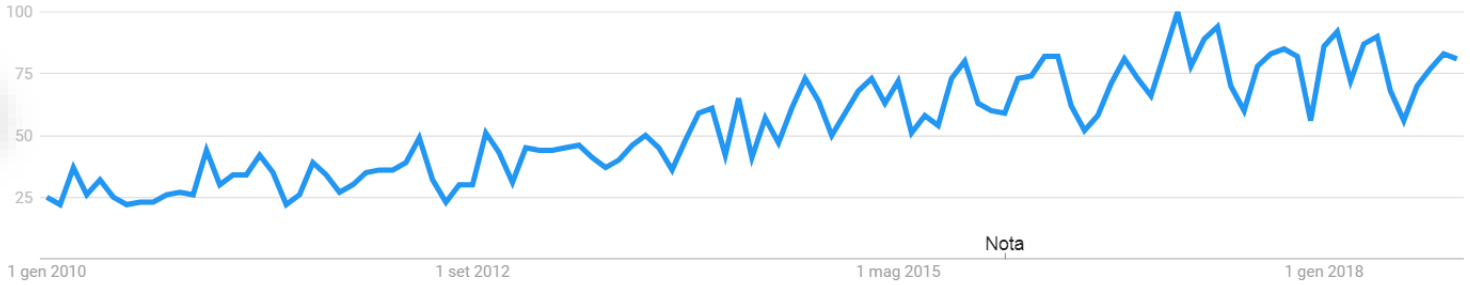
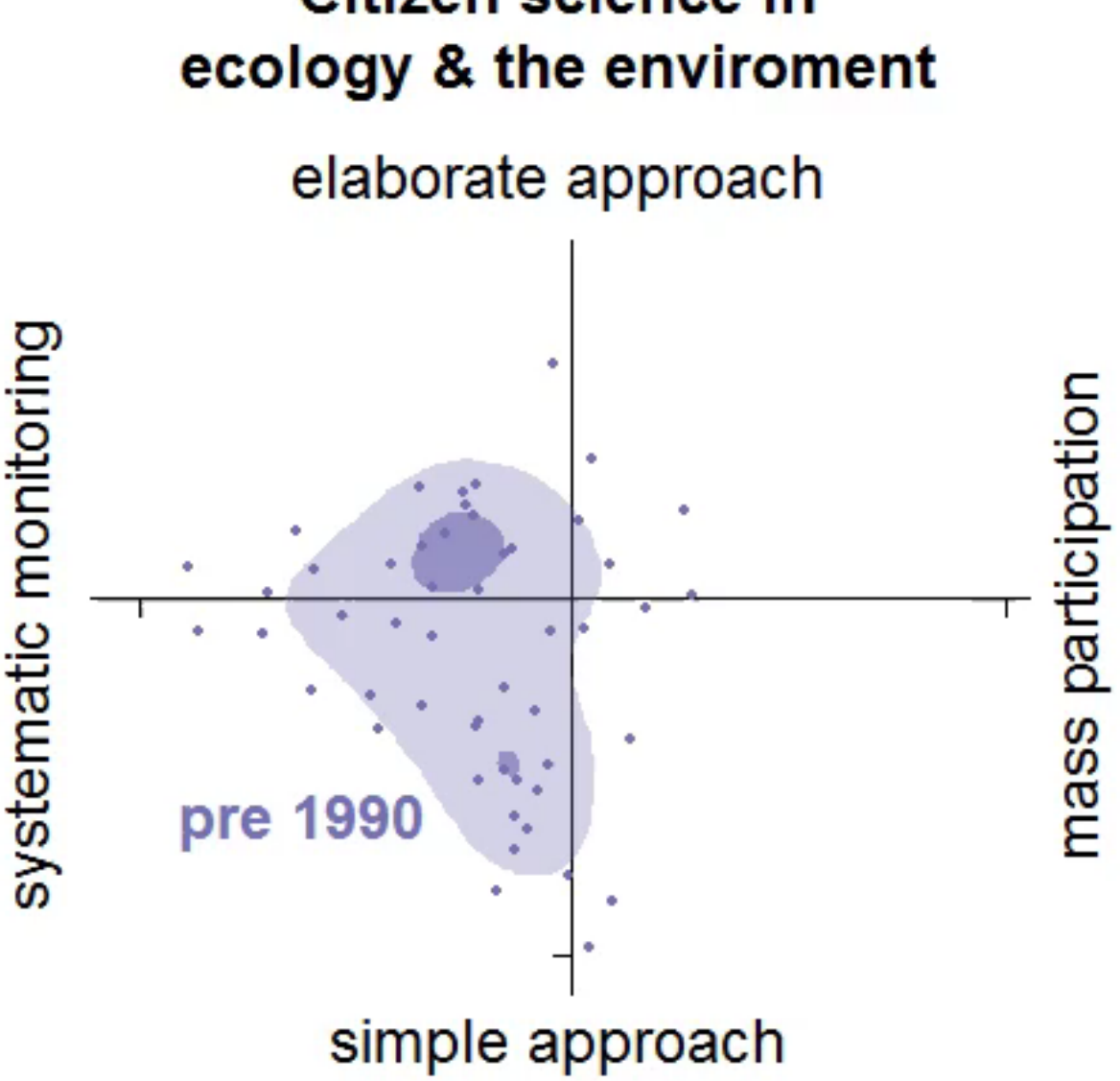
Beyond academia





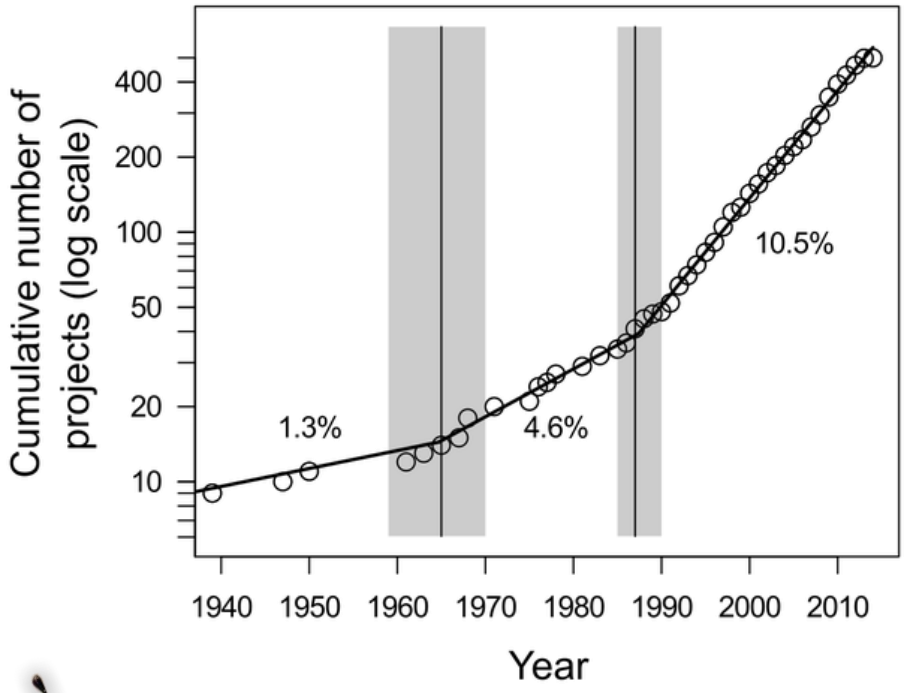
2010 2018

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.

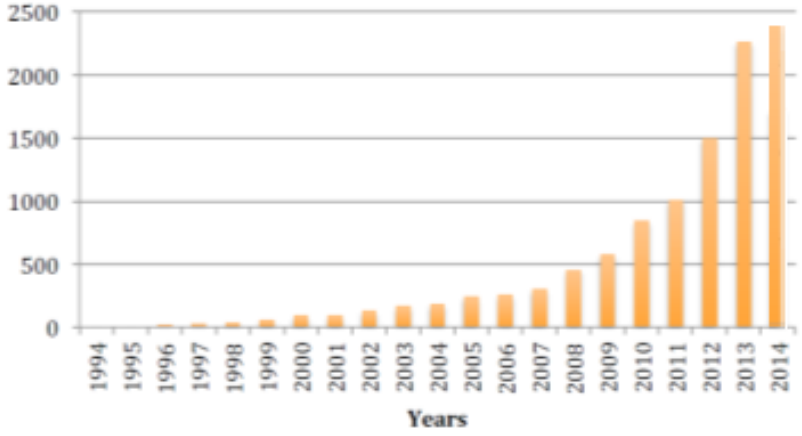


Source: Pocock *et al.* 2017. The diversity and evolution of ecological and environmental citizen science.

