Community Engagement & Citizen Science
Joana Magalhães
Senior Researcher, Science for Change, Spain
Citizen science for multiskateholder engagement

Joana Magalhães, PhD
Science for Change, Barcelona, Spain
joana.magalhaes@scienceforchange.eu
Citizen Science definition

What is Citizen Science?
Citizen Science refers to the general public engagement in scientific research activities when citizens actively contribute to science, either with their intellectual effort or surrounding knowledge or with their tools and resources.

There are multiple forms of participation associated with the different stages of the research cycle, where citizens - particularly, but not only, those affected by a social challenge - can play a very relevant role:

- Problem Detection
- Research Planification
- Data Collection and Analysis
- Co-creation of Methodologies
- Carrying out Experiments
- Interpretation of Results
- Solution Proposal
- Technology Development
- Application Development
- Publication of Results
Citizen Science levels

- **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

Haklay, 2013. Citizen Science and volunteered geographic information: Overview and typology of participation, Crowdsourcing Geographic Knowledge
Citizen Science is a valid data generator

➢ Generation and analysis of data relative to the natural world by members of the general public, usually as part of a collaborative project of professional scientists. *Oxford English Dictionary, 2014*
➢ The number of projects is multiplying in all areas of knowledge. Widely used for monitoring environmental pollution. *Open Science Monitor, EC 2016: European map of CS*
➢ In some scientific areas, such as biodiversity studies, the data collected by citizens is the largest valid source of knowledge for science. *Chandler et al, 2017*

**Implementing citizen science projects is not simple!!!**
*It goes beyond public participation*

**Potentials:**
➢ Complement existing data sets
➢ Compare new data with existing data
➢ Create new data sets
➢ Informing public policies in social and environmental topics

*Inventory of CS activities for environmental policies, JRC, 2018*

Source: Verity Harrison - [www.thinkdoodly.com](http://www.thinkdoodly.com)
Copyright: ©Verity Harrison 2015
Citizen Science Impact

SCIENTIFIC IMPACT

Citizen science is an important vehicle for democratizing science and promoting the goal of universal and equitable access to scientific data and information.

Evolution of the scientific publications that include citizen science methodologies

Scientists across the continent have proven that citizen science can deliver good quality data.

“Citizen science activities offer an under-used, cost-efficient additional source of knowledge and feedback in the monitoring of the environment and the implementation of environment policies.”


More and more scientific projects are using the citizen science methodology to obtain results, and professionals from various countries are joining forces to carry out their research together with citizens.

Research collaborations between countries

We can observe a spectacular growth rate, particularly after 2010, of papers that mention citizen science methodologies in their studies. The same thing happens when we consider qualitative metrics, such as the quartile in JCR Journal Citation Reports, and the JCR impact.


https://eu-citizen.science/policy_brief/
Citizen Science Impact

SOCIAL IMPACT

Scientists and communities tend to consider citizen science as action, strengthening its ability to create social change and understanding participation as a process of individual or collective transformation.


Increased number of communities involved as research areas are diverse.

The expansion of the areas of knowledge where citizen science is used favors the incorporation of new communities of citizens who see this methodology as a way of knowing, describing and dealing with issues in their environment.

388 Citizen Science biodiversity projects around the world provide:

- 1.3 to 2.3 million citizen science participants
- Up to $2.5 billion of economic value per year (more than €2,000 million per year)

Sources:

- Open collaboration and discussion of new communities of citizens...

https://eu-citizen.science/policy_brief/
Citizen Science Impact

ECONOMIC IMPACT

Citizen science increases social and technological innovation, budget savings and budget availability to tackle additional issues of public concern.

165 citizen science projects funded under different topics in the FP7 and Horizon 2020 research and innovation programmes

In Spain, up to November 2020 77 citizen science projects have meant a return of €51,740,092 to national, regional and local institutions.

