Citizen science: what’s going on in Italy

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“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”.
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
Beyond academia
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.

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...)

Enhance Environmental Awareness through Social Information Technologies

EVERY AWARE
What is the value of citizen science?

**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.

**Scientific**

- 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.

**Policy making**

Citizen science can serve policy makers by:
- raising awareness about an environmental issue
- providing evidence
Different approaches / levels of participation

| Source: Bonney et al. (2009) |
|---|---|---|
| **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 |  |  |

- **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).
Different types of citizen science projects

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

Maremma Natural History Museum

MNHM Citizen Science activities
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
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.
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

Welcome to the Zooniverse

People-powered research

CLASSIFICATIONS SO FAR, MADE BY 1,764,101 REGISTERED VOLUNTEERS

421,690,238

421,690,238 CLASSIFICATIONS SO FAR, MADE BY 1,764,101 REGISTERED VOLUNTEERS
Alzheimer's is the 7th biggest killer in the world, and there is no cure.

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!
Online crowdsourcing
Digital technology-mediated CS projects

insects collected and identified by citizen scientists

collection data provided by citizen scientists

dNA - extraction

images of specimens

marker amplification

barcode sequencing

all specimens and data archived in museum

quality check and portal for project management

open access data publication in BOLD database
Different types of citizen science projects

Community science

Public Lab is a community where you can learn how to investigate environmental concerns. Using inexpensive DIY techniques, we seek to change how people see the world in environmental, social, and political terms. Join now »

I. The Problem
II. The Collaboration
III. The Solution

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

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

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

~ 260 Members
Over 30 Countries
Partnerships

MoUs:

- EU BON
- RRI Tools
- EUPRIO

Australian Citizen Science Association

China Citizen Science

Commons Lab
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

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

Members of CSI

Other: air quality, seismology, hydrogeological risks, epidemiology, etc.
A growing, lively interest
SNPA, the Italian National System for the Protection of Environment, has recently set up a permanent WG on Citizen Science.

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
Toward a citizen science strategy in Italy

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.
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.
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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