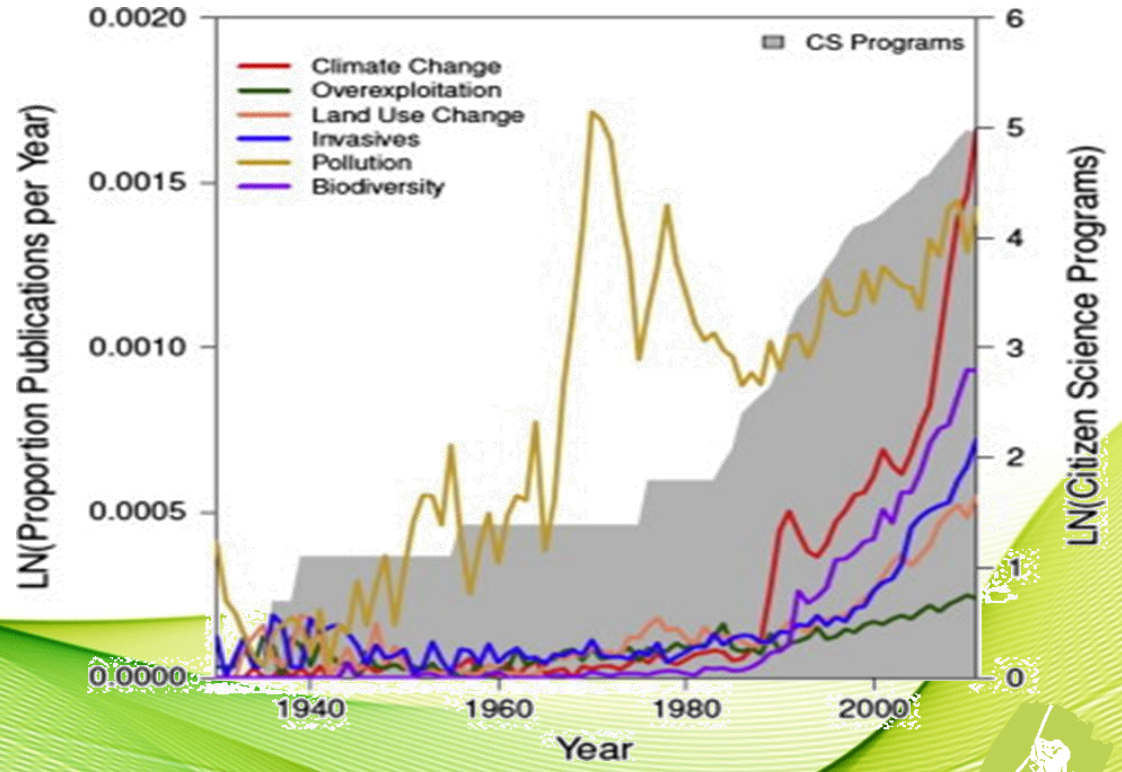
Scientific production ...



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

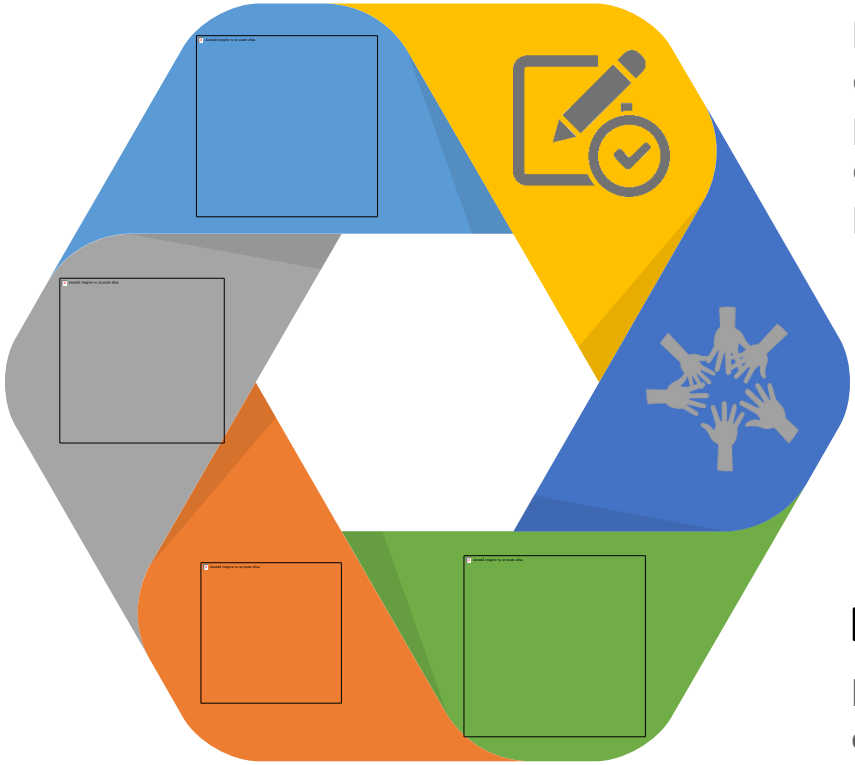
Providing a way for people to engage with science and their environment. Participants often describe CS as fun and providing a way to contribute to something important and valuable.

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

Every Aware

Enhance Environmental Awareness through Social Information Technologies

EVERYAWARE

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What is the value of citizen science?

Scientific

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

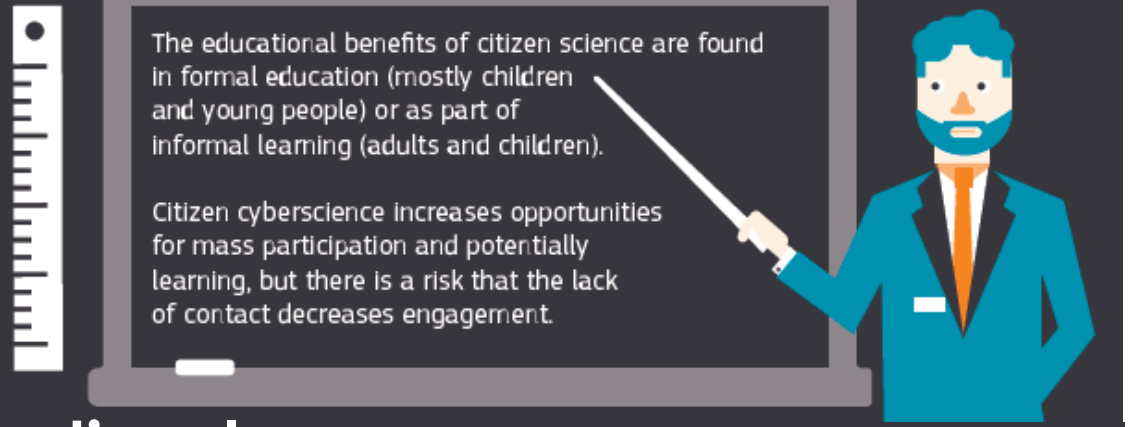
Societal

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.

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.



Policy making

Citizen science can serve policy makers by:

- raising awareness about an environmental issue
- providing evidence

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)

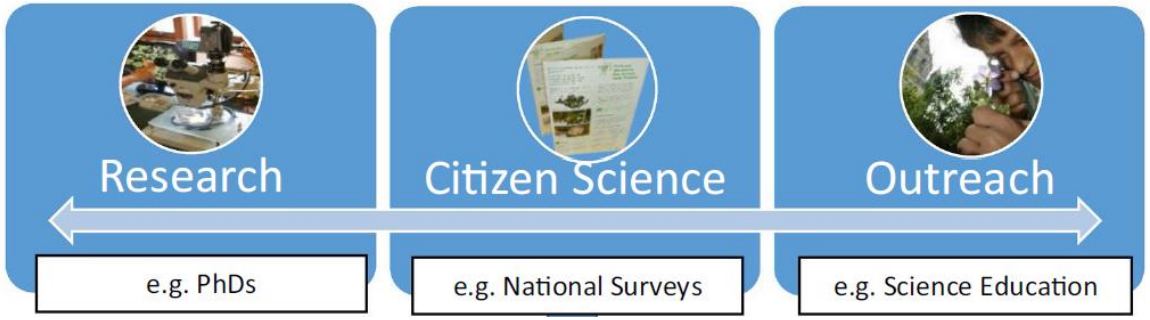
Level 4 'Extreme Citizen Science'
- Collaborative science – problem definition, data collection and analysis

Level 3 'Participatory science'
- Participation in problem definition and data collection