The French Administration saves between €678,523 and €4,415,251 per year thanks to the participation of volunteers in biodiversity monitoring programmes.

https://eu-citizen.science/policy_brief/
POLITICAL IMPACT

"Citizen science projects can change the political agenda by spurring political involvement of citizens, which can eventually lead to policy change."

Jurre Honkoop. Political impact through citizen science?

Useful policy briefs can be found in the resource section of the EU-Citizen.Science platform categorised under the resource type "Policy brief" here.

Mariya Gabriel
Commissioner for Innovation, Research, Culture, Education and Youth.

Source: European Commission (2020). Citizen science elevating Research & Innovation through Societal Engagement. Available at:

https://eu-citizen.science/policy_brief/
Odour Pollution

2nd cause of complaints worldwide (after noise)
Deficient regulations
Methodologies do not consider social impact

Co-creating collaborative odour maps by gathering real time odour observations
Odour Pollution is a local issue that can be regulated through Ordinances or Environmental Licenses.
D-NOSES
Distributed Network for Odour Sensing, Empowerment and Sustainability

QUADRUPLE HELIX MODEL

LOCAL REGIONAL STATE
GOVERNMENT, ENVIRONMENTAL
AUTHORITIES
- Determine the origin of odour episodes
- Increase transparency and credibility
- Improve community relations
- Co-design solutions with the community

CITIZENS, NGO, ASSOCIATIONS
- Improving the quality of life
- Citizen participation in local decisions
- Co-creation of local solutions
- Increasing the level of co-responsibility
- Increasing scientific knowledge

INDUSTRIES, SME, CLUSTERS
- Getting real-time data
- Optimise industrial processes
- Track best practices and best techniques
- Define odour management plans with real-time nuisance data
- Decrease the cost of odour studies
- Improve industrial social responsibility

ACADEMIC, EXPERTS
- Advancing the state of the art
- Put odour pollution on the map
- Obtain valuable data
- Develop further technical studies
- Validate model results to assess impact
- Verify the effectiveness of deodorisation technologies
The pioneer pilot: the Barcelona Case Study

- Urban context
- Historical odour issues
- A variety of emitting activities (Waste and Wastewater treatment plants, amongst others)
- A variety of social realities
- Variety of access to technology (usually high)
- Potential good collaboration with environmental authorities and emitting activities
Collect perceptions on odour issues from women working in markets + stakeholders waste management sector
Detected need: more effective communication strategies for each 4H stakeholder

**LOCAL REGIONAL STATE GOVERNMENT, ENVIRONMENTAL AUTHORITIES**
- Determine the origin of odour episodes
- Increase transparency and credibility
- Improve community relations
- Co-design solutions with the community

**CITIZENS, NGO, ASSOCIATIONS**
- Improving the quality of life
- Citizen participation in local decisions
- Co-creation of local solutions
- Increasing the level of co-responsibility
- Increasing scientific knowledge

**INDUSTRIES, SME, CLUSTERS**
- Getting real-time data
- Optimise industrial processes
- Track best practices and best techniques
- Define odour management plans with real-time nuisance data
- Decrease the cost of odour studies
- Improve industrial social responsibility.

**ACADEMIC, EXPERTS**
- Advancing the state of the art
- Put odour pollution on the map
- Obtain valuable data
- Develop further technical studies.
- Validate model results to assess impact.
- Verify the effectiveness of deodorisation technologies
NEWSERA: CS in the new paradigm for scicomm

The overall aim of NEWSERA is to demonstrate the virtues of citizen science as an inclusive, broad and powerful science communication mechanism that can allow to increase trust in science communication and, in turn, in science at large, while opening up science and innovation to society, raising awareness and educating in science, and reducing the chances of incurring in fake news, by promoting critical thinking.

