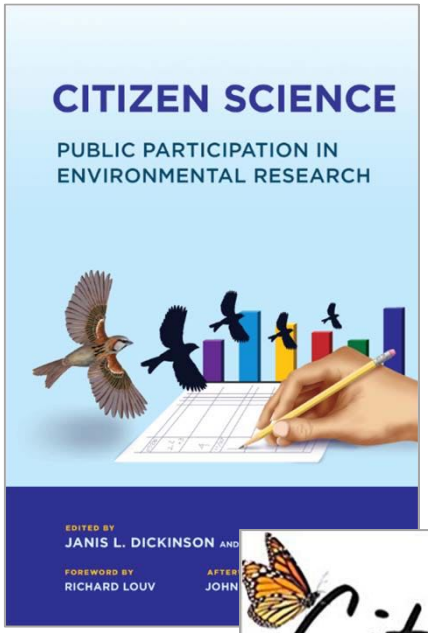
The Landscape of Citizen Observatories across the EU

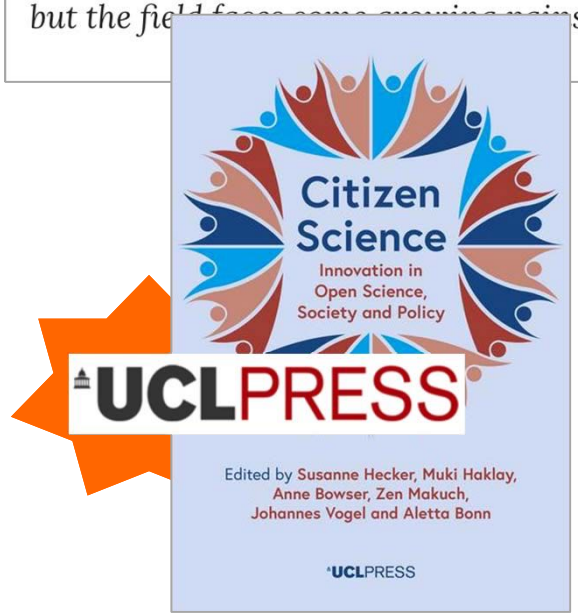
European Commission
Horizon 2020
European Union funding
for Research & Innovation

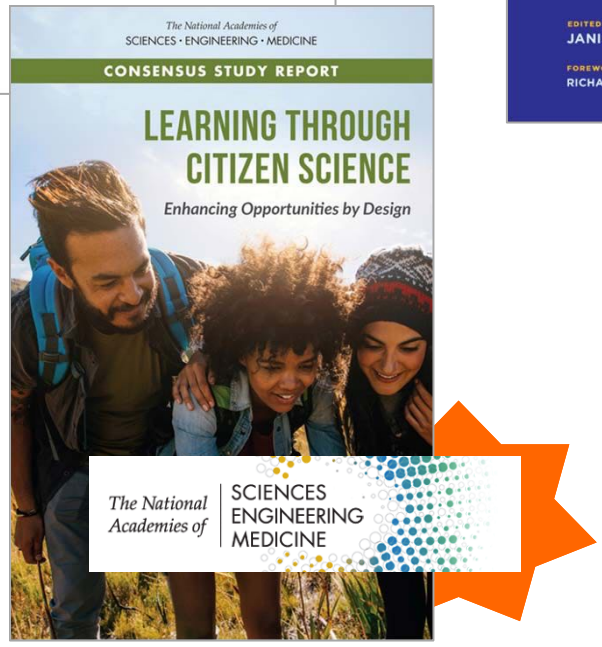
Margaret Gold, European Citizen Science Association (ECSA)

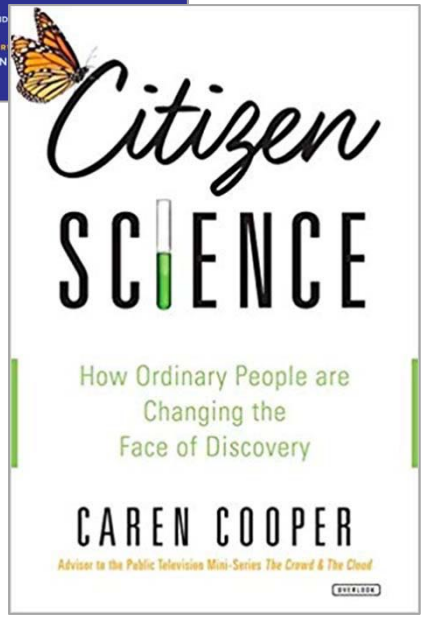
EUROPEAN
CITIZEN SCIENCE
ASSOCIATION


nature > news feature > article
a natureresea
nature
International journal of science
NEWS FEATURE · 23 OCTOBER 2018
No PhDs needed: how citizen science is transforming research
Projects that recruit the public are getting more ambitious and diverse, but the fie
s.

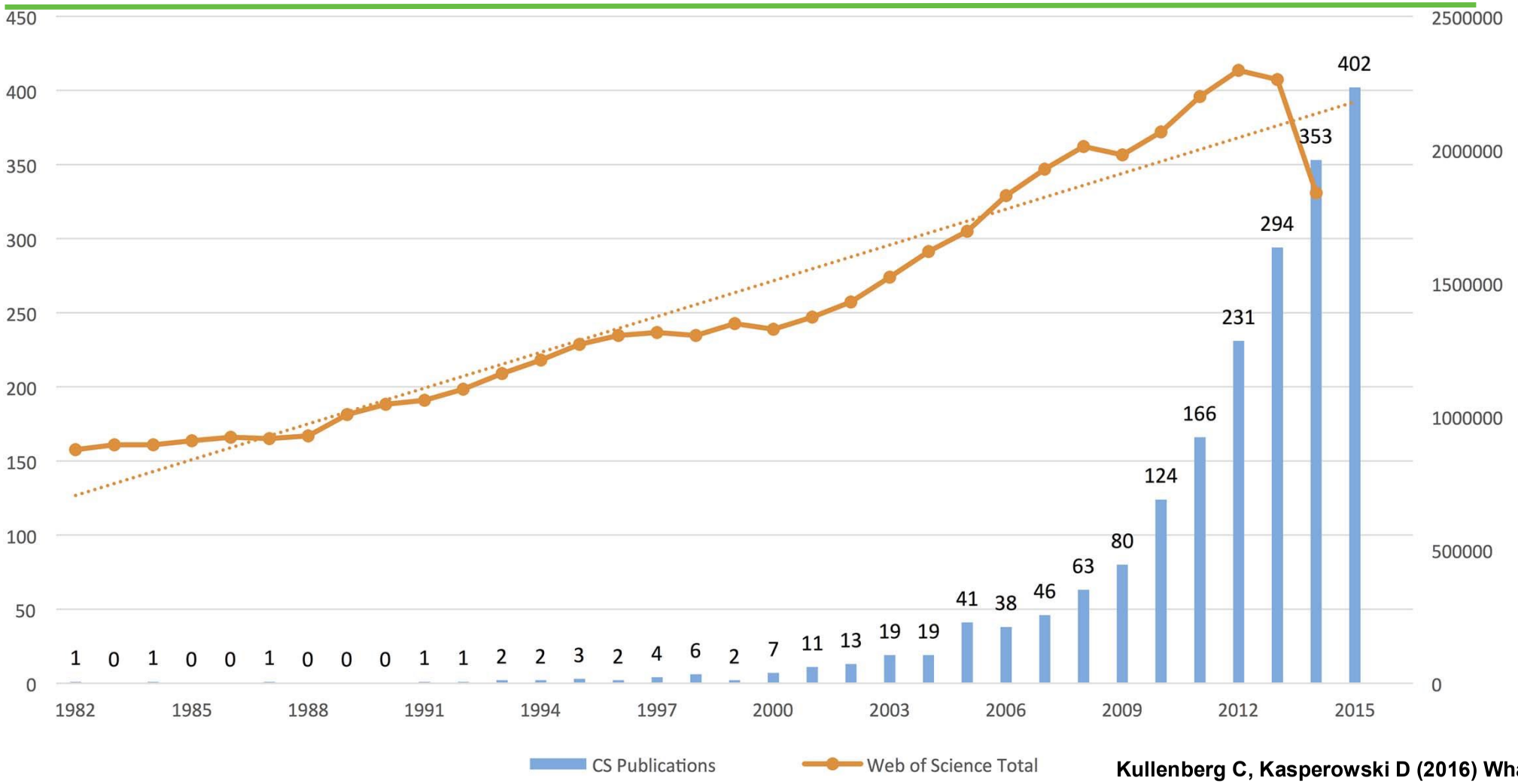

CITIZEN SCIENCE
PUBLIC PARTICIPATION IN ENVIRONMENTAL RESEARCH
EDITED BY
JANIS L. DICKINSON AND
FOREWORD BY
RICHARD LOUV


Citizen Science
Innovation in Open Science, Society and Policy
UCLPRESS
Edited by Susanne Hecker, Muki Haklay, Anne Bowser, Zen Makuch, Johannes Vogel and Aletta Bonn
UCLPRESS


The National Academies of
SCIENCES · ENGINEERING · MEDICINE
CONSENSUS STUDY REPORT
LEARNING THROUGH CITIZEN SCIENCE
Enhancing Opportunities by Design
The National Academies of
SCIENCES
ENGINEERING
MEDICINE


Citizen
SCIENCE
How Ordinary People are Changing the Face of Discovery
CAREN COOPER
Advisor to the Public Television Mini-Series The Crowd & The Cloud

Growth of Citizen Science publications in absolute numbers compared to Web of Science total



Kullenberg C, Kasperowski D (2016) What Is Citizen Science? – A Scientometric Meta-

Professionalisation of Citizen Science

CITIZEN SCIENCE | GLOBAL PARTNERSHIP

CITIZEN SCIENCE ASSOCIATION

EUROPEAN CITIZEN SCIENCE ASSOCIATION

Australian Citizen Science Association

CitizenScience.Asia

Citizen Science Platforms & Knowledge Exchange

Bürger schaffen Wissen
Die Citizen Science Plattform

Österreich forscht
www.citizen-science.at

SCHWEIZ FORSCHT

ATLAS OF LIVING AUSTRALIA
sharing biodiversity knowledge

scistarter

ZOONIVERSE
REAL SCIENCE ONLINE

Biological Conservation
Volume 181, January 2015, Pages 236-244

Global change and local solutions: Tapping the unrealized potential of citizen science for biodiversity research

Within projects sampled (n = 388), **~1.3 million volunteers** participate, contributing up to **$2.5 billion in-kind** annually.

Journal of Environmental Monitoring
Cite this: *J. Environ. Monit.*, 2011, **13**, 2687
www.rsc.org/jem

PERSPECTIVE

The role of 'Big Society' in monitoring the state of the natural environment

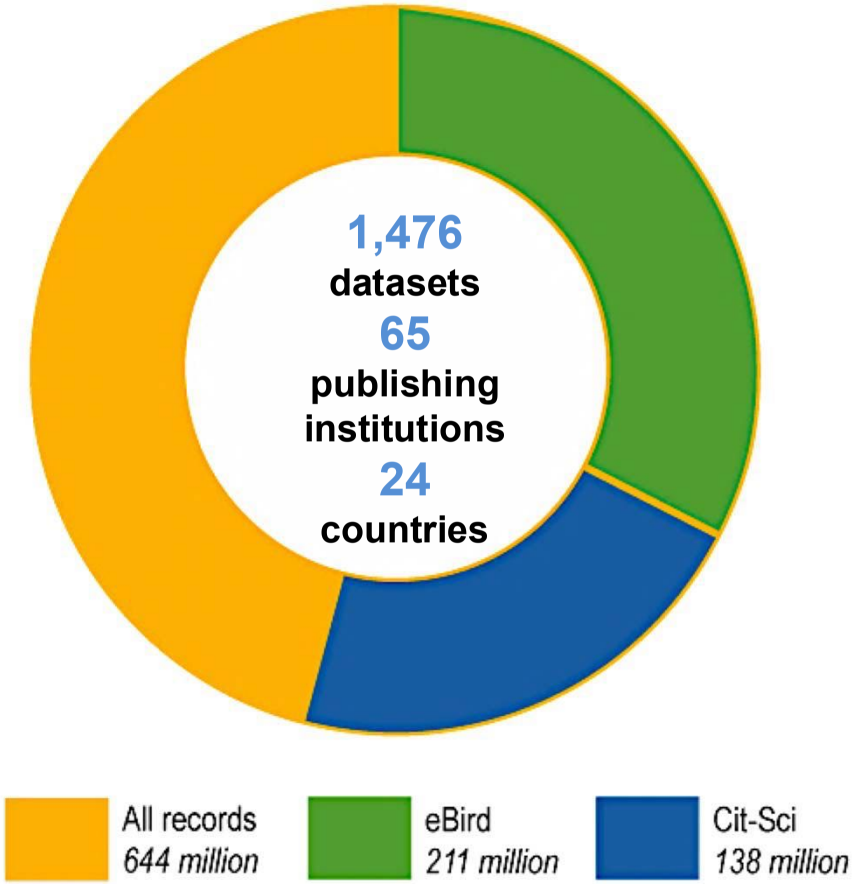
Colin Mackechnie,*[a] Lindsay Maskell,[b] Lisa Norton[b] and David Roy[c]

Terrestrial biodiversity surveillance in UK involved **> 30 different organizations**, to which volunteer contributions had an estimated value of **£20 million**, for a government investment of £7 million.