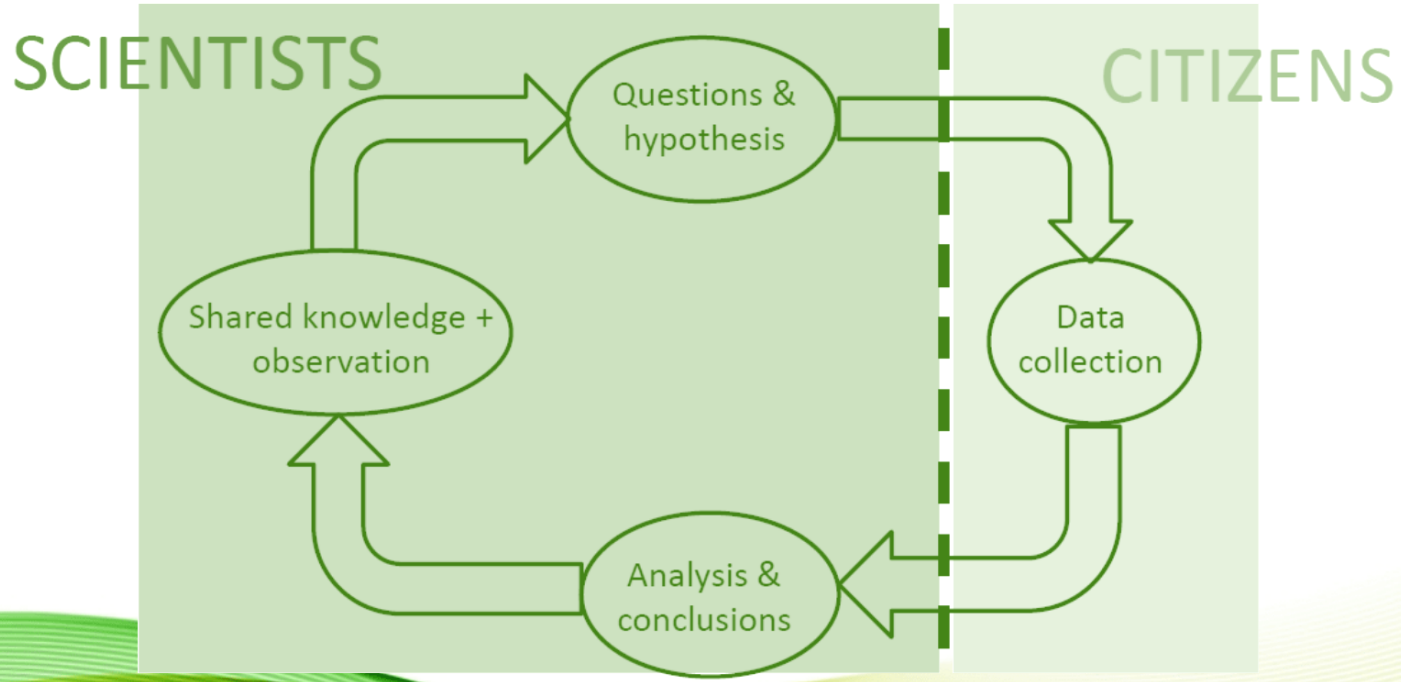
Level 2 'Distributed Intelligence'
- Citizens as basic interpreters
- Volunteered thinking

Level 1 'Crowdsourcing'
- Citizens as sensors
- Volunteered computing

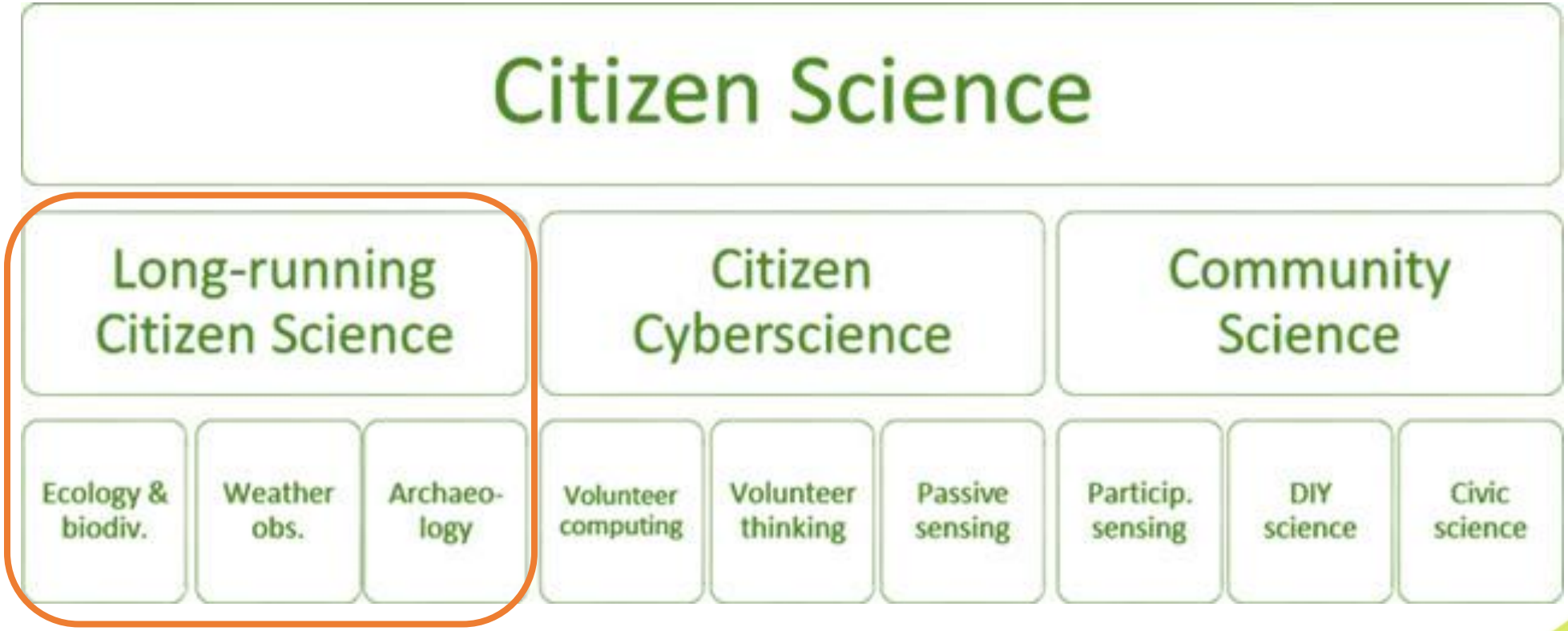
Participatory levels of citizen science. Source: Haklay (2012).



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*

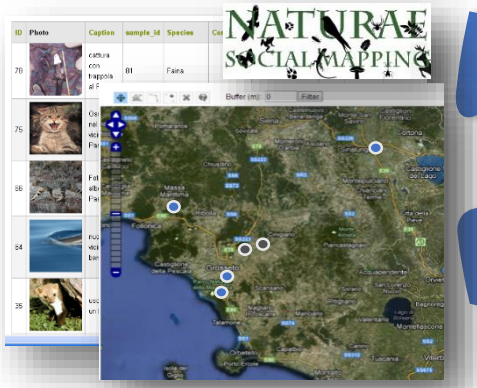
Our experience: from the museum galleries to the field … and back!

Maremma Natural History Museum

MNHM Citizen Science activities

Training courses

Bioblitzes



01

02

03

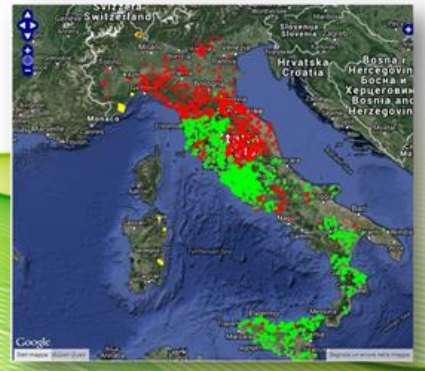
04

05

Recording site

National surveys

Other projects



Natura sulle Mura

POLLI:BRIGHT

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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!

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Examples of activities carried out at our Bioblitzes

European Environment Agency

Topics Countries Data and maps Indicators Publications Media About us

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

SCROLL DOWN

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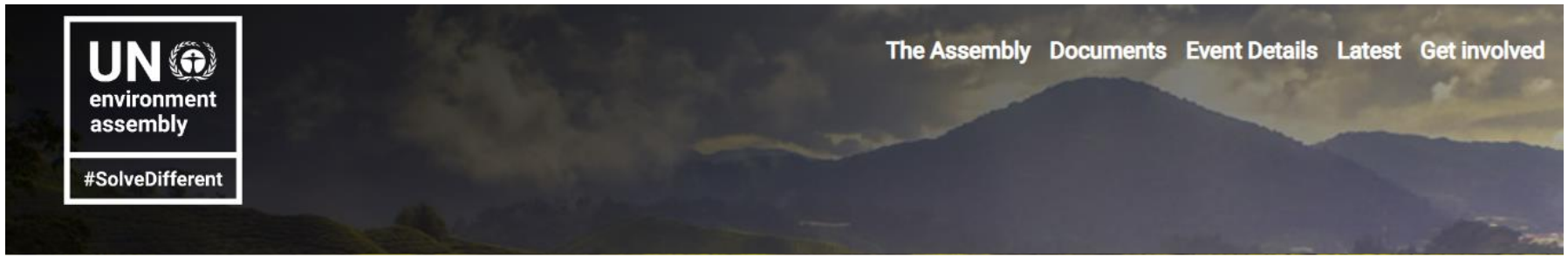
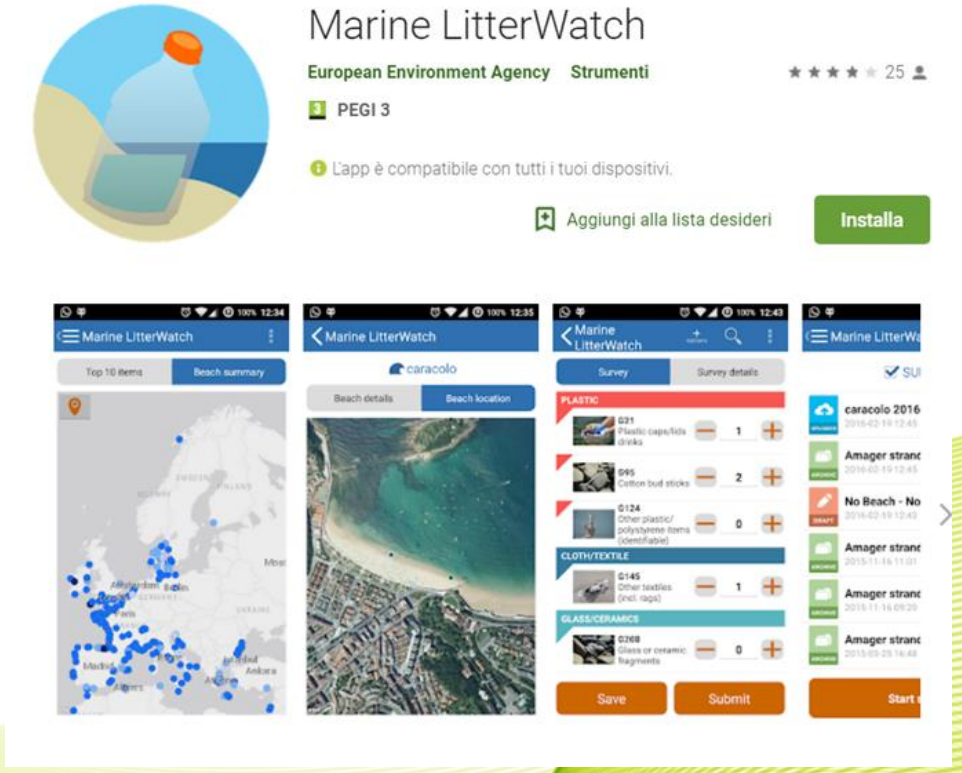