Our challenge is to integrate citizen science as a tool in science communication and define specific strategies addressed to quadruple helix stakeholders.
Common need with other CS Projects

Main findings:

i) common target audience - majority citizens;

ii) social networks as main communication tool;

iii) data open access policies

38 CS Projects engaged as the NEWSERA pilots (17 Spain, 11 Italy, 10 Portugal)


Figure 1. Geographical distribution of projects surveyed European countries in EU-28 including UK and Switzerland. (n=157). Yellow color intensity indicates the concentration of projects. Grey indicates no projects.
#CitSciComm Labs

NEWSEERA uses a bottom-up approach to co-design innovative science communication strategies for selected ongoing CS projects, to improve their #scicomm practices and impact, towards each of the 4-helix stakeholder groups and science communication and journalism professionals.
Co-creation with target stakeholders is key
NEWSERA Impact Framework and indicators
Innovative Communication Actions

- Directed social media campaigns
- Establishment of ambassadors’ networks
- Gamification
- Storytelling to humanize subject
- Contests’ organization
- Integration of citizen science in university curricula
- Train the Trainers
Challenges
Lack of industry
Lack of understanding the real impact
Lack of long term engagement

Challenges
Lack of initiative and motivation for academic scientists
Lack of trust in citizen generated data
Lack of funding
Lack of professionalization

Challenges
Lack of awareness
The policy ecosystem is complex and dynamic
Lack of trust
Lack of training
Lack of funding

Challenges
Lack of trust
Lack of mutual knowledge and understanding
Lack of common language
Lack of funding

Policy Brief NEWERA Available in EN, ES, PT, IT
Recommendations

CITIZENS
1. **Foster Public Engagement** (team up with other existing groups, co-create your CS project with citizens and include their needs and concerns)
2. **Involve Citizens in doing science** (as data collectors, analysts, in the dissemination of results, etc., foster alliances for mutual benefit)
3. **Be flexible in difficult times** (Social media can be useful to maintain regular communication, use gamification to ensure a high rate of participation)
4. **Fight fake news** (citizens can be an evidence-informed network to tackle fake scientific information)

SCIENTISTS
1. **Involve researchers and academics** (make platforms openly accessible creating opportunities for researchers to improve their research)
2. **Identify champions within the scientific community** (find CS ambassadors within research institutions that can amplify results at any level)
3. **Be sure to communicate the science within the project** (make clear the scientific aims of your CS project and benefits of implementing this methodology)
4. **Nurture coordination among researchers involved in similar CS initiatives** (make use of existing experiences and resources, involve different scientific disciplines and research fields, make the bridge between the local level and the researcher's interest)
5. **Promote Open Science** (CS can contribute to embrace open science and improve the quality, efficiency, and responsiveness of any research)
Recommendations

POLICY MAKERS
1. Build alliances (benefit from mutual interest - policymakers are also trying to find new ways to connect with citizens and improve administration popularity)
2. Do your work (understand which level and type of policy maker is of interest to your project to identify how to be integrated in the political sphere)
3. Timing (connect to the policy agendas. It is important to find the right moment to collaborate)
4. Support evidence-informed public policies (create specific materials that offer solutions to a given issue in the political agenda based on your research)
5. Have a direct and concrete message (adjust your message to a stakeholder who is usually extremely busy and solving urgent matters all the time)
6. Team up with other organizations and let them see what you have in common (coordinate across governance levels: Think globally, act locally. Show CS as an innovative method to help giving consistency to public policies)

INDUSTRY
1. Involve industry and SMEs (try to engage with the vision and mission of industries with a potential interest in your project)
2. Network with sister CS projects (build up a social capital network to gain credibility, shape a service for the industry to create a win-win situation)
3. One size does not fit all (identify the right industry - differ in scale, ownership, etc)
4. Embrace new business models (convince that RRI and CSR dimensions are important aspects of today's industry, contribute to rethink organization culture and develop new talent at the interface of science and society)
5. Your data is valuable. Be proactive (show the added value of CS based-data to improve products/services/processes and social & environmental capital)
More...