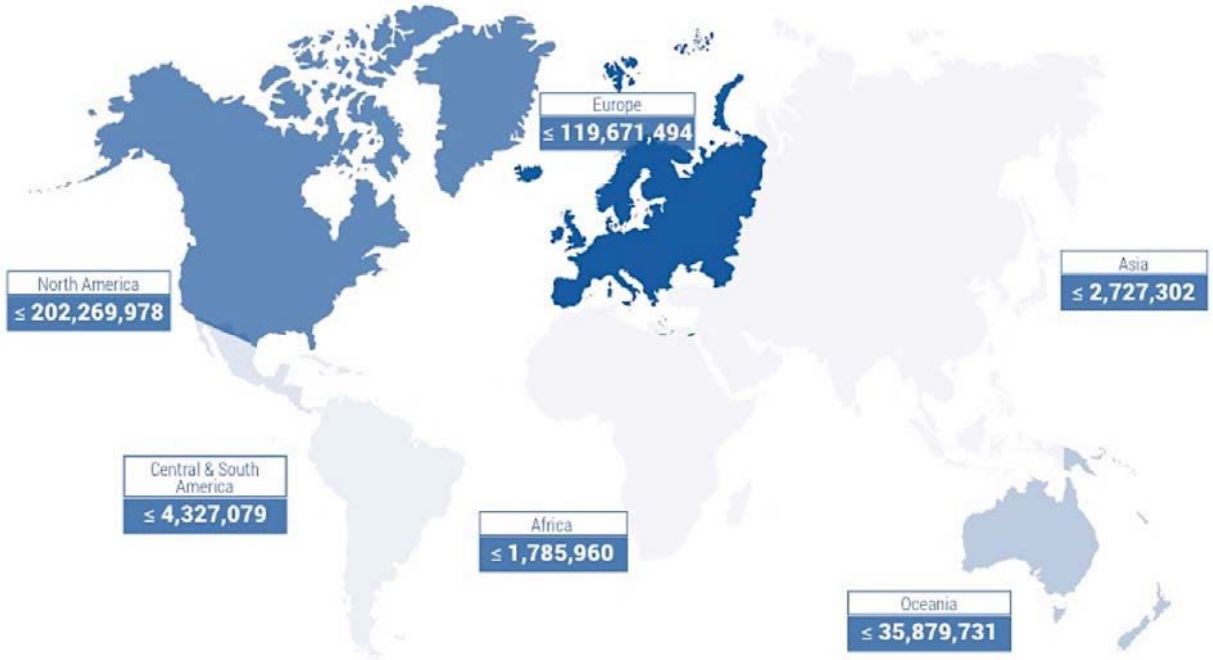
Theobald, E., Ettinger, A., Burgess, H., DeBey, L., Schmidt, N., & Froehlich, H. et al. (2015). Global change and local solutions: Tapping the unrealized potential of citizen science for biodiversity research. Biological Conservation, 181, 236-244. doi:10.1016/j.biocon.2014.10.021

Mackechnie C., Maskell L., Norton L. & Roy D. (2011) The role of "Big Society" in monitoring the state of the natural environment. Journal of Environmental Monitoring, 13, 2687–2691

Citizen science contributions to the GBIF global index

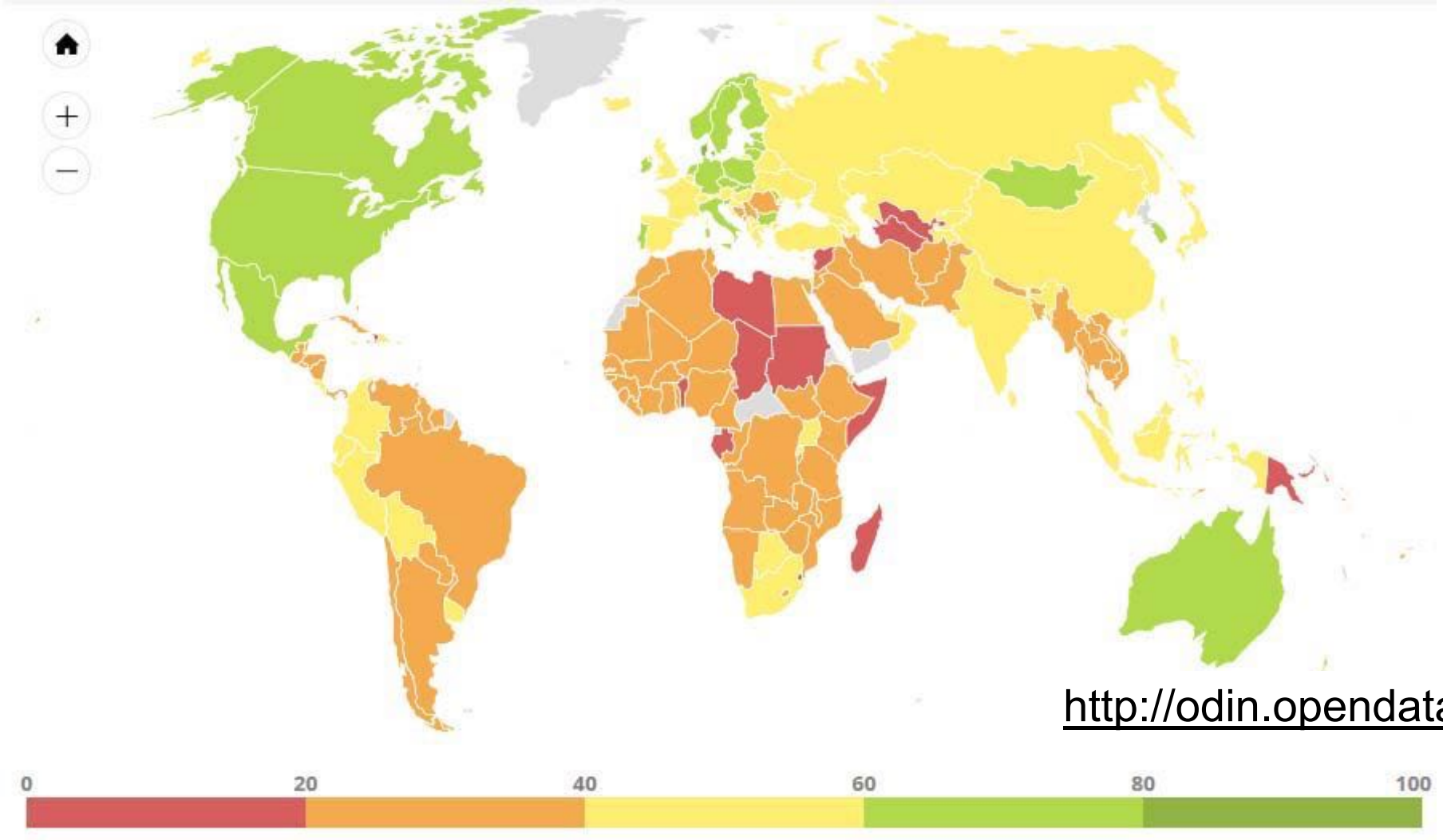


Analysis as of 1 March 2016



Mark Chandler, Linda See, Kyle Copas, Astrid M.Z. Bonde, Bernat Claramunt, Finn Danielsen, Jan Kristoffer Legind, Siro Masinde, Abraham J. Miller-Rushing, Greg Newman, Alyssa Rosemartin & Eren Turak (2016) Contribution of citizen science towards international biodiversity monitoring. Biological Conservation
doi:10.1016/j.biocon.2016.09.004

Open Data Watch – Open Data Inventory 2017



http://odin.opendatawatch.com/

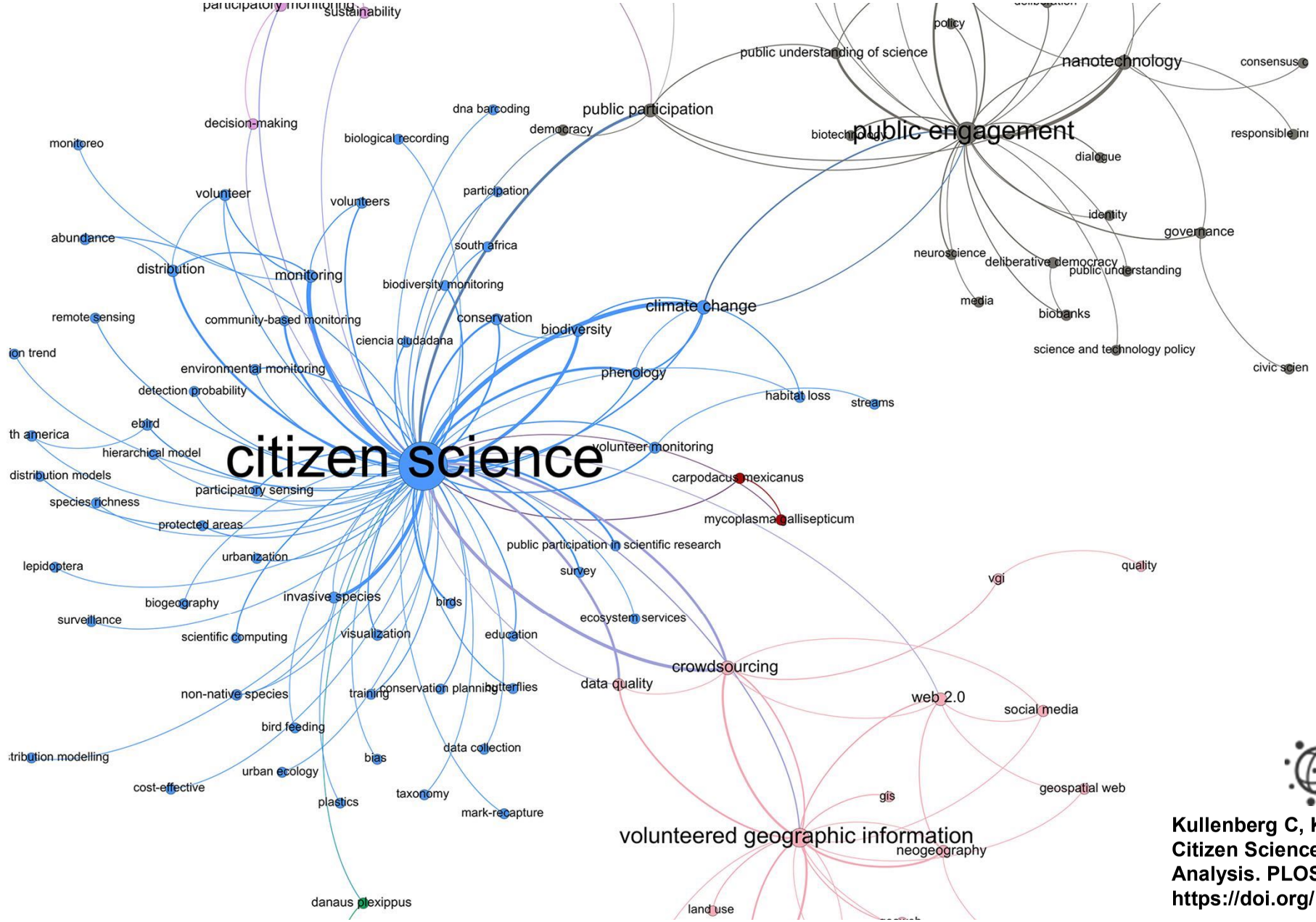
JAN 2018

DIGITAL AROUND THE WORLD IN 2018

KEY STATISTICAL INDICATORS FOR THE WORLD'S INTERNET, MOBILE, AND SOCIAL MEDIA USERS

TOTAL POPULATION	INTERNET USERS	ACTIVE SOCIAL MEDIA USERS	UNIQUE MOBILE USERS	ACTIVE MOBILE SOCIAL USERS
				
7.593 BILLION	**4.021 BILLION**	**3.196 BILLION**	**5.135 BILLION**	**2.958 BILLION**
URBANISATION: **55%**	PENETRATION: **53%**	PENETRATION: **42%**	PENETRATION: **68%**	PENETRATION: **39%**

SOURCES: POPULATION: UNITED NATIONS; U.S. CENSUS BUREAU; INTERNET: INTERNETWORLDSTATS; ITU; EUROSTAT; INTERNETLIVESTATS; CIA WORLD FACTBOOK; MIDEASTMEDIA.ORG; FACEBOOK; GOVERNMENT OFFICIALS; REGULATORY AUTHORITIES; REPUTABLE MEDIA; SOCIAL MEDIA AND MOBILE SOCIAL MEDIA: FACEBOOK; TENCENT; VKONTAKTE; KAKAO; NAVER; DING; TECHRASA; SIMILARWEB; KEPIOS ANALYSIS; MOBILE: GSMA INTELLIGENCE; GOOGLE; ERICSSON; KEPIOS ANALYSIS. **NOTE:** PENETRATION FIGURES ARE FOR TOTAL POPULATION (ALL AGES).