Focus On Open Science

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**.



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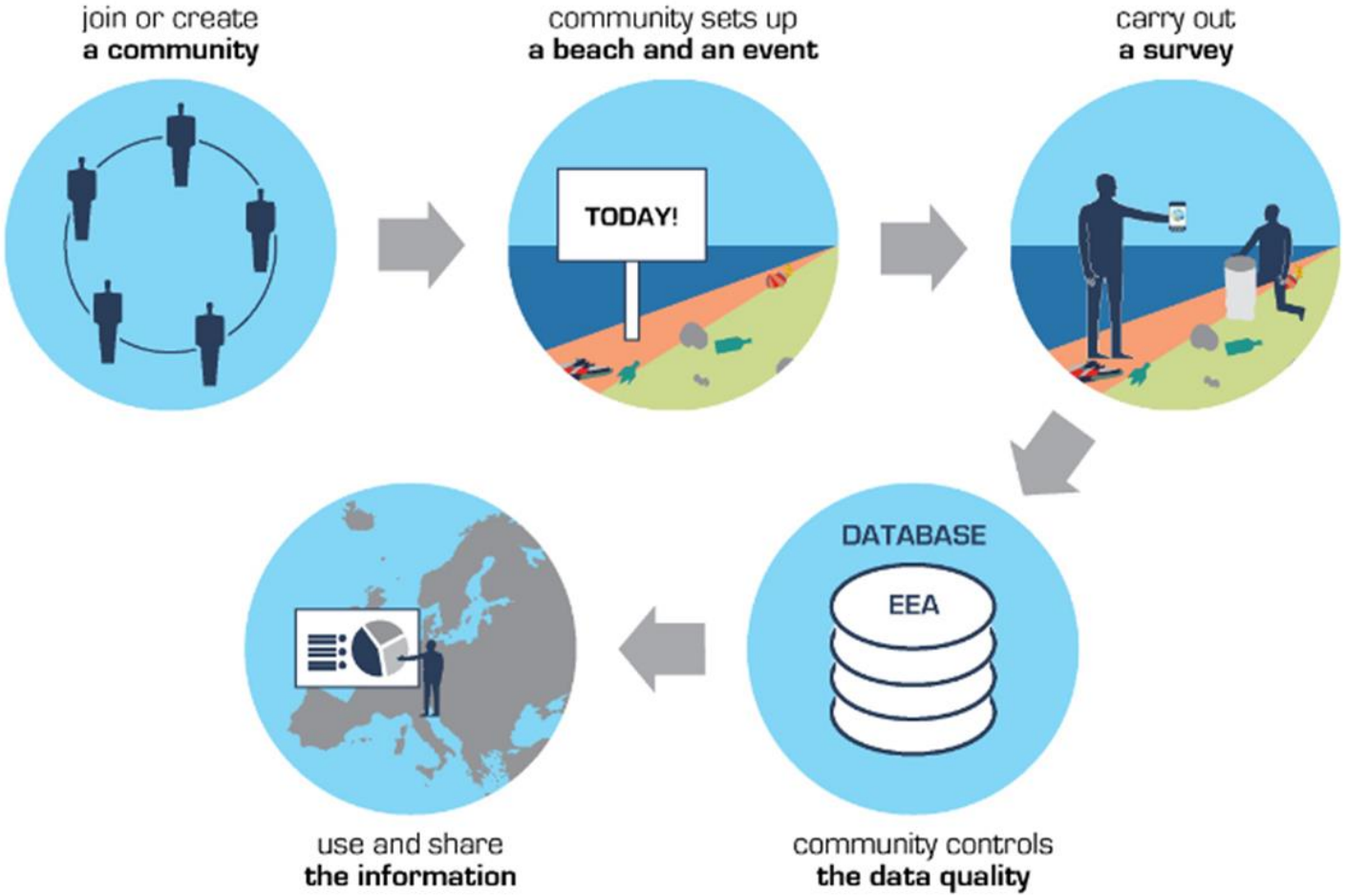
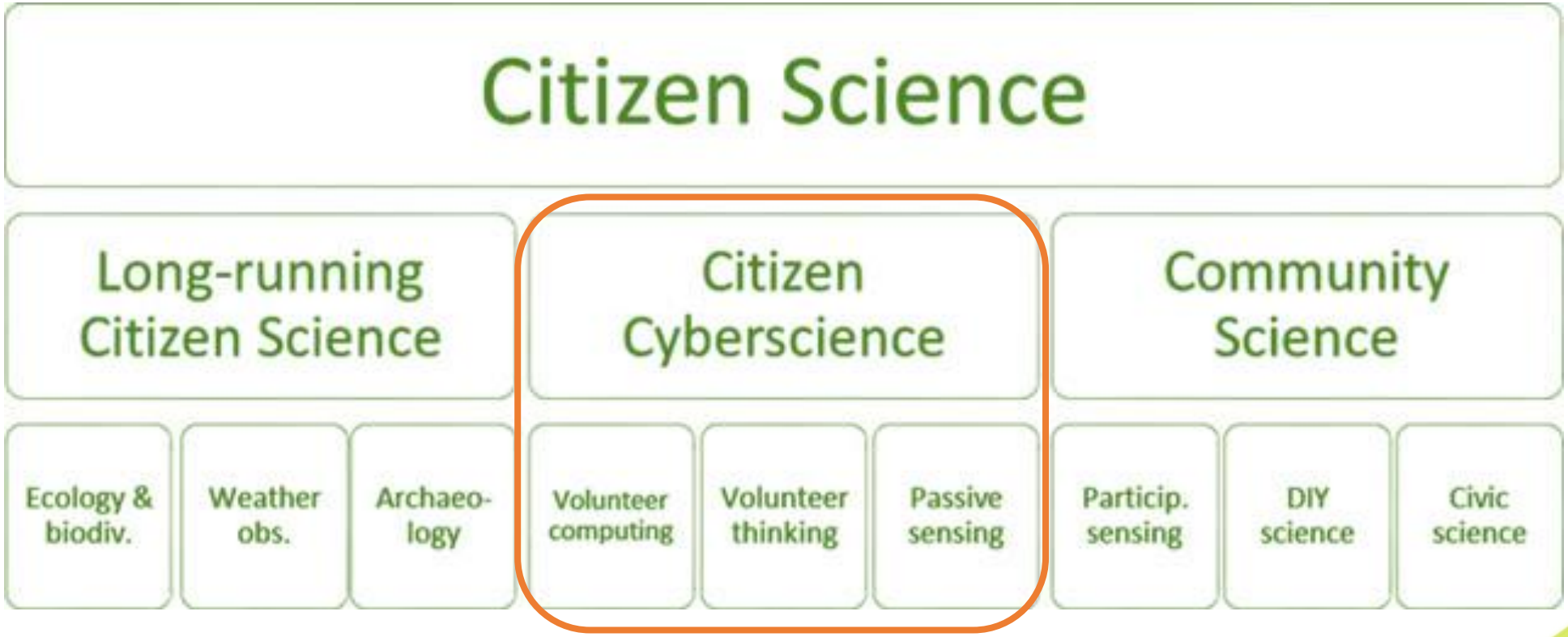


Data collected are used to better understand the problem, and help to support a policy response as formulated in the European Marine Strategy Framework Directive.