Common Needs

- Flexibility
- Mentoring
- Capacity Building
- Dedicated and specialized HR
- Funding
- Cross-border synergies
- Networking
Mutual Learning Exercise - 11 EU countries
Supporting and giving recognition to citizen science in the European Research Area

TOPIC ID: HORIZON-WIDER-2021-ERA-01-01

- **Expected Outcome:**
  - Projects are expected to contribute to the following expected outcomes:
  - Significant number of experimental citizen science initiatives kick-started.
  - Significant number of citizen science initiatives supported to become sustainable.
  - Significant number of newcomers to the Framework Programme and a significant number of citizens involved in co-producing scientific knowledge.
  - Increased recognition of excellent citizen science initiatives throughout the European Research Area.
  - Improved evidence base for making policy on citizen science.

- **Kick-starting:** This will kick-start and provide support services to at least 100 citizen science activities that are at the conceptual or pilot stage and which show promise in terms of innovative theme or approach, collecting and analysing data, or generating other important benefits.

- **Sustaining:** This will support at least 25 on-going or recent citizen science activities to find ways to sustain their activities; these will have shown their worth in terms of innovative theme or approach, collecting and analysing data, generating other important benefits, or have particular potential to scale up across member states or the ERA.

In addition, this action should launch a European Union Prize for Citizen Science (funded by the action through financial support to third parties) open to all citizen science initiatives involving research and innovation actors, including civil society organisations, in the European Union. The action should prepare, publicise and launch the competition.
Acknowledgments

NEWSERA project has received funding from the European Union's Horizon 2020 Research and Innovation program under Grant Agreement n. 873125. We acknowledge all the representatives of the quadruple helix and data journalism that were involved in the CoP and specially to the team members from the CS projects that participate as NEWSERA pilots, as described in NEWSERA website https://newsera2020.eu/labs/

Legal Disclosure

This presentation reflects the views only of the authors, and neither the European Commission nor the Research Executive Agency can be held responsible for any use that may be made of the information contained therein.

Partners

Website: www.newsera2020.eu
Twitter: @citscicomm
Hashtags: #CitSciComm #CitSciJournalism
E-mail: info@newsera2020.eu
Acknowledgments

Website: www.scienceforchange.eu
Twitter: @sciencefchange
Rajesh Tandon

Founder & President of PRIA & UNESCO Co-Chair in Community Based Research and Social Responsibility in Higher Education, India
The Annual, International Conference on Impact of Science
Leiden, Netherland
22-24 June 2022

Community Engagement & Citizen Science

Dr. Rajesh Tandon
Founder- President, PRIA
UNESCO Chair in CBR- SR in Higher Education

AESIS
Network for Advancing & Evaluating the Impact of Science
• What Science?
• Citizens' Lens
Knowledge Production

• Communities & everyday life
• labs and academia
Knowledge Cultures

- Academic (scientific?)
- Community (culture, language, contexts)
Partnerships

Co-creation...from framing to dissemination

Integration of knowledge cultures.....methods & tools
Resources

UNESCO Chair Open Science Webinar Series
https://www.unescochair-cbrsr.org/open-science-webinar-series/

Watch Dr. B Rao talk on OS and SDGs:
https://www.youtube.com/watch?v=UT5ym42VeVg&feature=youtu.be&ab_channel=unescochaircbrsr

Read here:
https://www.unescochair-cbrsr.org/past-event/

Read Open Science Policy Brief:
Reach us!