PLOS ONE

Kullenberg C, Kasperowski D (2016) What Is Citizen Science? – A Scientometric Meta-Analysis. PLOS ONE 11(1): e0147152. https://doi.org/10.1371/journal.pone.0147152

Citizen Science

community-based monitoring

volunteer based monitoring

participatory monitoring

volunteer monitoring

participatory sensing

participatory science

public engagement

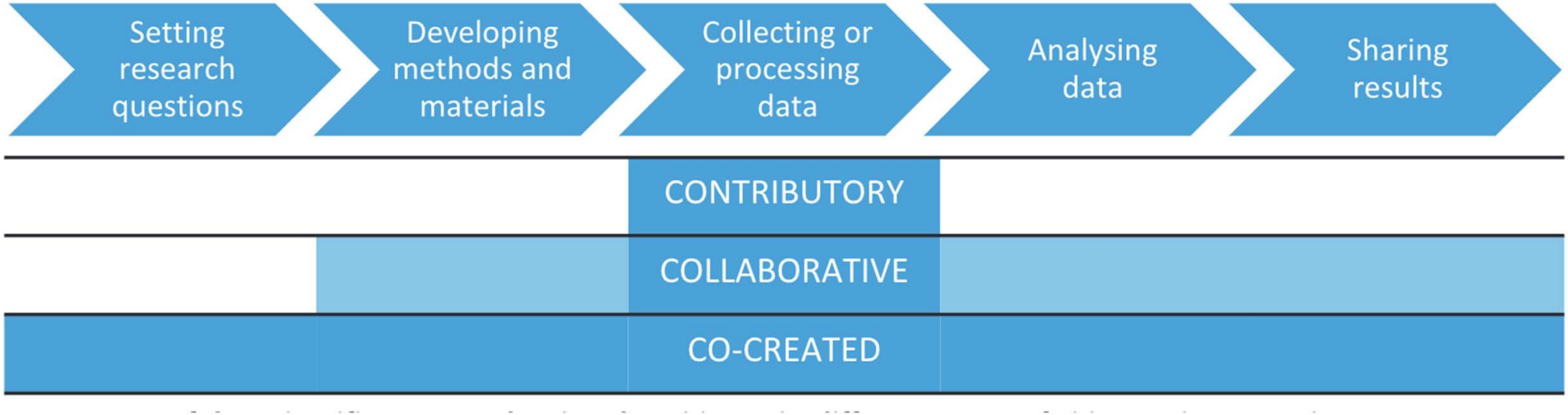
popular epidemiology

Do It Yourself Science

crowd science

public participation in scientific research

Stages of the scientific process that involve citizens in different types of citizen science projects



SOURCE: Bonney, R., Cooper, C. B., Dickinson, J., Kelling, S., Phillips, T., Rosenberg, K. V. and Shirk, J. (2009). Citizen science: A developing tool for expanding science knowledge and scientific literacy. BioScience, 59(11). 977–84.
DOI:10.1525/bio.2009.59.11.9

AS ILLUSTRATED IN: Sarah West and Rachel Pateman (2017). How could citizen science support the Sustainable Development Goals? Policy brief. Stockholm Environment Institute.

Citizen Observatories

"Community-based environmental monitoring and information systems that build on innovative and novel Earth observation applications" (EU)

WeObserve

An Ecosystem of Citizen Observatories for Environmental Monitoring

VISION

Citizen Observatories are an integral component of managing environmental challenges and empowering resilient communities

MISSION

Move Citizen Science into the mainstream by building a sustainable ecosystem of Citizen Observatories and related activities

IIASA · UNESCO · IHE DELFT · University of Dundee · CREAF · ΕΠΙΣΕΥ ICCS · Autorità di Bacino dei fiumi Isonzo, Tagliamento, Livenza, Piave, Brenta-Bacchiglione · European Citizen Science Association

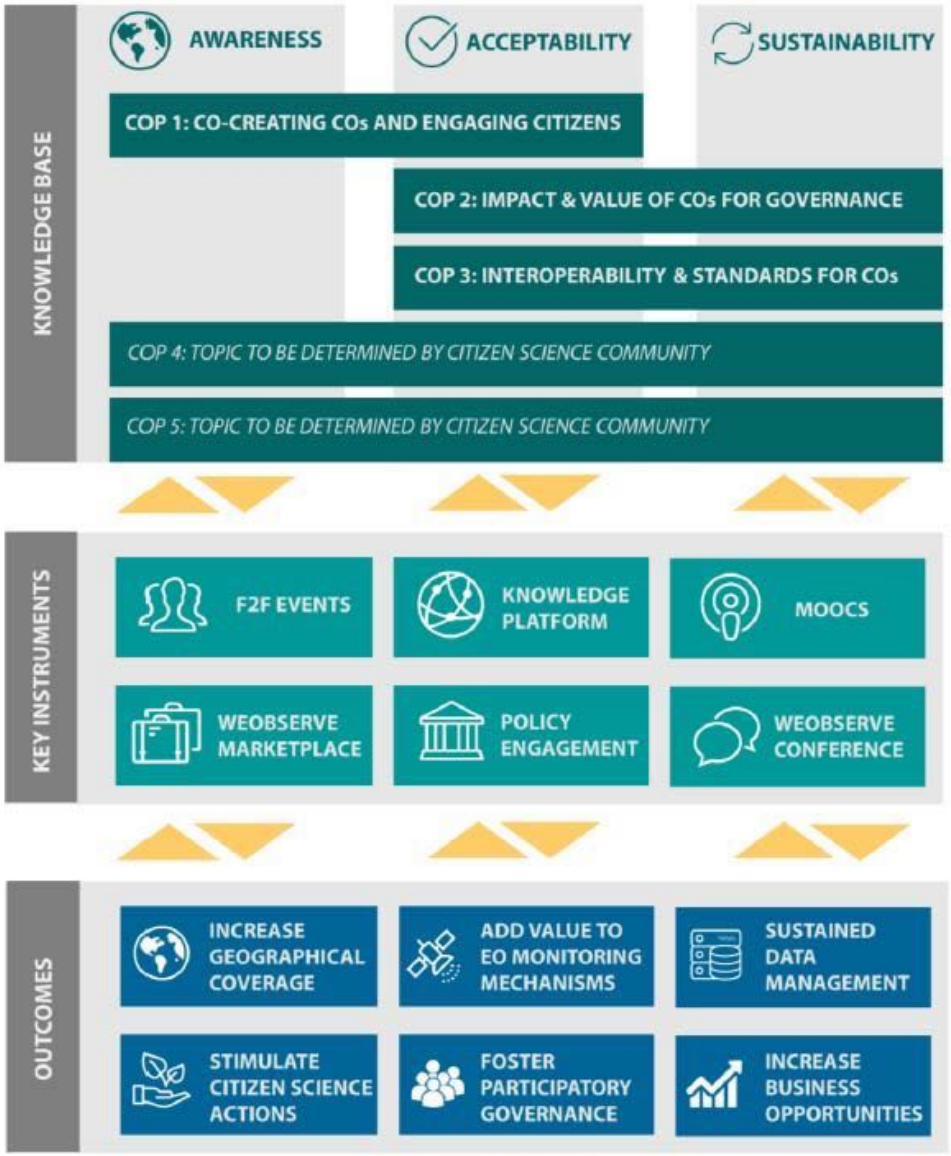


Figure 1: WeObserve Concept

Global Citizen Observatory

The Role of Individuals in Observing and Understanding our Changing World

"it is no longer sufficient to develop passive lists or reports to 'inform' citizens of changes in our environment. We need to engage with citizens and ask how they can 'inform' us."

Prof. Jacqueline McGlade's 2009 Earthwatch Lecture

WeObserve Communities of Practice (CoPs)

JOIN the WeObserve Communities of Practice

https://tinyurl.com/WOCoPs

WeObserve Communities of Practice (CoPs)

- CoP 1 : Co-creating citizen observatories and engaging citizens
- CoP 2 : Impact and value of citizen observatories for governance
- CoP 3 : Interoperability and standards for citizen observatories
- **CoP 4 : UN Sustainable Development Goals and Citizen Observatories**

The COWM Conference in Venice / November 2018 / https://www.cowm.eu/

Citizen Science & the Sustainable Development Goals

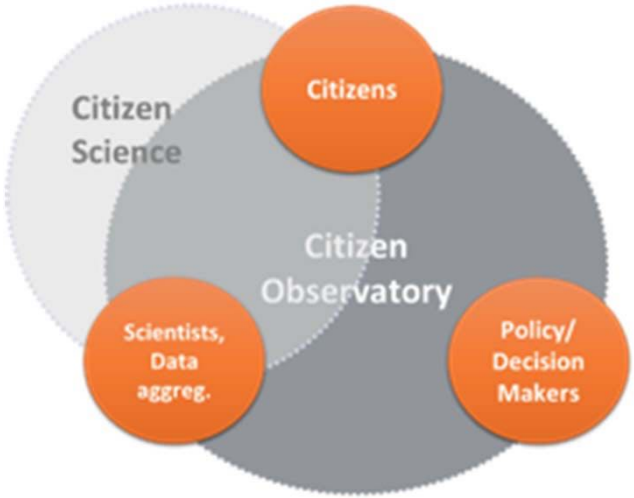
Help leverage the SDG efforts with the application of new methodologies to enhance the quality of such data.*

Support SDG implementation through transformative practices - attitude and behaviour change.

* UN. (2017). The Sustainable Development Goals Report 2017. New York: UN. Retrieved from https://unstats.un.org/sdgs/files/report/2017/TheSustainableDevelopmentGoalsReport2017.pdf

CS is a subset of COs

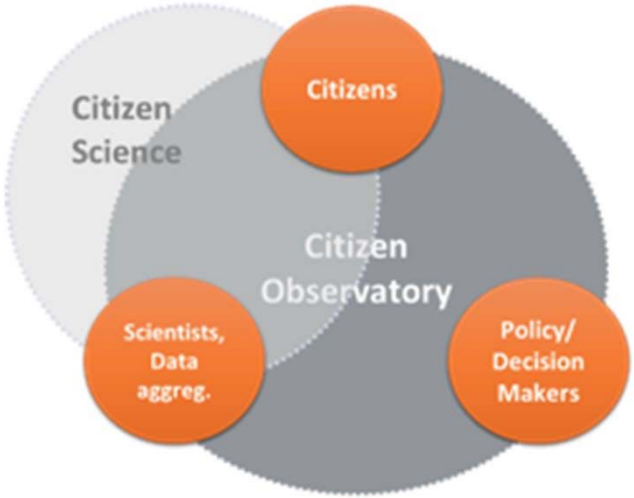
CS is a subset of COs and beyond



COs are a subset of CS

CS is a subset of COs

CS is a subset of COs and beyond



COs are a subset of CS

WeSenseIT

“a method, an environment and an infrastructur

2013

supporting an information ecosystem for communities and citizens, as well as emergency operators and policymakers, for discussion, monitoring and intervention on situations, places and events”

CITI-SENSE

2014

“the citizens’ own observations and understanding of environmentally related problems and in particular ... reporting and commenting on them within a dedicated ICT platform”

ALAN GRAINGER

2017

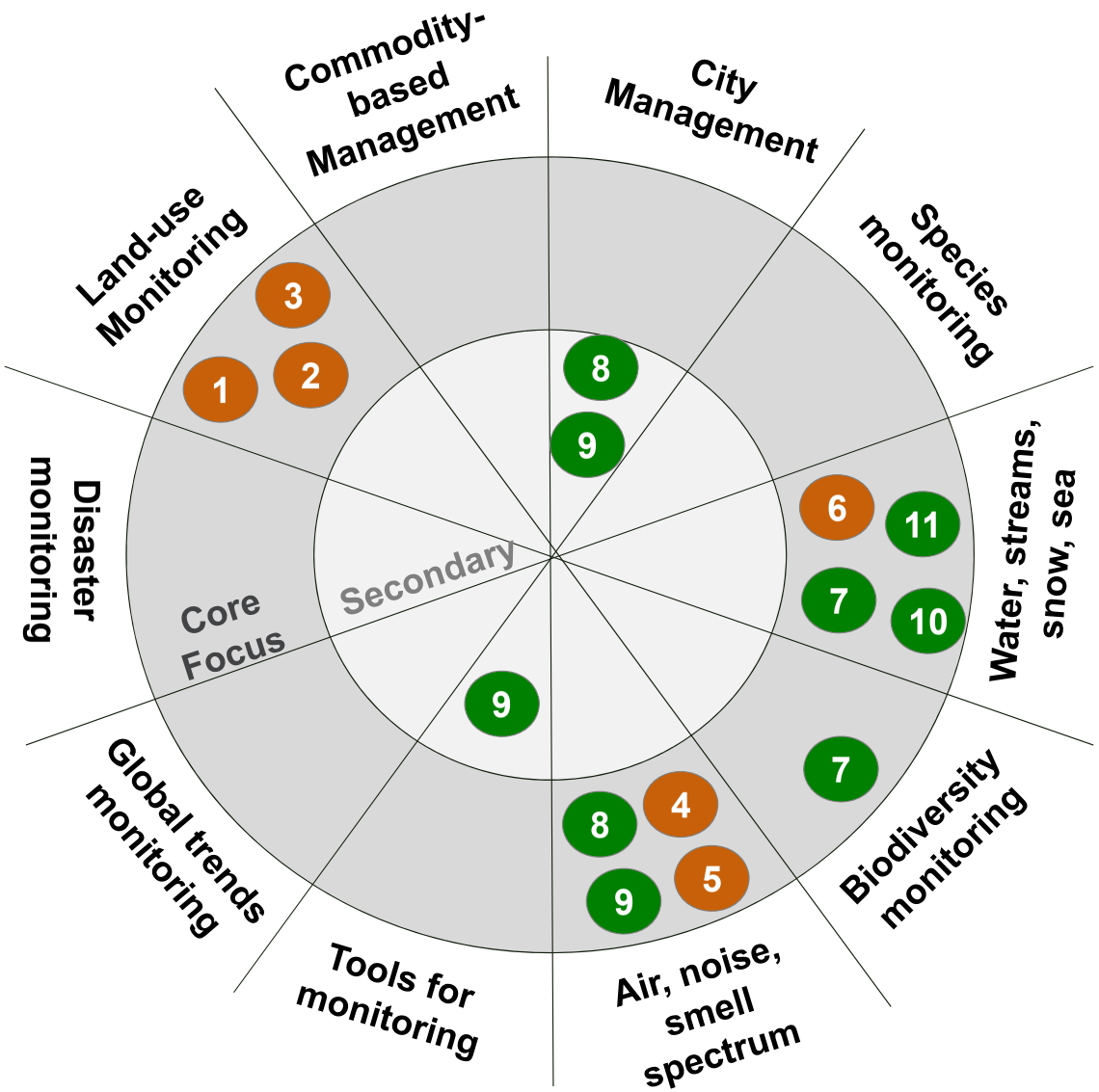
“any use of Earth observation technology in which citizens collect data and are empowered by the information generated from these data to participate in environmental management.”