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

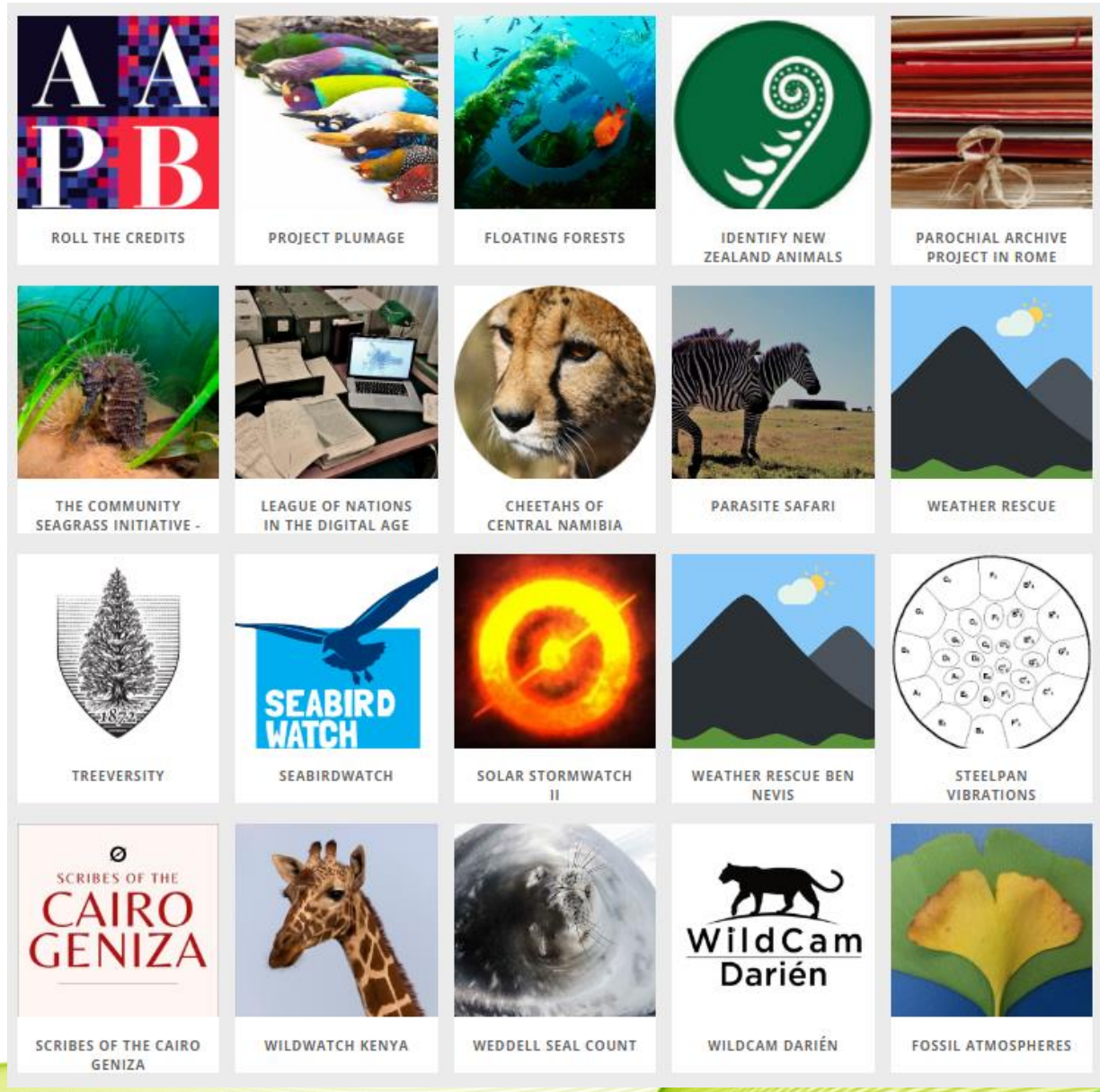
ARTS | BIOLOGY | CLIMATE | HISTORY

LANGUAGE | LITERATURE | MEDICINE | NATURE

PHYSICS | SOCIAL SCIENCE | SPACE

421.690.238

CLASSIFICATIONS SO FAR,
MADE BY **1.764.101**
REGISTERED VOLUNTEERS



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EyesOnALZ

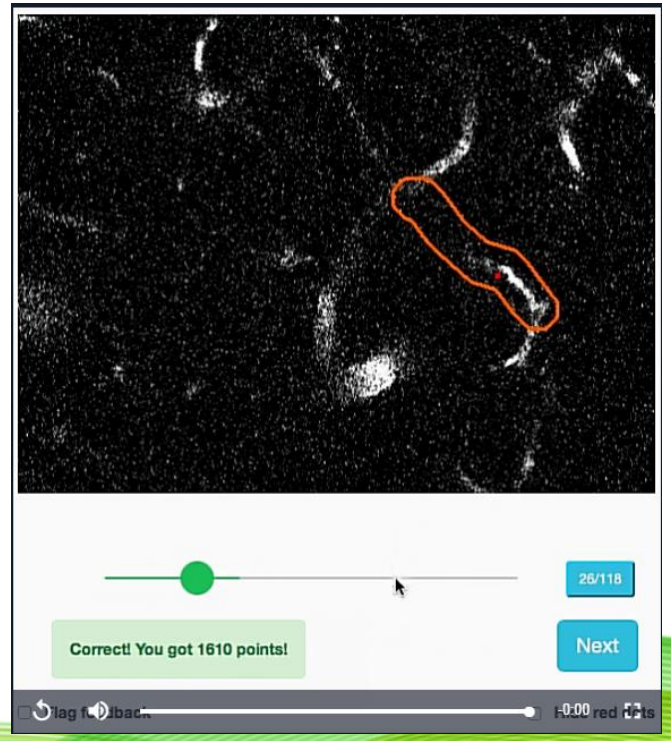
Alzheimer's is the 7th biggest killer in the world, and there is no cure.

Focus On Open Science

STALL CATCHERS

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!

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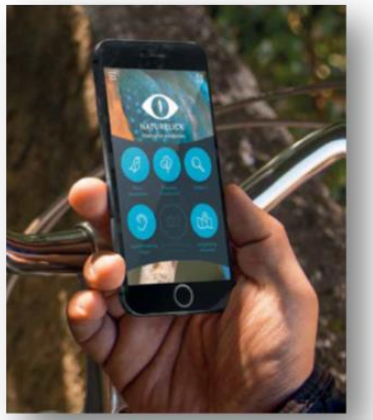
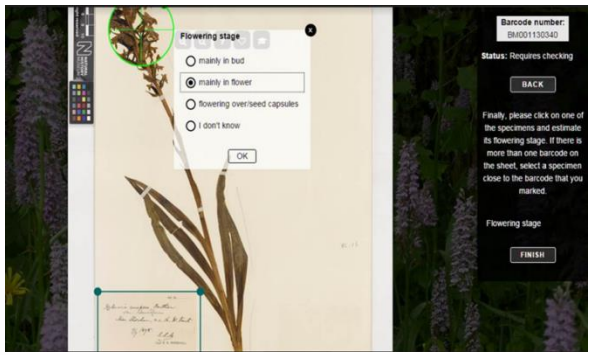
Digital technology-mediated cs projects

museum für naturkunde berlin



NATURBLICK
Stadtnatur entdecken



Online crowdsourcing

NATURAL HISTORY MUSEUM

Miniature Fossils Magnified

At a glance

Transcribe microscope slide labels.