@pria.india; @UNESCOchairCRR; @PRIA_India

Email: rajesh.tandon@pria.org

Websites: www.pria.org / www.unescochair-cbrsr.org

YouTube: https://www.youtube.com/user/PRIAIndia

UNESCO Chair: https://www.youtube.com/channel/UCJpmb7ZyuLtW9jkaYbp6Ztw
Pen-Yuan Hsing
Research Associate, Department of Mechanical Engineering,
University of Bath, United Kingdom
Citizen science as collaboration

...not just a “methodology”

Dr Pen-Yuan Hsing
co-founder
MammalWeb.org

Impact of Science 2022
B020, 11:45 UTC+2, 22 June 2022
@MammalWeb
citizen science
wildlife monitoring
motion-sensing camera traps
<table>
<thead>
<tr>
<th>Name</th>
<th>Camera Type</th>
<th>Description</th>
<th>Start Date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botanics</td>
<td></td>
<td></td>
<td>2015-05-19</td>
<td></td>
</tr>
<tr>
<td>TG + MD</td>
<td></td>
<td></td>
<td>2015-06-13</td>
<td></td>
</tr>
</tbody>
</table>
What do you see in this sequence?

<table>
<thead>
<tr>
<th>Common (UK)</th>
<th>Mammals (UK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds (UK)</td>
<td></td>
</tr>
<tr>
<td>American mink</td>
<td>Roe deer</td>
</tr>
<tr>
<td>Badger</td>
<td>Small mustela</td>
</tr>
<tr>
<td>Brown (European) hare</td>
<td>Speckled mouse</td>
</tr>
<tr>
<td>Brown rat</td>
<td>Vole (unknown species)</td>
</tr>
<tr>
<td>Domestic cat</td>
<td>Wood mouse</td>
</tr>
<tr>
<td>Domestic dog</td>
<td>Basset (European)</td>
</tr>
<tr>
<td>Fallow deer</td>
<td>Cattle (same)</td>
</tr>
<tr>
<td>Grey squirrel</td>
<td>Domestic</td>
</tr>
<tr>
<td>Hedgehog (European)</td>
<td>Great Yt</td>
</tr>
<tr>
<td>Home</td>
<td>Jackal (European)</td>
</tr>
<tr>
<td>Muntjac</td>
<td>Stag (European)</td>
</tr>
<tr>
<td>Otter</td>
<td>Bearded (European)</td>
</tr>
<tr>
<td>Roe (European)</td>
<td>Cattle (same)</td>
</tr>
<tr>
<td>Red dear</td>
<td>Song Thrush</td>
</tr>
<tr>
<td>Red fox</td>
<td>Unidentified bird</td>
</tr>
<tr>
<td>Red squirrel</td>
<td>Wood pigeon</td>
</tr>
<tr>
<td>Dry feeder</td>
<td>Other</td>
</tr>
</tbody>
</table>

English (United Kingdom)
interactive visualisations

Please note, the displayed data are based on submitted classifications and have not been checked for accuracy.
consensus classifications “votes”

logistic regression model calibrated with expert classifications
machine learning for automated species identification

Norouzzadeh et al. (2018) PNAS 115 (25), CC BY-NC-ND 4.0
people referred to MammalWeb as their favourite activity.

“...great to see young people who are so knowledgeable and enthusiastic about science.”

Dr Paula Martin, coordinator
Celebrate Science 2017
citizen science as science engagement and crowdsourcing
scientists

everyone else
authority-driven citizen science

Ottinger, G. (2017) in The Political Economy of Science
Reconstructing or reproducing? Scientific authority and models of change in two traditions of citizen science
Is the galaxy simply smooth and rounded, with no sign of a disk?

- Smooth
- Features or Disk
- Star or Artifact

NEED SOME HELP WITH THIS TASK?

Done & Talk  Done
200+ citizen scientists since May 2015
350+ years of observation time
~2,000,000 photos uploaded
MammalWeb Britain

The MammalWeb Britain project aims to enlist the public in helping us to catalogue Britain's mammalian biodiversity, and to understand what species are around us, where they occur, and what aspects of the environment impact on their occurrence and activity.

MAMMALNET

The MammalNet project is assessing the potential of voluntary citizen involvement for mammal monitoring across Europe. How much can citizens contribute to mammal monitoring in Europe using camera traps?