COMMON ELEMENTS

- PARTICIPATION OF CITIZENS ‘IN-SITU’
- MOBILE + WEB TECHNOLOGIES
- ENVIRONMENTAL MONITORING
- BI-DIRECTIONAL DATA & INFO

EU funded Citizen Observatories (FP7 & H2020)

FP7 - funded COs	*Focus*	*Timeline*
COBWEB	Biosphere monitoring	2012 - 2016
OMNISCIENTIS	Odour monitoring	2012 - 2014
CITI-SENSE	Air pollution monitoring	2012 - 2016
WeSenseIt	Flood and drought monitoring	2012 - 2016
Citclops	Coastal and marine water quality monitoring	2012 - 2015
H2020 - funded COs		
Ground Truth 2.0	Flora and fauna, water availability and water quality, for land and natural resources management	2016 - 2019
GROW	Soil, land-use, crop planting, and water resources	2016 - 2019
LandSense	Land use and land cover	2016 - 2019
Scent	Water supply & quality, flood risks	2016 - 2019



Domains Represented

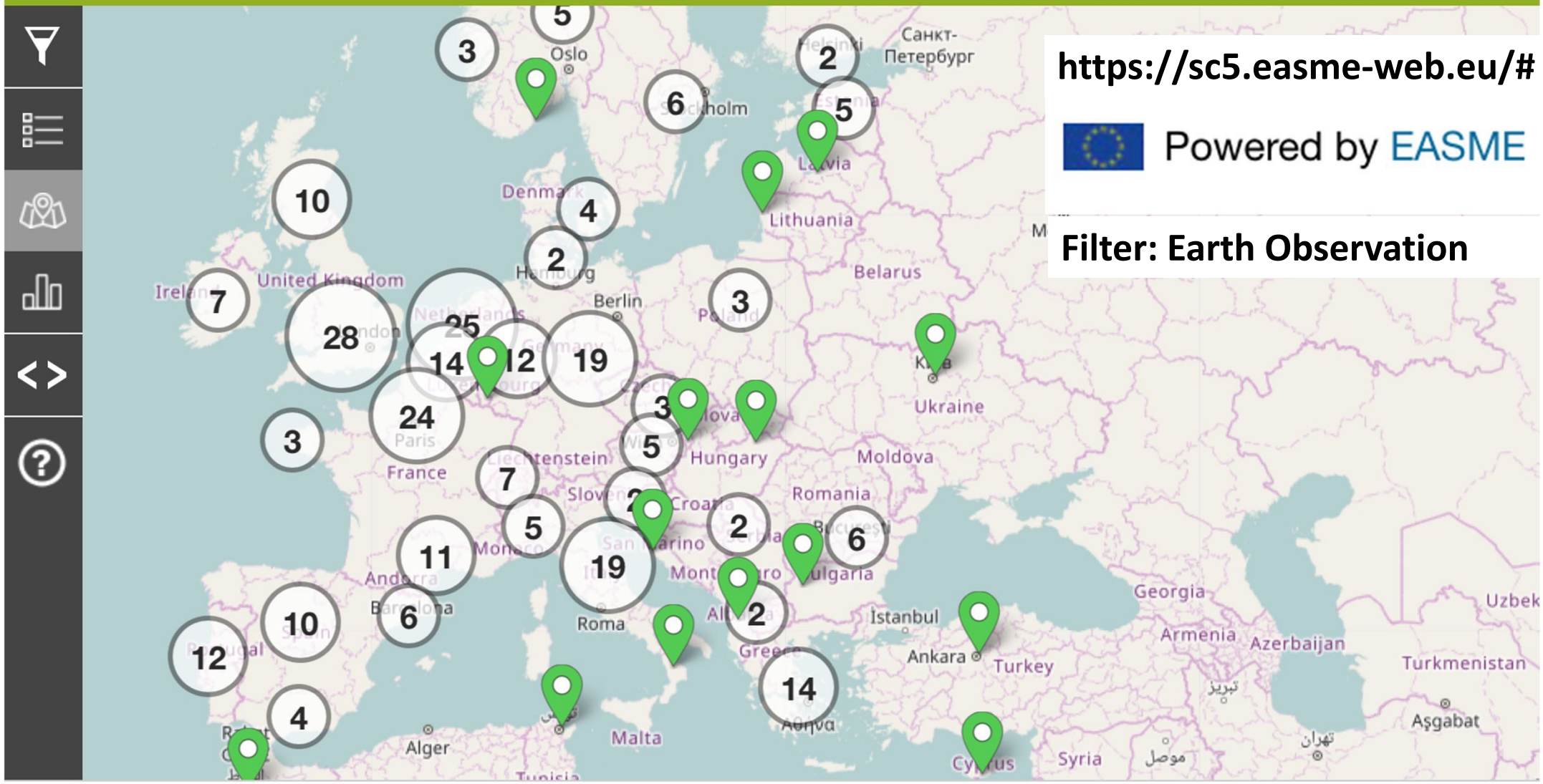
H2020 COs

1. Ground Truth 2.0
2. GROW
3. LandSense
4. Scent
5. D-Noses
6. Monocle

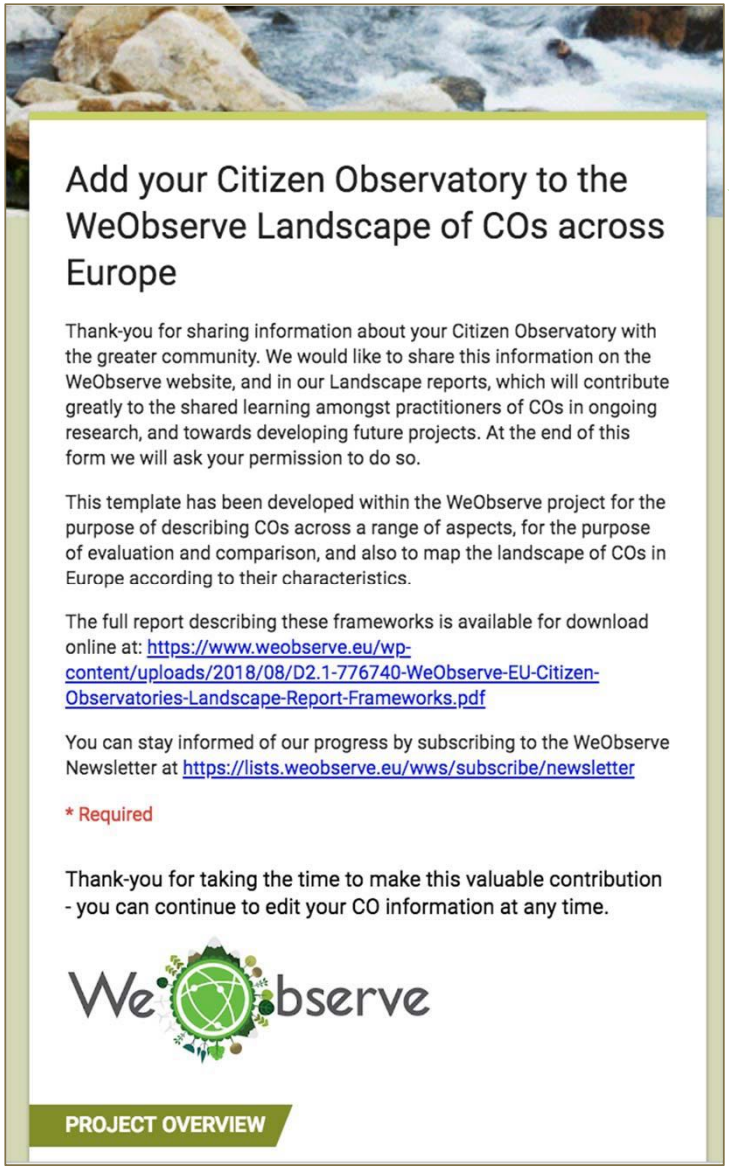
FP7 COs

7. COBWEB
8. Ominscientis
9. Citi-Sense
10. WeSenseIt
11. Citiclops

Horizon 2020 Environment and resources data hub



Add YOUR Citizen Observatory



Add your Citizen Observatory to the WeObserve Landscape of COs across Europe

Thank-you for sharing information about your Citizen Observatory with the greater community. We would like to share this information on the WeObserve website, and in our Landscape reports, which will contribute greatly to the shared learning amongst practitioners of COs in ongoing research, and towards developing future projects. At the end of this form we will ask your permission to do so.

This template has been developed within the WeObserve project for the purpose of describing COs across a range of aspects, for the purpose of evaluation and comparison, and also to map the landscape of COs in Europe according to their characteristics.

The full report describing these frameworks is available for download online at: https://www.weobserve.eu/wp-content/uploads/2018/08/D2.1-776740-WeObserve-EU-Citizen-Observatories-Landscape-Report-Frameworks.pdf

You can stay informed of our progress by subscribing to the WeObserve Newsletter at https://lists.weobserve.eu/wws/subscribe/newsletter

* Required

Thank-you for taking the time to make this valuable contribution - you can continue to edit your CO information at any time.

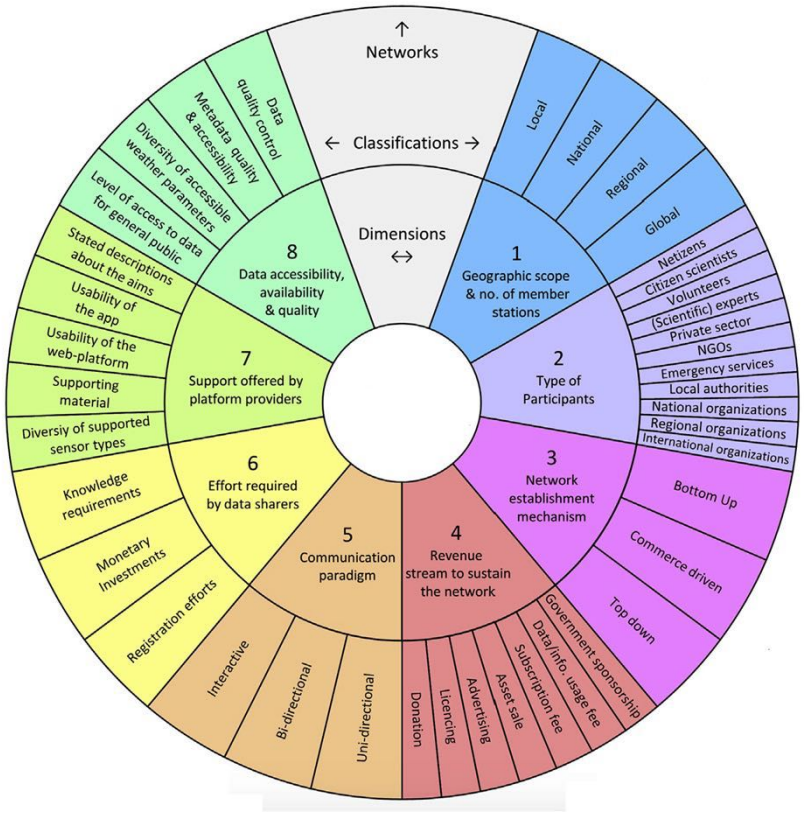
WeObserve

PROJECT OVERVIEW

We are now compiling project details on as wide a range of initiatives in Europe as possible. Please share project information with us via this online form.

https://tinyurl.com/COlandscape

Developing a Framework for Benchmarking COs across Europe



1. Geographic scope
2. Type of participants
3. Network establishment mechanism
4. Revenue stream
5. Communication Paradigm
6. Effort required
7. Platform support
8. Data accessibility, availability & quality

Gharesifard, Mohammad & Wehn, Uta & van der Zaag, Pieter. (2017). Towards benchmarking Citizen Observatories: Features and functioning of online amateur weather networks. Journal of Environmental Management. 193. 381-393. 10.1016/j.jenvman.2017.02.003.