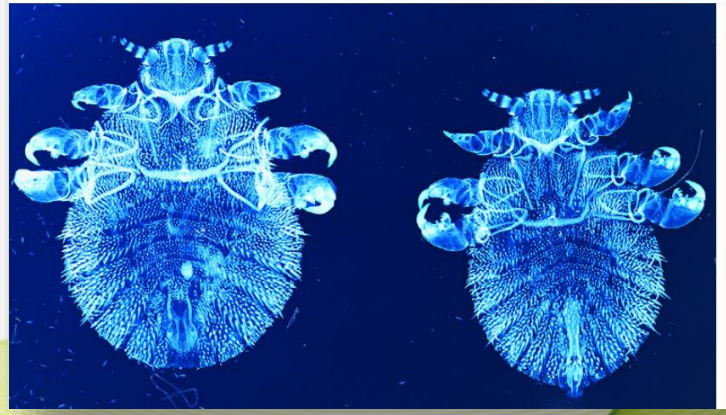
Type of activity: Online

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



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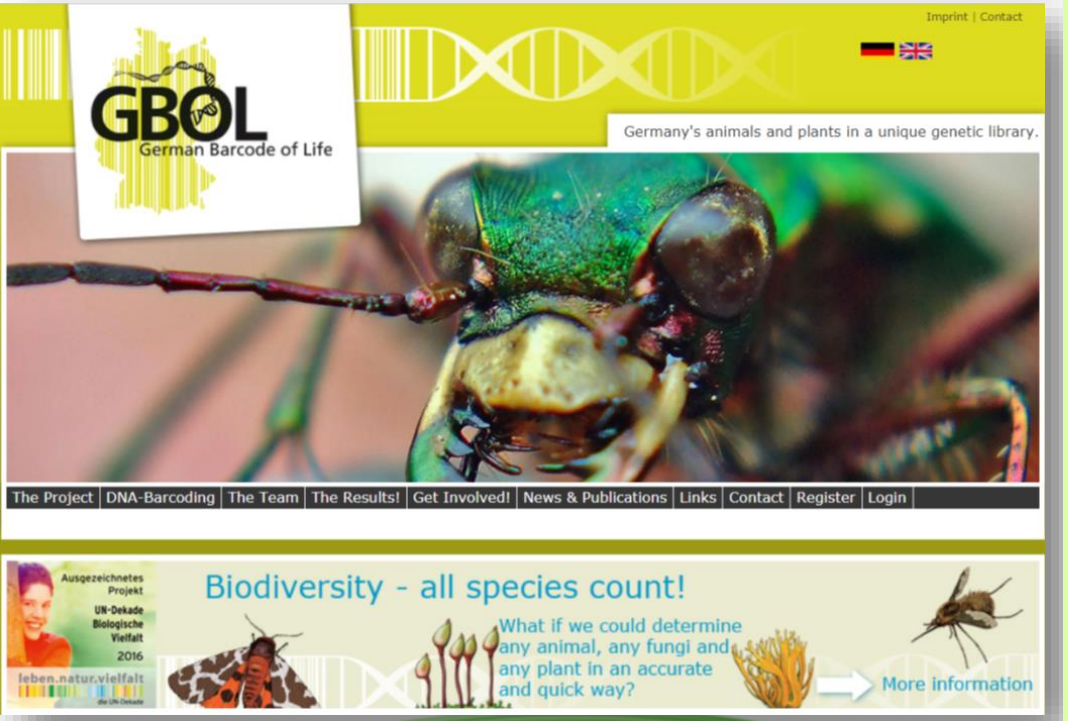
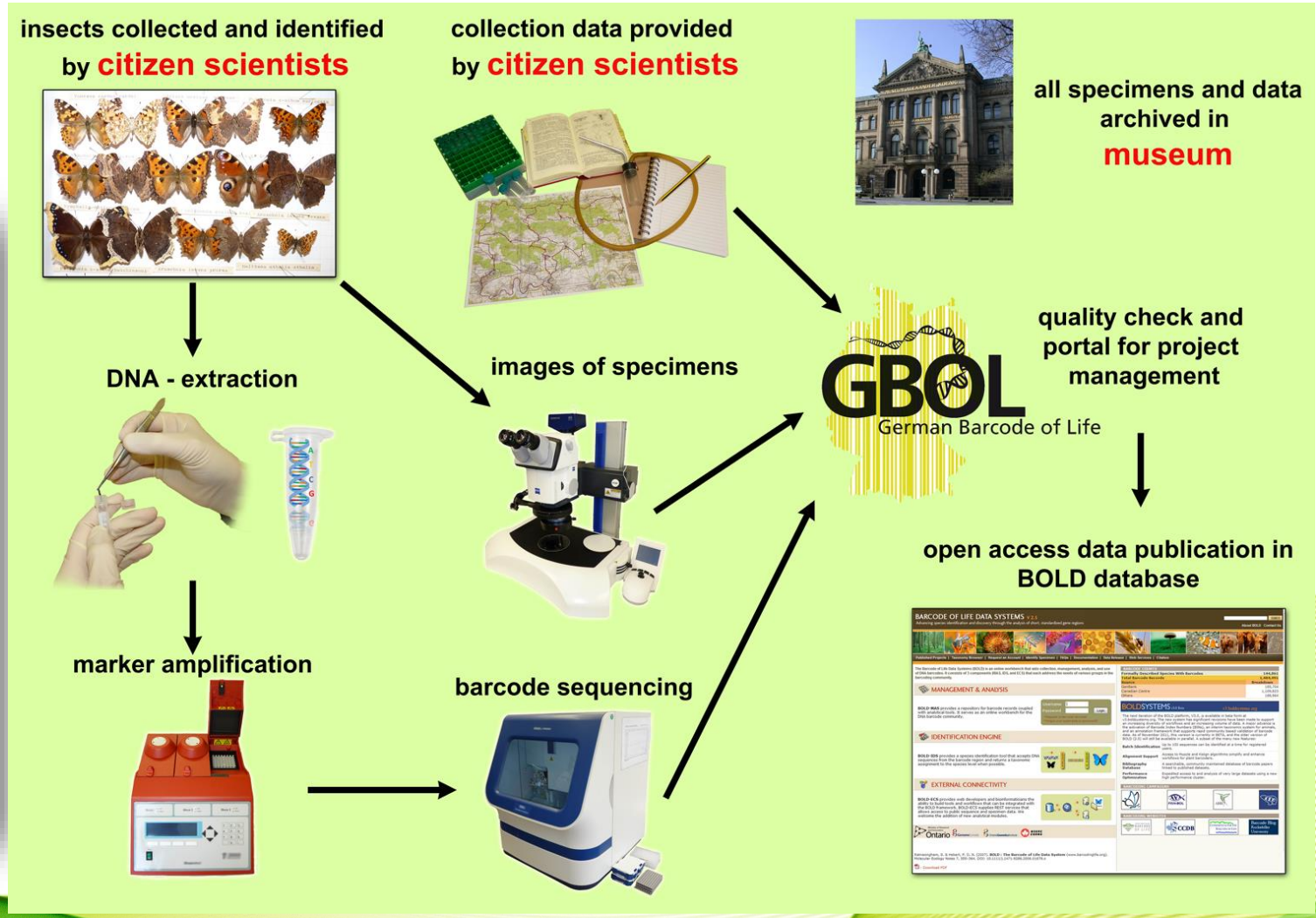
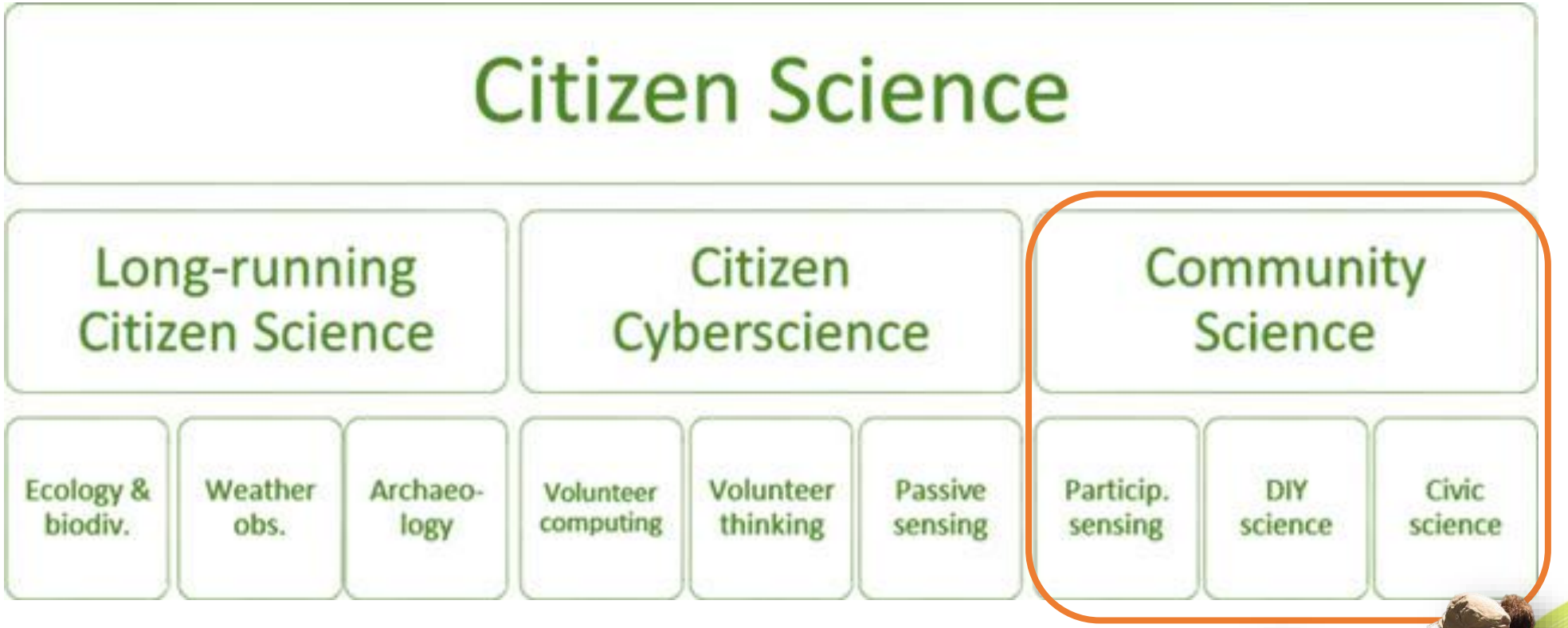
Digital technology-mediated cs projects