County Durham Survey

A large-scale camera trapping project to study mammal distribution, abundance and behaviour across County Durham. For this project, camera traps were placed in a systematic grid of 109 sites over summer 2018.

Forest of Dean Photos

This project contains photos collected through a systematic grid of camera traps in the Forest of Dean in collaboration with the Gloucestershire Wildlife Trust.

20+ partner projects
international partners
<table>
<thead>
<tr>
<th>Sequence</th>
<th>Species name</th>
<th>Age class</th>
<th>Gender</th>
<th>Count</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>63123</td>
<td>Parus major</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>63124</td>
<td>Parus major</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>63130</td>
<td>Parus major</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>63133</td>
<td>Parus major</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>63134</td>
<td>Parus major</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>63055</td>
<td>Apodemus sylvaticus</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>63056</td>
<td>Apodemus sylvaticus</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>63057</td>
<td>Apodemus sylvaticus</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>63112</td>
<td>Apodemus sylvaticus</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>63113</td>
<td>Apodemus sylvaticus</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>63114</td>
<td>Apodemus sylvaticus</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>63115</td>
<td>Apodemus sylvaticus</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>63116</td>
<td>Apodemus sylvaticus</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>63065</td>
<td>Sciurus vulgaris</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td>Dark brown bushy tail, deep red coat, dark red or</td>
</tr>
<tr>
<td>63066</td>
<td>Sciurus vulgaris</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td>1</td>
<td>Same individual as previous observation.</td>
</tr>
</tbody>
</table>
Ottinger, G. (2017) in The Political Economy of Science
Reconstructing or reproducing? Scientific authority and models of change in two traditions of citizen science
Fukushima nuclear disaster
5,000+ citizen scientists

100+ countries

170,000,000+ measurements!
Deepwater Horizon oil spill
In addition to this kit, you'll need a camera that can do continuous shooting and a soda or juice bottle.

Each kit includes:
- A 5.5 foot (170cm) reusable balloon made of a latex/chloroprene (neoprene) mix
- 1000 feet (305m) of 110lb test (55 kilo) Dacron line, pre-wound on an 8" hoop winder
- Leather gloves for handling the line.
- Three high-strength (270lb) swivel clips
- Two mini-carabiners for attaching the camera
- Twenty rubber bands for making a camera cradle
- Ten zip ties for closing the balloon
- One 1" ring for attaching the balloon to the line

Once assembled, this open source kit -- developed by community researchers from the Public Laboratory for Open Technology and Science -- enables you to collect your own aerial photos from up to 1000 ft. Use it to tell a different story from the "official" map!

http://publiclaboratory.org/tool/balloon-mapping
Bourj Al Shamali
refugee camp
LEBANON
ONE DAY THEY WOULD LIKE THE WIND TO OUR HOUSES...
UNESCO Recommendation on Open Science

ratified in November 2021
...dialogue with **other knowledge systems...** knowledge holders **beyond the traditional scientific community**

5. Building on the essential principles of academic freedom, research integrity and scientific excellence, open science sets a new paradigm that integrates into the scientific enterprise practices for reproducibility, transparency, sharing and collaboration resulting from the increased opening of scientific contents, tools and processes.

6. For the purpose of this Recommendation, **open science** is defined as an inclusive construct that combines various movements and practices aiming to make multilingual scientific knowledge openly available, accessible and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community. It comprises all scientific disciplines and aspects of scholarly practices, including basic and applied sciences, natural and social sciences and the humanities, and it builds on the following
citizen science as a methodology
citizen science as a collaboration
thank you!

by Dr Pen-Yuan Hsing of MammalWeb.org

@MammalWeb #CitizenScience
#IOS2022

penyuanhsing {at} posteo [dot] is
Community Engagement & Citizen Science

“We need to move beyond citizen science as a methodology towards a collaborative mindset with tangible mutual benefits. Diversity, equity and inclusion in early stages of the process can value and integrate multiple community knowledge cultures to achieve a sustainable impact aligned with societal needs.”