Environmental Citizen Science & the UN SDGs

Inventory of Citizen Science activities for environment policies

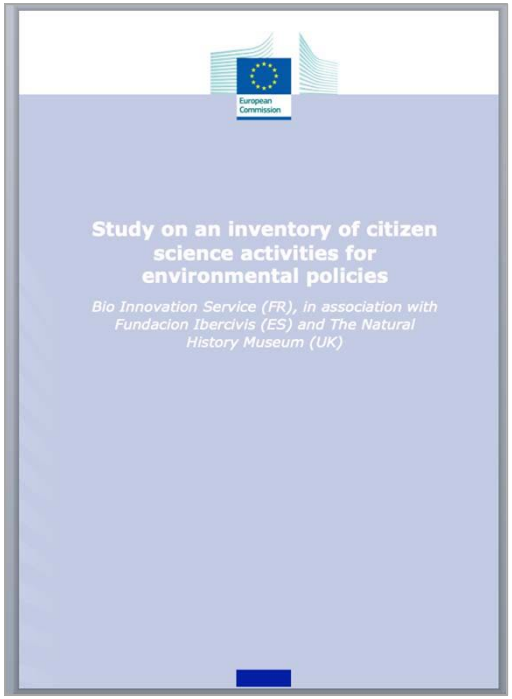
>500 projects examined, incl. first mapping to SGDs