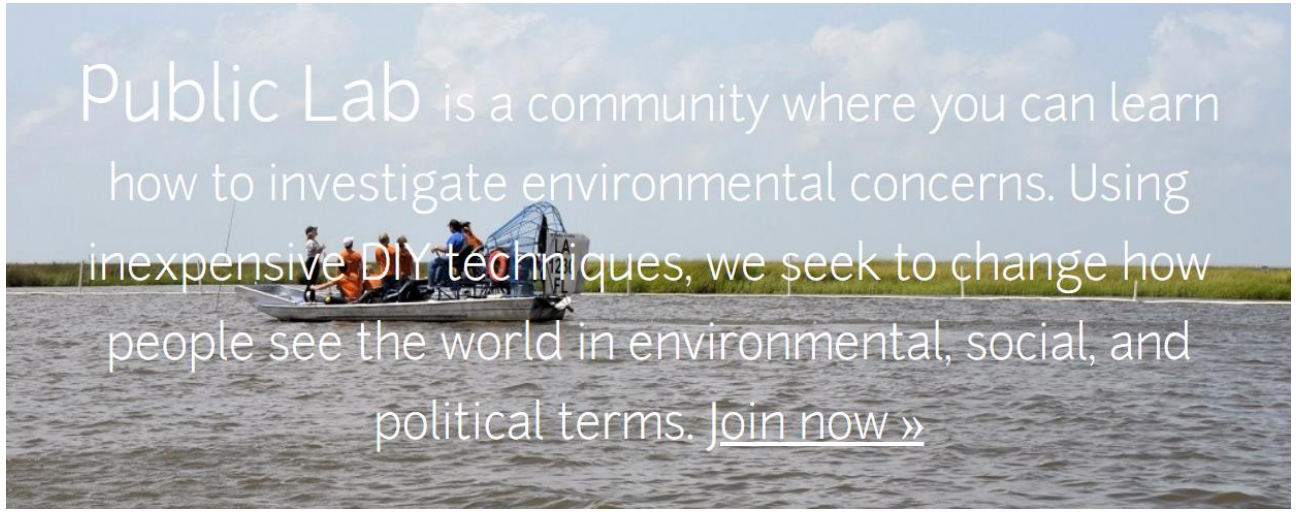


Different types of citizen science projects



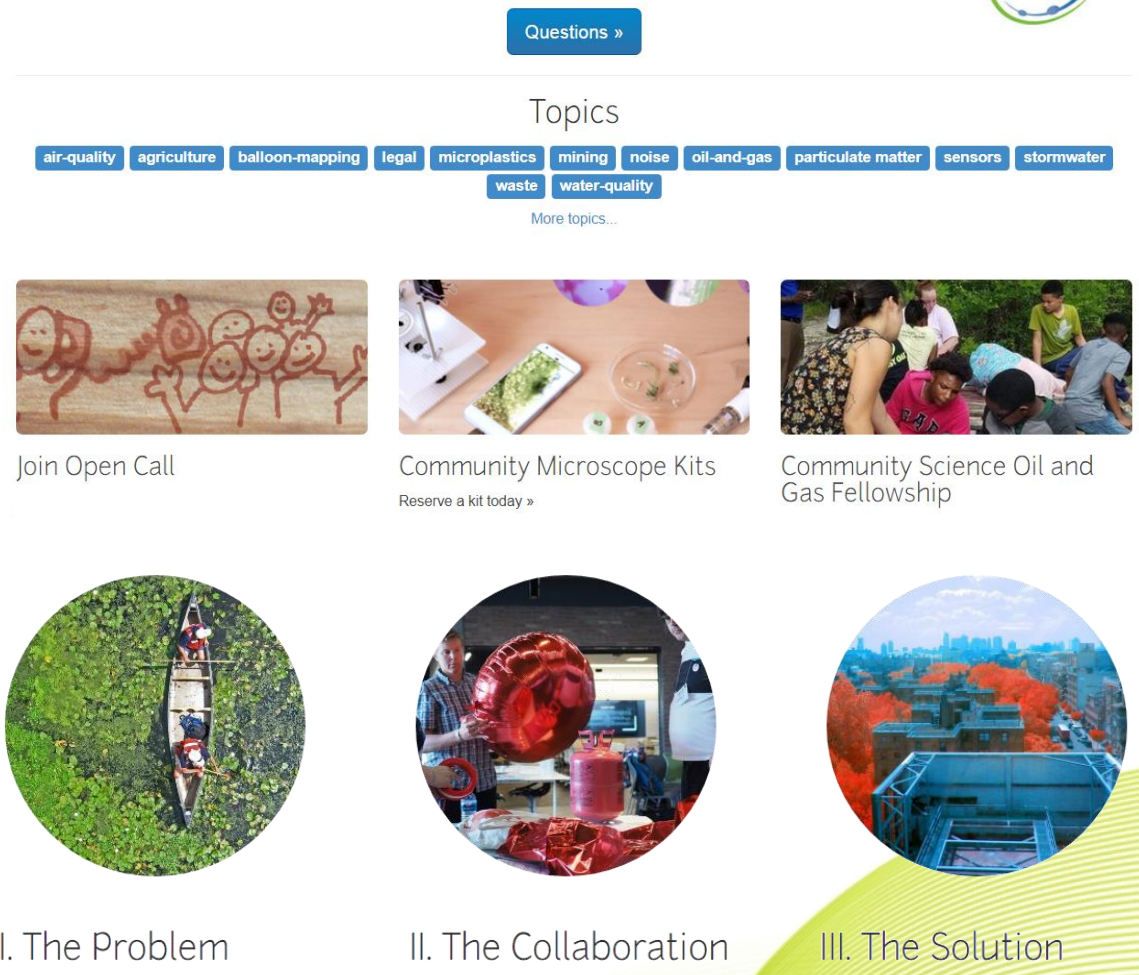
Source: Haklay, Mazumdar & Wardlaw, 2018. Citizen Science for Observing and Understanding the Earth. *Earth Observation, Open Science and Innovation*

Community science



UNEP Year Book 2014 emerging issues update

Realizing the Potential of Citizen Science



But also…

NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

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**."*

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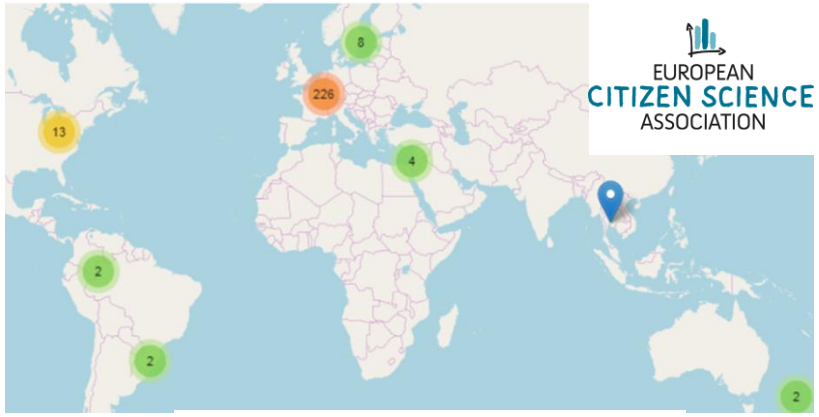
ECSA, the European Citizen Science Association

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.

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Partnerships

MoUs:

EU BON

RRI Tools

EUPRIO

Australian Citizen Science Association

CITIZEN SCIENCE ASSOCIATION

Österreich forscht
www.citizen-science.at

Bürger schaffen Wissen
Die Citizen Science Plattform

Focus On Open Science

中国公众科学项目平台
China Citizen Science

Commons Lab

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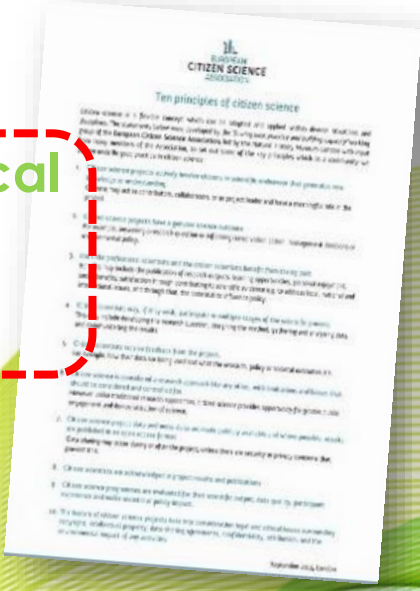
Ten principles of citizen science