Possible starting point for more detailed investigations

Results to be published for re-use in the coming weeks

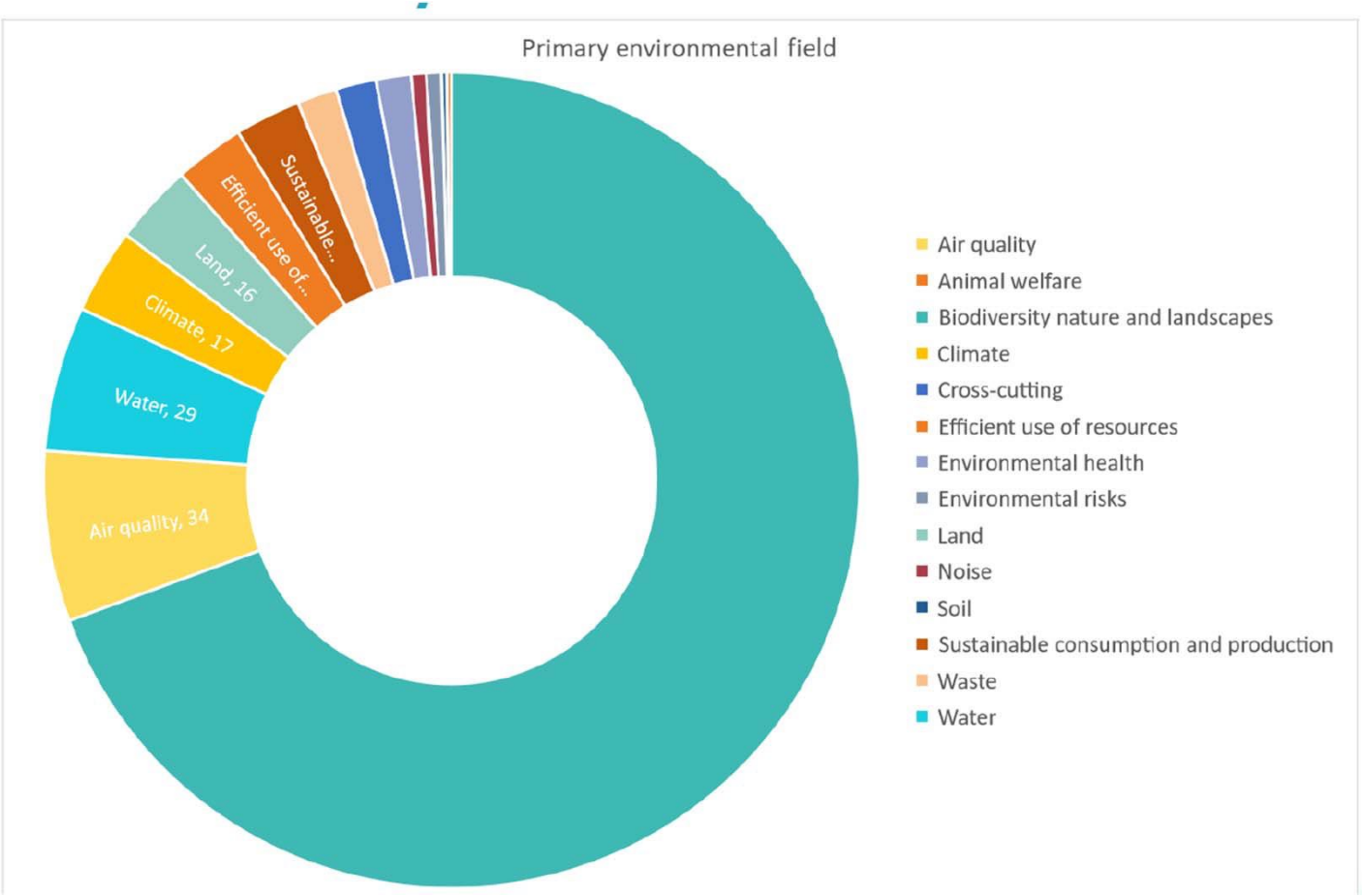
Attributes were carefully selected…

Study on an inventory of citizen science activities for environmental policies

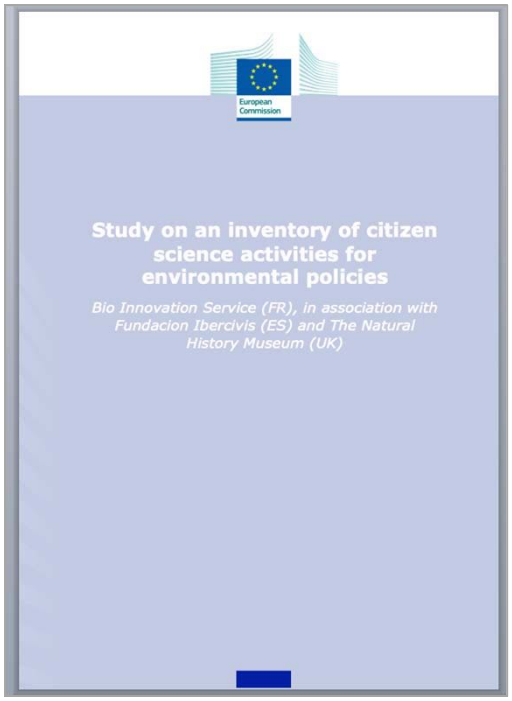


https://ec.europa.eu/easme/sites/easme-site/files/documents/sept_13.zip

Inventory – Fields Covered

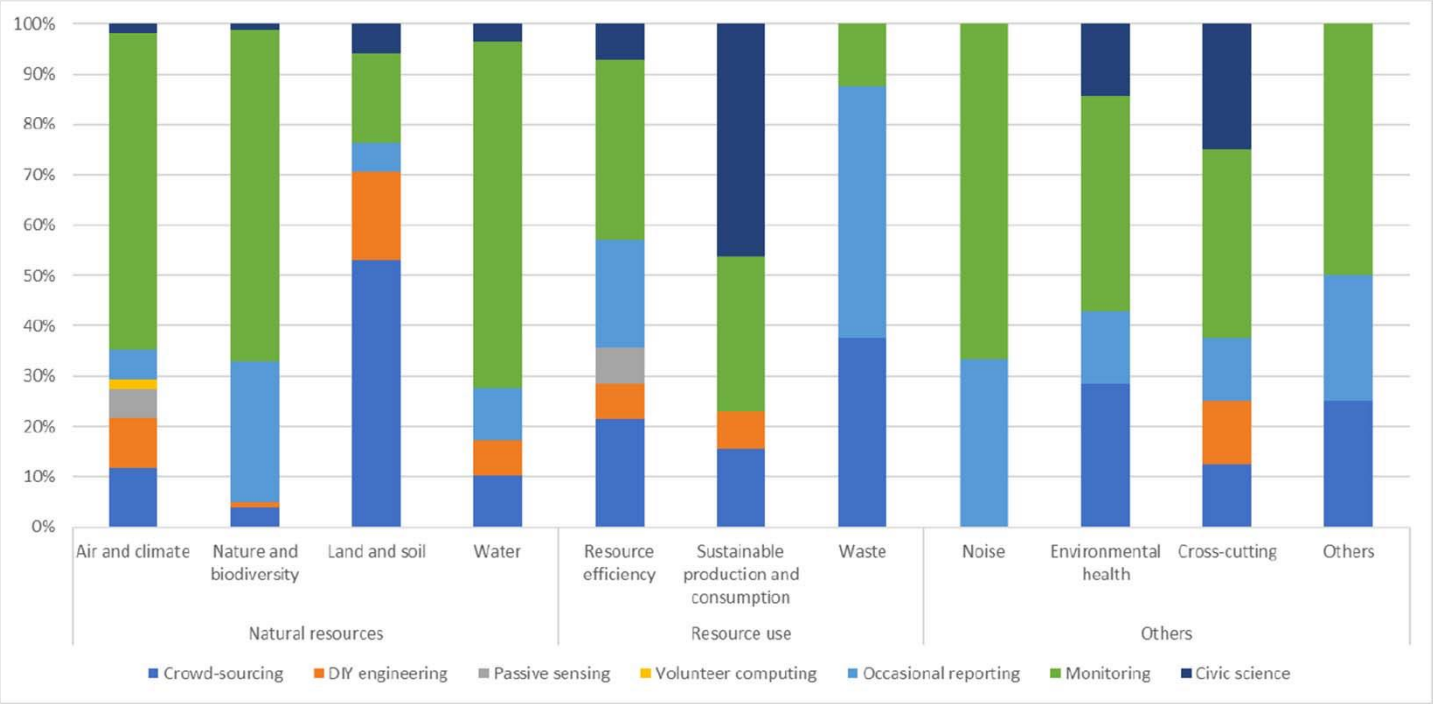


Study on an inventory of citizen science activities for environmental policies

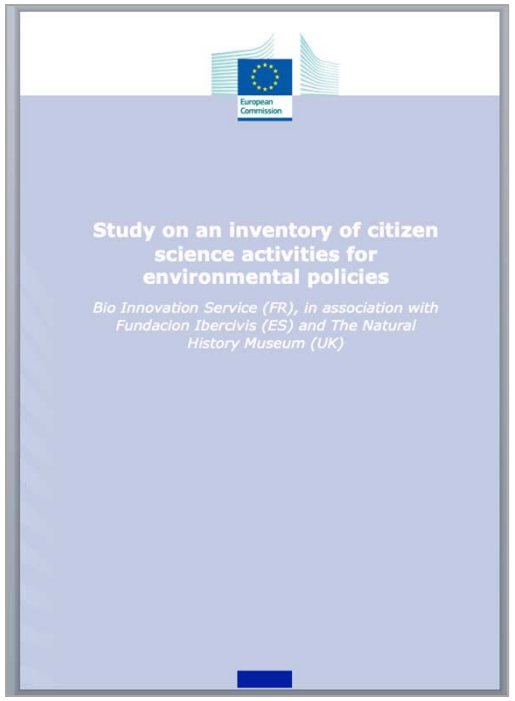


https://ec.europa.eu/easme/sites/easme-site/files/documents/sept_13.zip

Inventory – Type of Projects

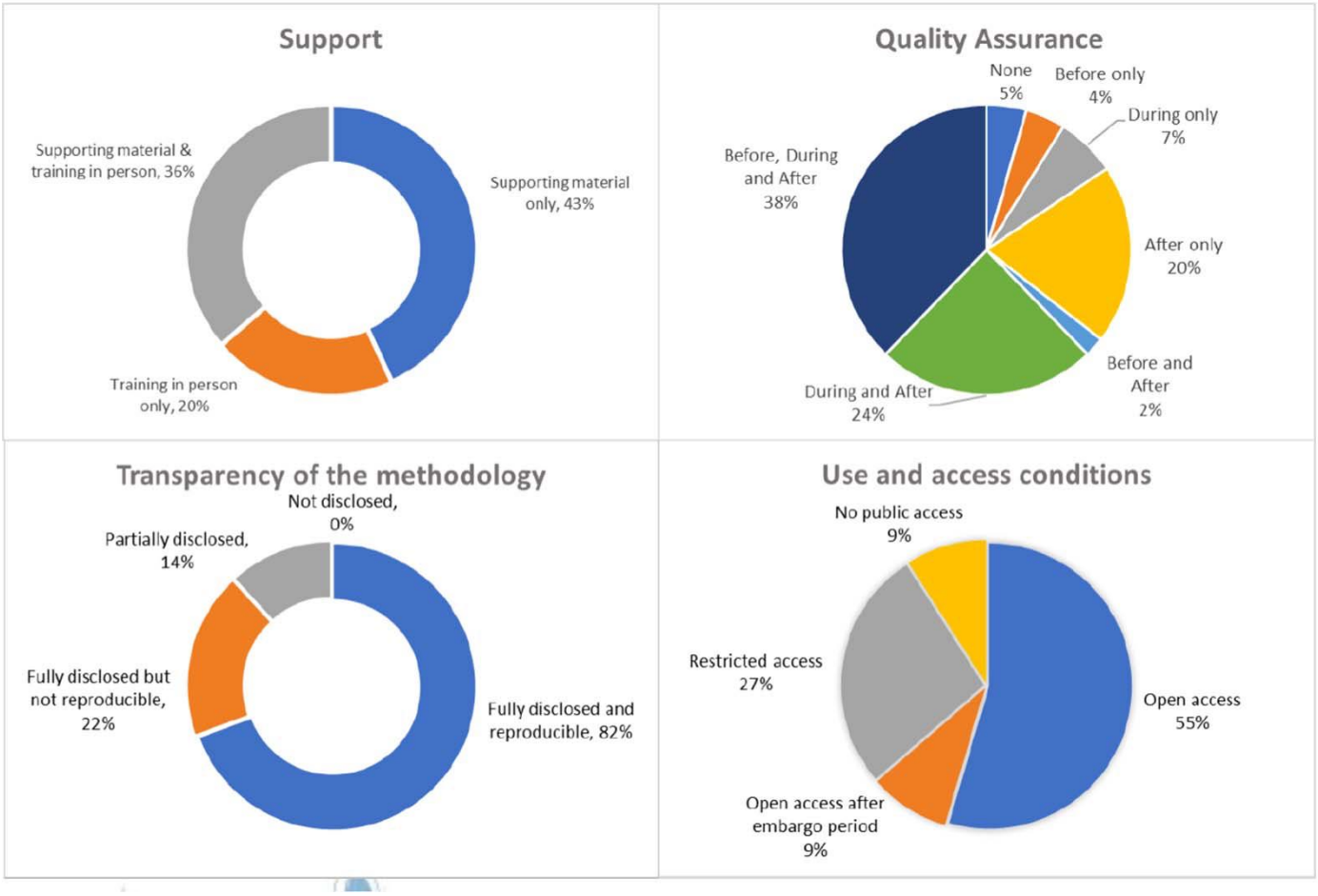


Study on an inventory of citizen science activities for environmental policies

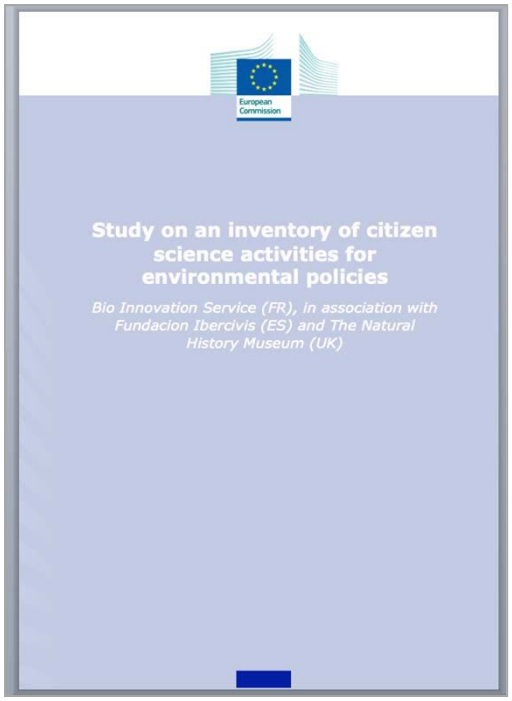


https://ec.europa.eu/easme/sites/easme-site/files/documents/sept_13.zip

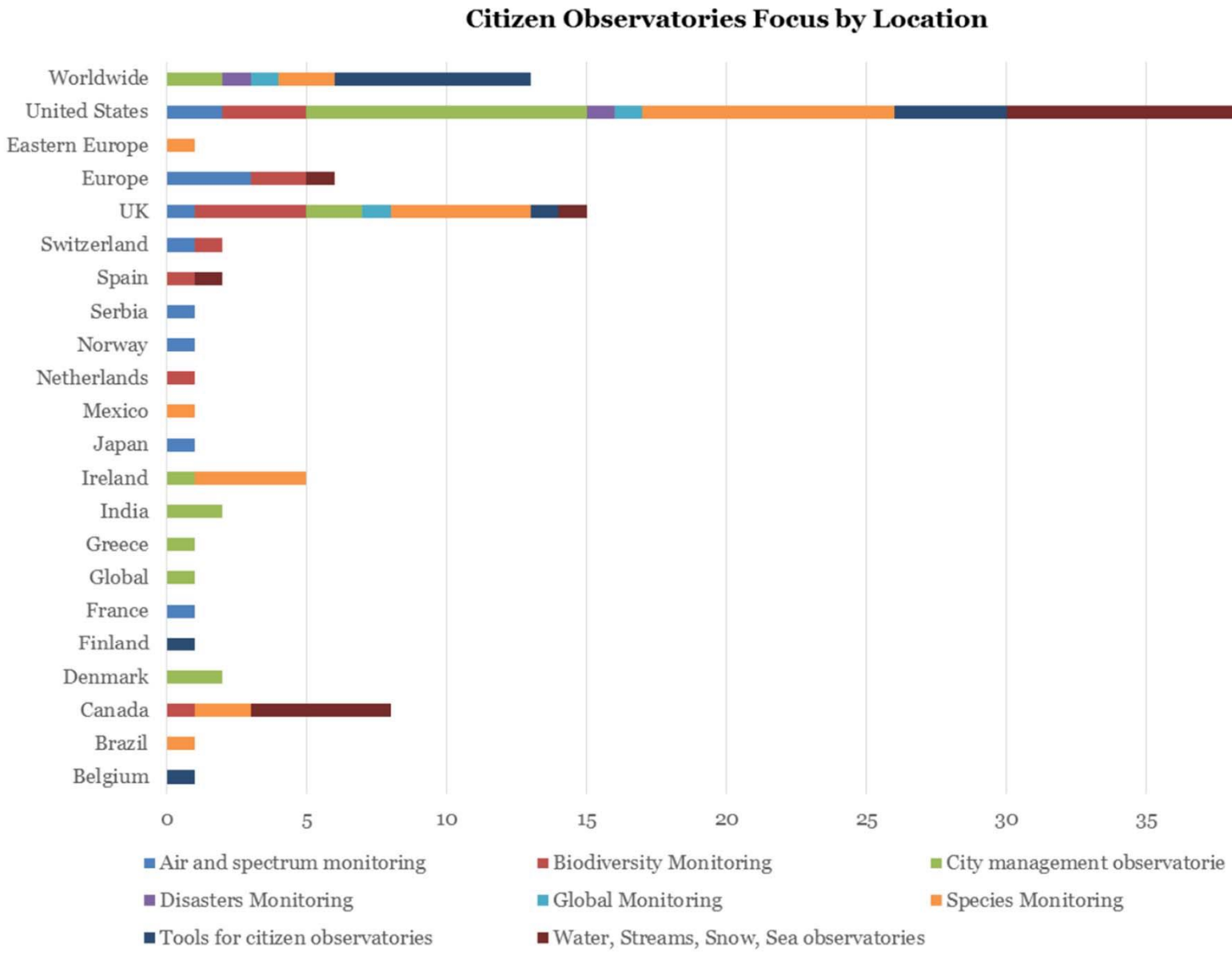
Analysis – Scientific Data Quality



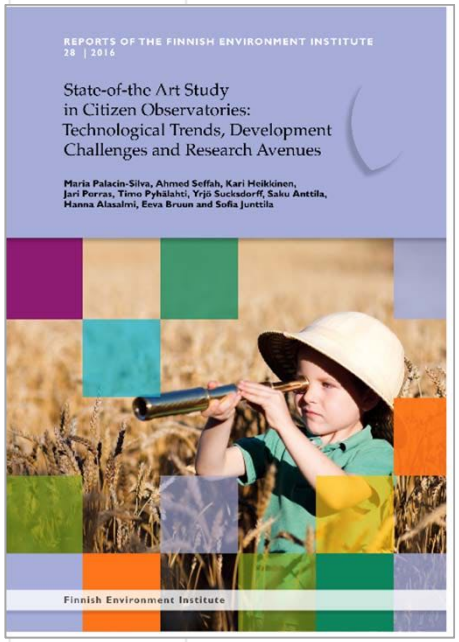
Study on an inventory of citizen science activities for environmental policies



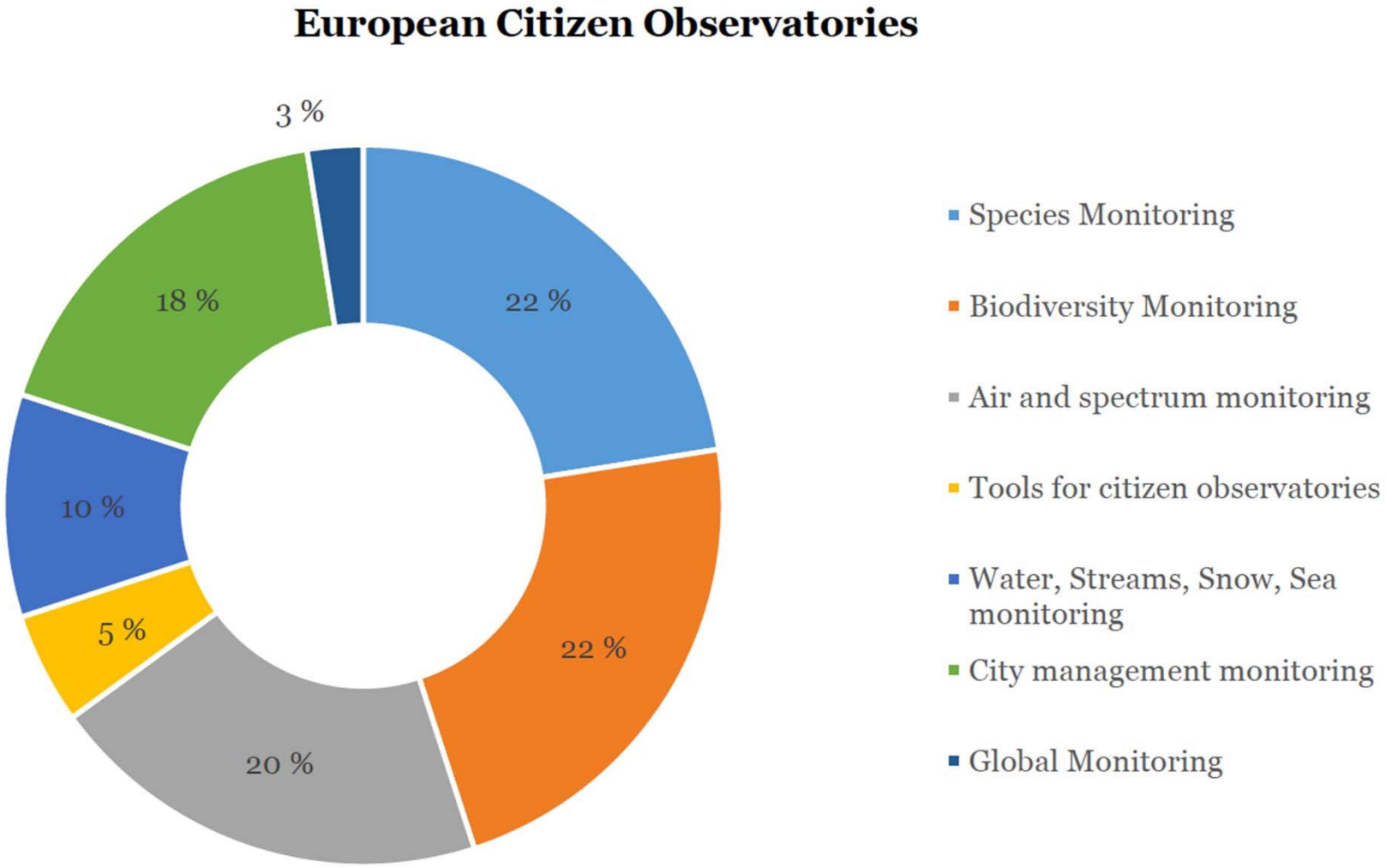
https://ec.europa.eu/easme/sites/easme-site/files/documents/sept_13.zip



State-of-the Art Study in Citizen Observatories



Palacin-Silva et al. State-of-the Art Study in Citizen Observatories: Technological Trends, Development Challenges and Research Avenues; Finnish Environment Institute: Helsinki, Finland, 2016