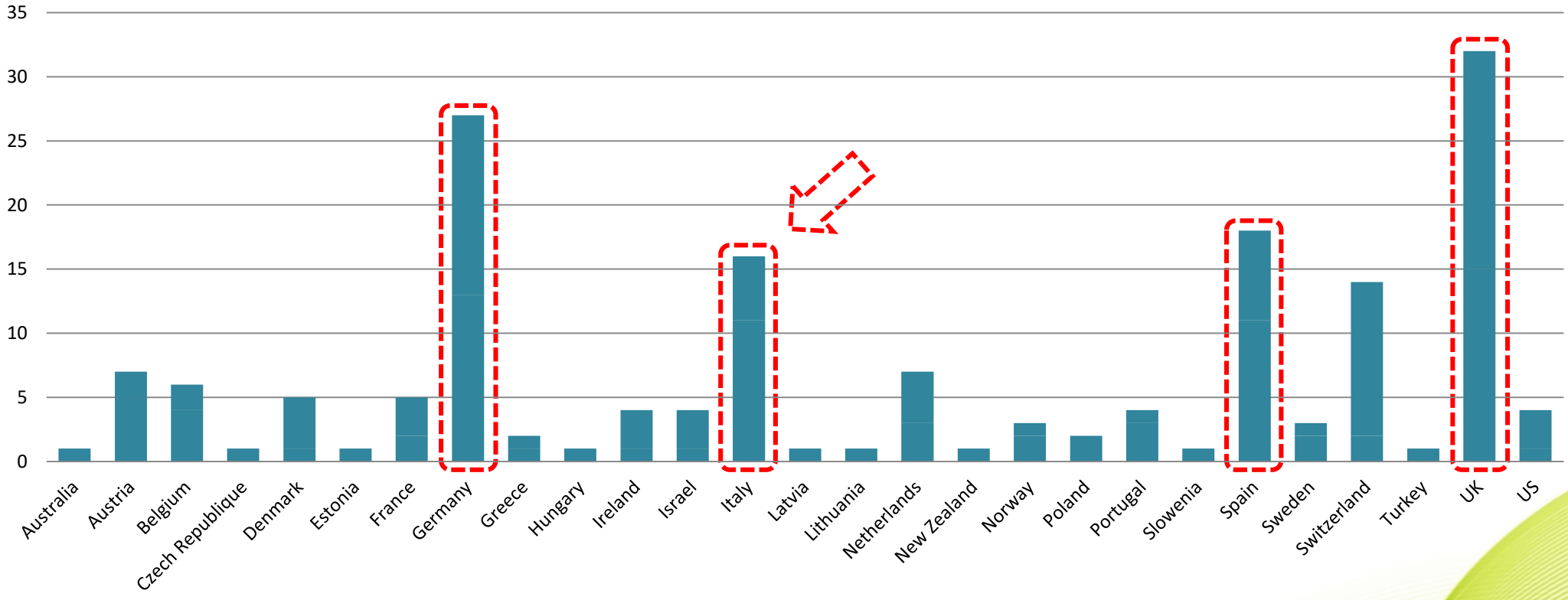
1. **Citizen science projects actively involve citizens in scientific endeavour that generates new knowledge or understanding. Citizens may act as contributors, collaborators, or as project leader and have a meaningful role in the project.**
2. **Citizen science projects have a genuine science outcome.** 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)

123

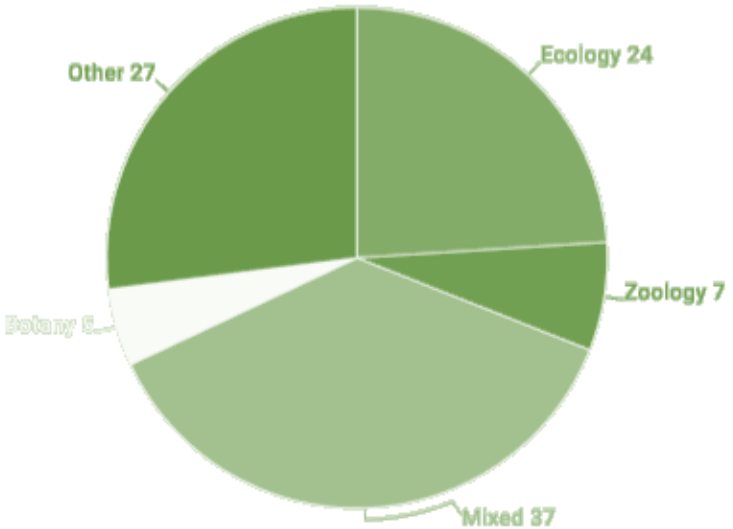
43

104

Members of CSI

Stakeholders

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



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

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A growing, lively interest

Focus On Open Science

UNIVERSITÀ DEGLI STUDI DI TORINO

UNIVERSITÀ DI PARMA

UNIVERSITÀ DEGLI STUDI DI PALERMO

UNIVERSITÀ DI SIENA 1240

UNIVERSITÀ DEGLI STUDI FIRENZE

UNIVERSITÀ DI PISA

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

World Federation of Scientists — Founded in Erice — Beijing Geneva Moscow New York

X-POLLI:NATION

Associazione Teriologica Italiana

XI CONGRESSO ITALIANO TERIOLOGIA

Museo delle Scienze

CITIZEN SCIENCE COST ACTION

CONSERVAZIONE DELLE LIBELLULE ODV - ODONATA.IT - SOCIETÀ ITALIANA PER LO STUDIO E LA

Sistema Nazionale per la Protezione dell'Ambiente

EU-Citizen.Science

POLLI:BRIGHT

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National research institutions and Ministries

Sistema Nazionale per la Protezione dell'Ambiente

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

Network Nazionale Biodiversità

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

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Building up a citizen science community in Italy

FIRST ITALIAN
CITIZEN SCIENCE
CONFERENCE
ROMA 2017

Consiglio Nazionale delle Ricerche

LifeWatch ITALIA

ACCADEMIA NAZIONALE DELLE SCIENZE DETTA DEI XL 1782

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

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Toward a citizen science strategy in Italy

Tavola rotonda

"Verso una strategia condivisa per la citizen science in Italia"

5 – 6 Aprile 2018

doing it together science

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

B - Working groups

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

C - Preliminary draft

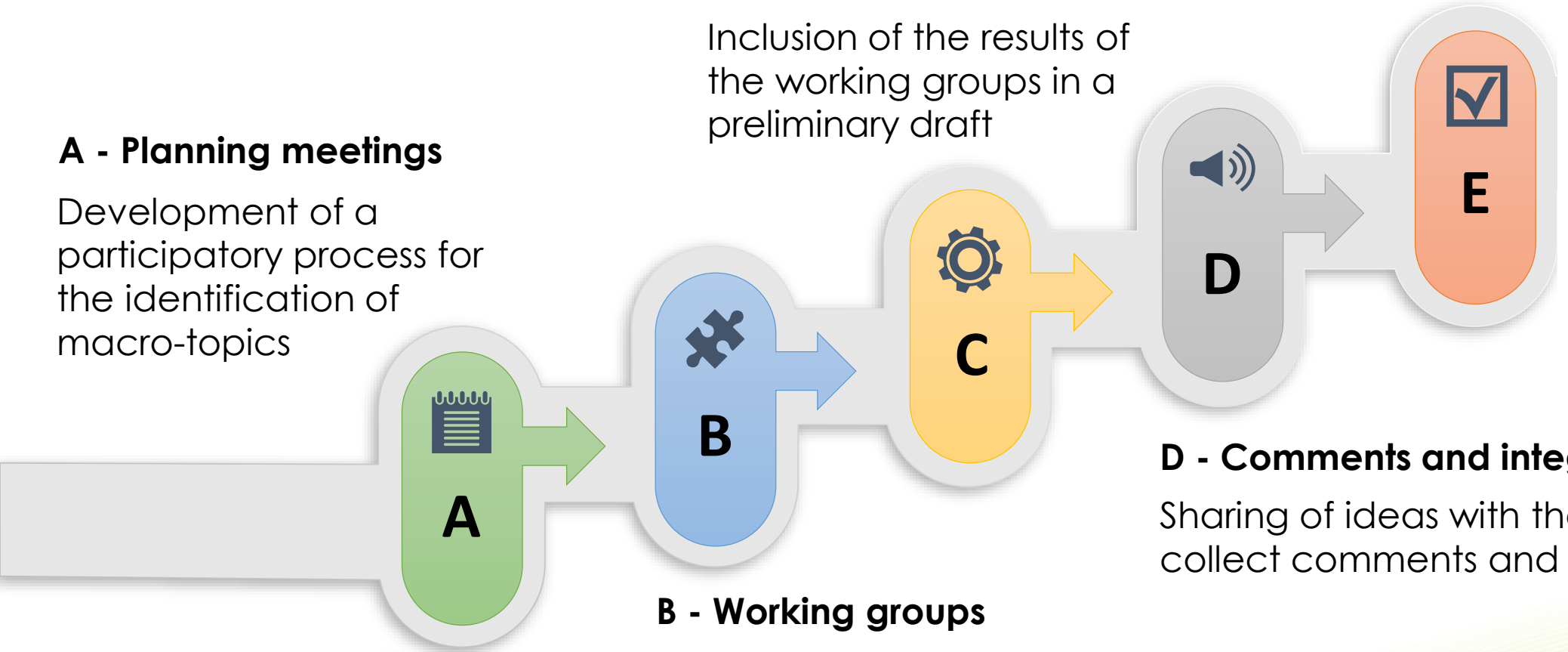
Inclusion of the results of the working groups in a preliminary draft

D - Comments and integrations

Sharing of ideas with the stakeholders to collect comments and integrations

E - Guidelines

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



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.

Focus On Open Science

EUROPEAN CITIZEN SCIENCE ASSOCIATION

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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.


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

Sintesi

Riconoscimenti internazionali della Citizen Science

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

Work in progress…

Focus on Open Science
CHAPTER XIII: TURIN

Thank you for your attention!

Questions?

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