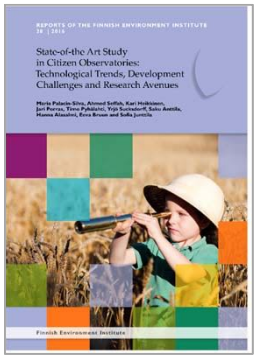


Figure 32: Citizen Observatories Focus Areas in Europe

Palacin-Silva et al. State-of-the Art Study in Citizen Observatories: Technological Trends, Development Challenges and Research Avenues; Finnish Environment Institute: Helsinki, Finland, 2016

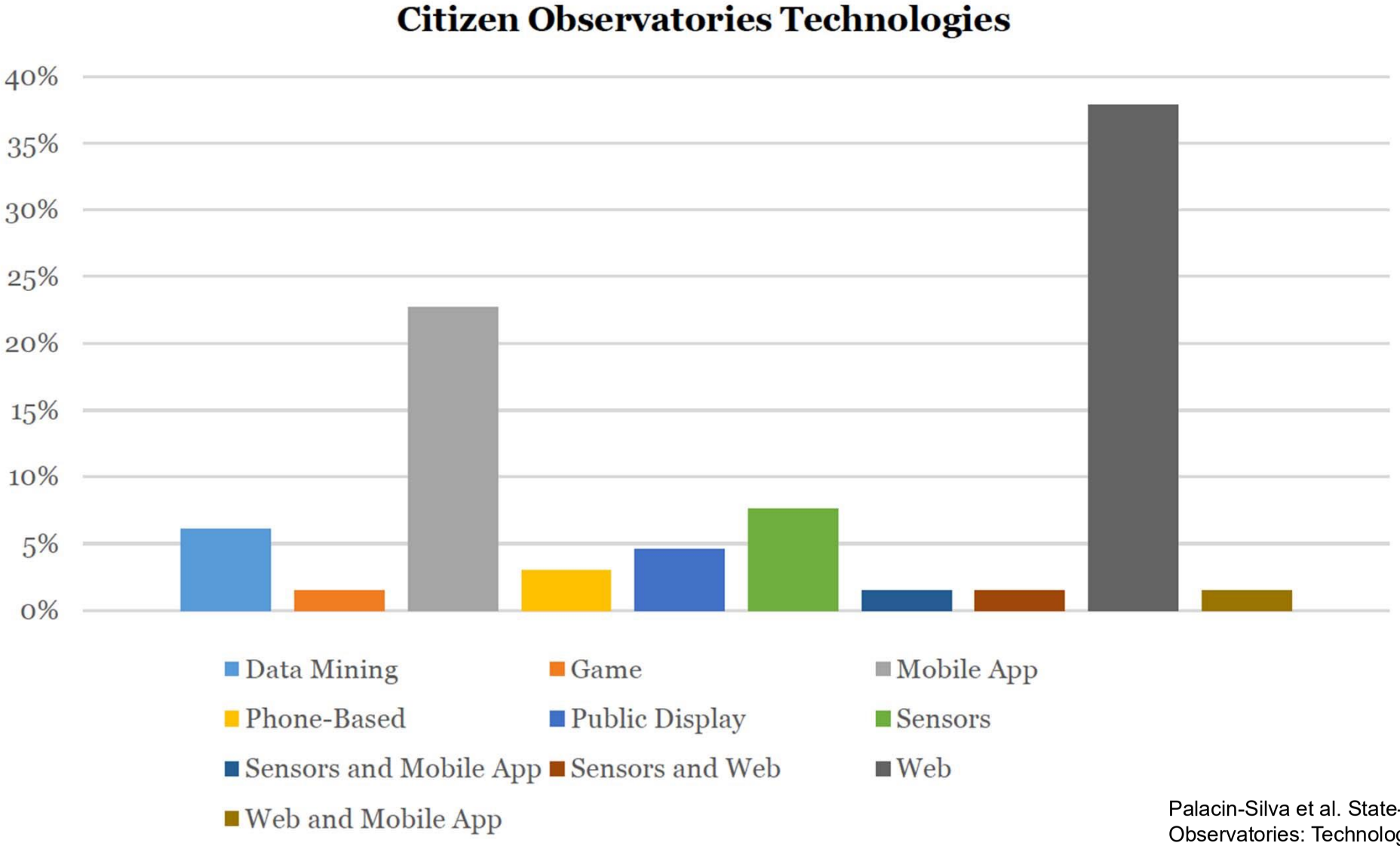
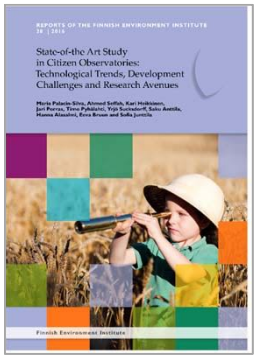


Figure 8: Citizen Observatories' by technology use



Palacin-Silva et al. State-of-the Art Study in Citizen Observatories: Technological Trends, Development Challenges and Research Avenues; Finnish Environment Institute: Helsinki, Finland, 2016

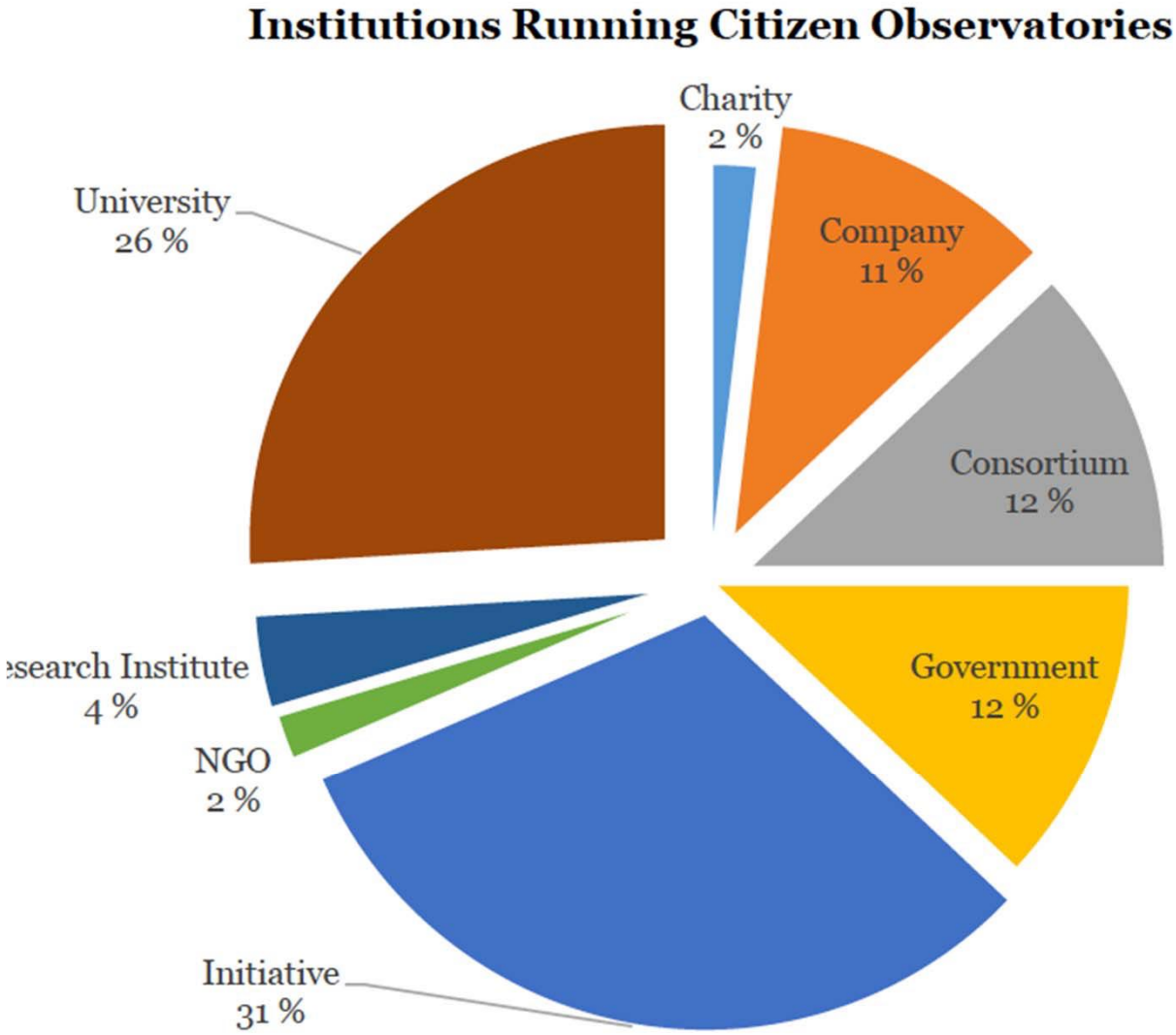
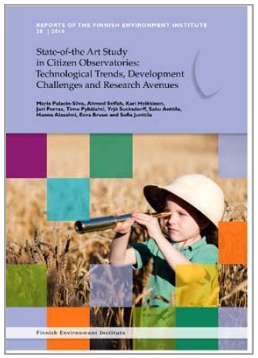
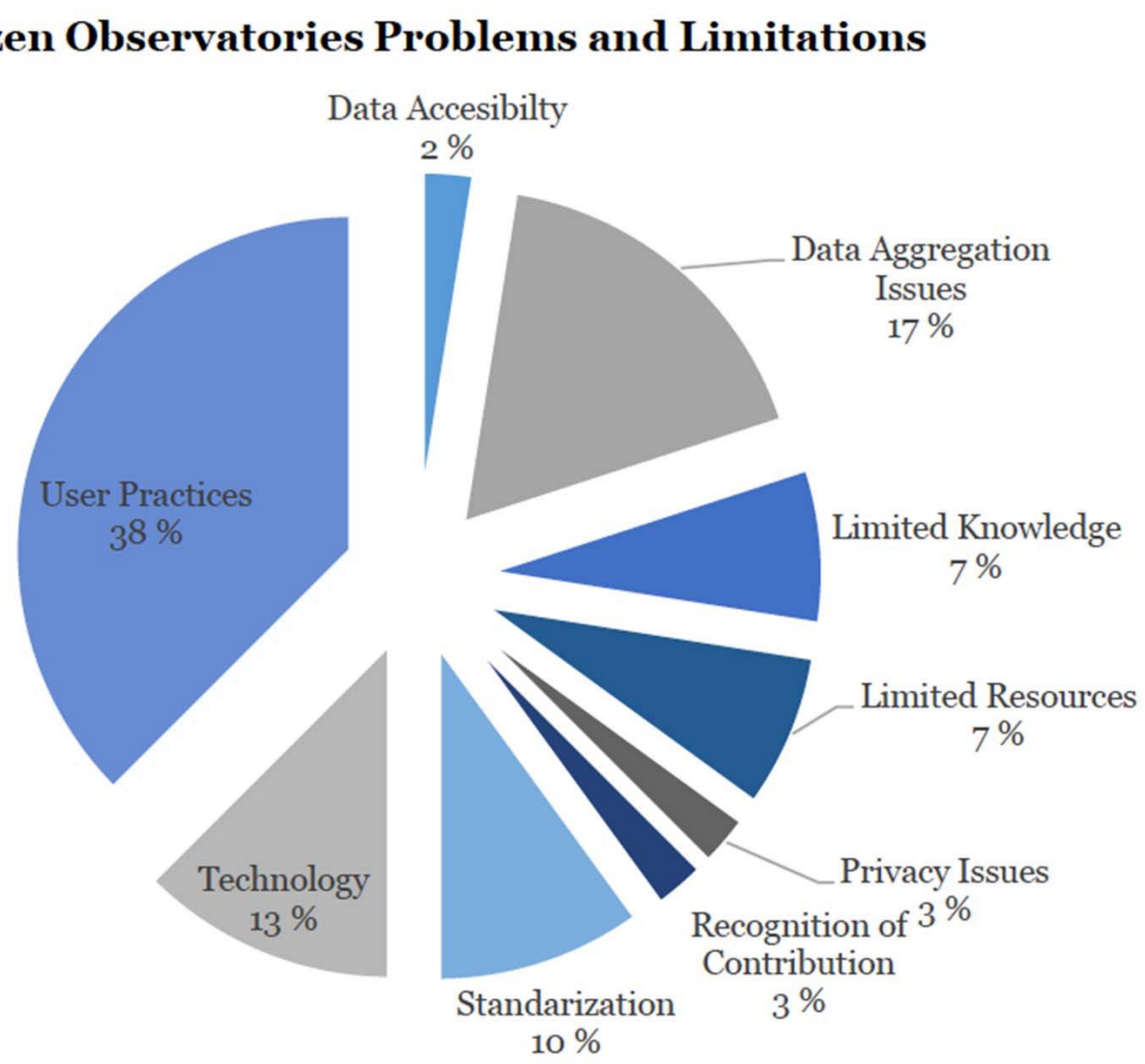


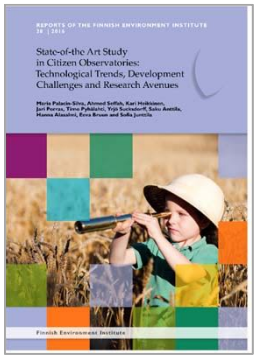
Figure 16: Institutions Running Citizen Observatories Worldwide



Palacin-Silva et al. State-of-the Art Study in Citizen Observatories: Technological Trends, Development Challenges and Research Avenues; Finnish Environment Institute: Helsinki, Finland, 2016

Figure 17: Common Problems and Limitations among Citizen Observatories





Palacin-Silva et al. State-of-the Art Study in Citizen Observatories: Technological Trends, Development Challenges and Research Avenues; Finnish Environment Institute: Helsinki, Finland, 2016

DATA QUALITY

How do we Ensure Data Quality?

- Quality Assurance Project Plan
- Repeated sample/tasks
- Participant tasks involving control items
- Uniform or calibrated equipment
- Personal knowledge of participant skills/expertise
- Participant training
- Participant testing
- Rating participant performance
- Filtering of unusual reports
- Contacting participants about unusual reports
- Automatic recognition techniques
- Expert Review
- Paper data sheets submitted in addition to online entry
- Digital vouchers
- Data triangulation
- Data normalization
- Data mining
- Data quality documentation

Wiggins, A., Newman, G., Stevenson, R., & Crowston, K. (2011). Mechanisms for Data Quality and Validation in Citizen Science. 2011 IEEE Seventh International Conference On E-Science Workshops. doi:10.1109/esciencew.2011.27

ExCiteS | Extreme Citizen Science

UCL

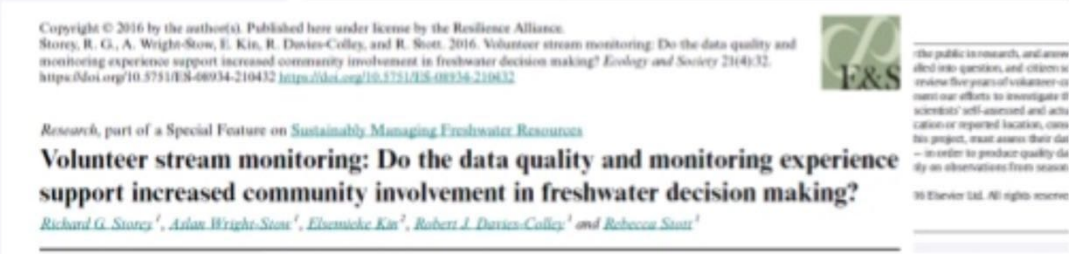
Can volunteers collect data?

- There are over 50 papers that are exploring the reliability of citizen science in collecting data
- Most show that data is of good quality and can be used for many purposes

Biological Conservation

Lessons from citizen science: Assessing volunteer-collected plant phenology data with Mountain Watch

Caitlin McDonough MacKenzie, Georgia Murray, Richard Primack, Doug Weihrauch

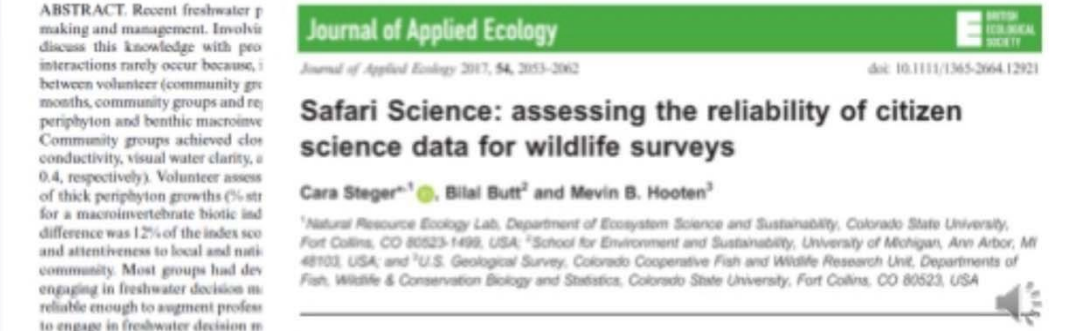


Copyright © 2016 by the author(s). Published here under license by the Resilience Alliance.
Storey, R. G., A. Wright-Stow, E. Kin, R. Davies-Colley, and R. Stott. 2016. Volunteer stream monitoring: Do the data quality and monitoring experience support increased community involvement in freshwater decision making? *Ecology and Society* 21(4):32.
https://doi.org/10.5751/ES-08934-210432

Research, part of a Special Feature on Sustainably Managing Freshwater Resources

Volunteer stream monitoring: Do the data quality and monitoring experience support increased community involvement in freshwater decision making?

Richard G. Storey, Adam Wright-Stow, Ebenezer Kin, Robert J. Davies-Colley and Rebecca Stott



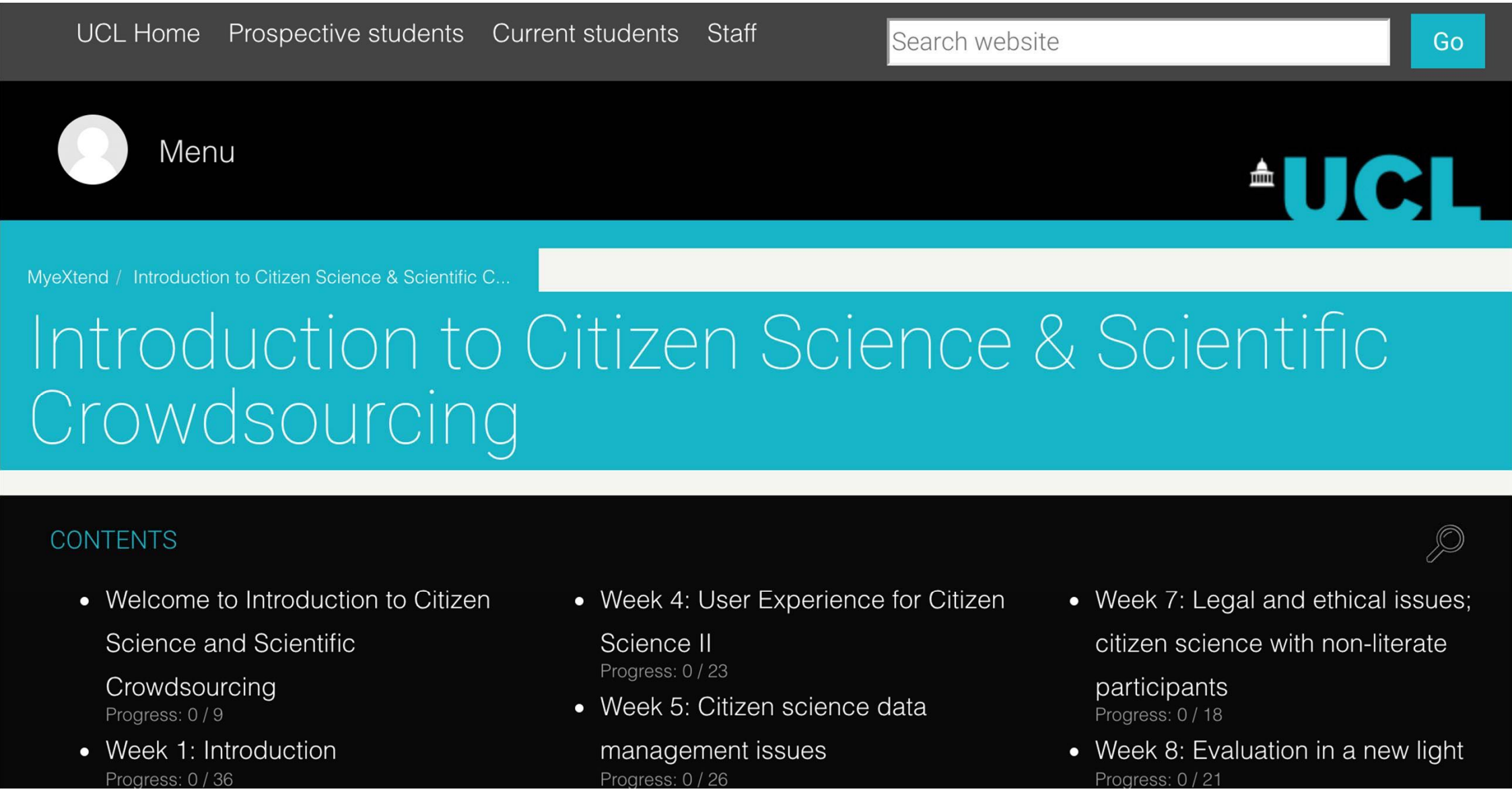
Journal of Applied Ecology

Journal of Applied Ecology 2017, **54**, 2053–2062 doi: 10.1111/1365-2664.12921

Safari Science: assessing the reliability of citizen science data for wildlife surveys

Cara Steger, Bilal Butt and Mevin B. Hooten

https://www.slideshare.net/mukih/introduction-to-citizen-science-and-scientific-crowdsourcing-data-quality-segment-87684089



https://extend.ucl.ac.uk/course/view.php?id=433#section-0

Home

Course Modules

- An Introduction to Citizen Science
- Environmental Citizen Science
- Information Technology in Cit Sci
- Understanding Participant Motivation
- Evaluation

OPENING UP SCIENCE FOR ALL!
A citizen science training course

Our ambition is for public involvement in all stages of the scientific process

Citizen Science, an introduction

Welcome to this free online introductory course about citizen science – the participation of people outside science (universities, research centres and government bodies) in scientific research.

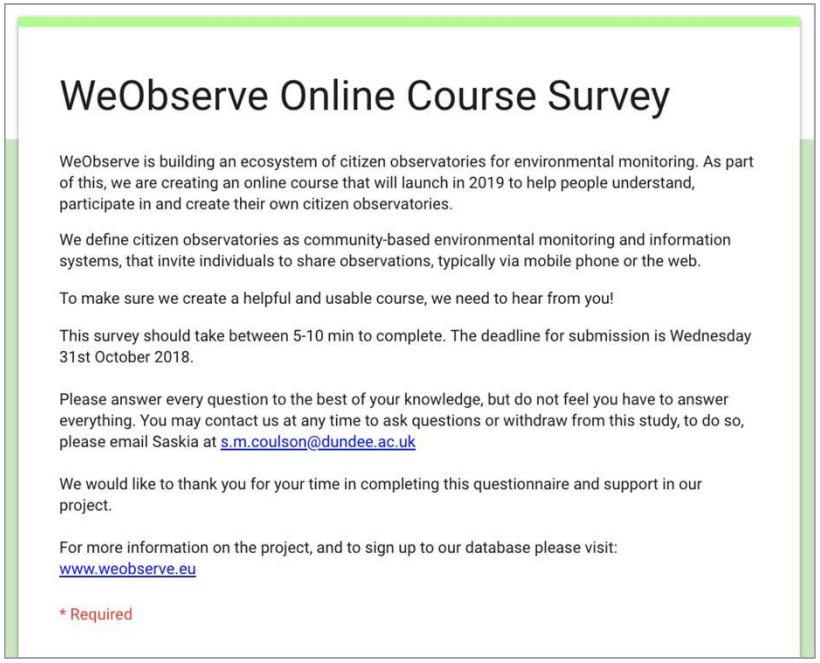
https://openupsci.wixsite.com/citizensciencecourse

The WeObserve Massive Open Online Course (MOOC) for COs

https://tinyurl.com/WO-MOOC-Survey

It takes only 5 to 10 minutes to take part in the WeObserve Online Course Survey!

WeObserve aims to configure an online course to be launched in 2019 to help people understand, participate in and create their own observatories. Complete the questionnaire to the best of your knowledge and support our effort.



WeObserve Online Course Survey

WeObserve is building an ecosystem of citizen observatories for environmental monitoring. As part of this, we are creating an online course that will launch in 2019 to help people understand, participate in and create their own citizen observatories.

We define citizen observatories as community-based environmental monitoring and information systems, that invite individuals to share observations, typically via mobile phone or the web.

To make sure we create a helpful and usable course, we need to hear from you!

This survey should take between 5-10 min to complete. The deadline for submission is Wednesday 31st October 2018.

Please answer every question to the best of your knowledge, but do not feel you have to answer everything. You may contact us at any time to ask questions or withdraw from this study, to do so, please email Saskia at s.m.coulson@dundee.ac.uk

We would like to thank you for your time in completing this questionnaire and support in our project.

For more information on the project, and to sign up to our database please visit: www.weobserve.eu

* Required

https://tinyurl.com/WOCoPs

https://tinyurl.com/WO-MOOC-Survey

Margaret Gold
ECSA Project Officer
(WeObserve & LandSense)
mg@margaretgold.co.uk
@MobileMaggie

The Landscape of Citizen Observatories in Europe

@WeObserve
WeObserve.eu

In the first WeObserve Landscape Report of COs in Europe, we reviewed the literature for a consolidated definition of what makes a CO, and frameworks for mapping existing CO initiatives and their relevant communities and interactions

DEFINITION

WeSenseIT (2013)
"a method, an environment and an infrastructure supporting an information ecosystem for communities and citizens, as well as emergency operators and policymakers, for discussion, monitoring and intervention on situations, places and events"

CITI-SENSE (2014)
"the citizens' own observations and understanding of environmentally related problems and in particular ... reporting and commenting on them within a dedicated ICT platform"

ALAN GRAINGER (2017)
"any use of Earth observation technology in which citizens collect data and are empowered by the information generated from these data to participate in environmental management."

COMMON ELEMENTS

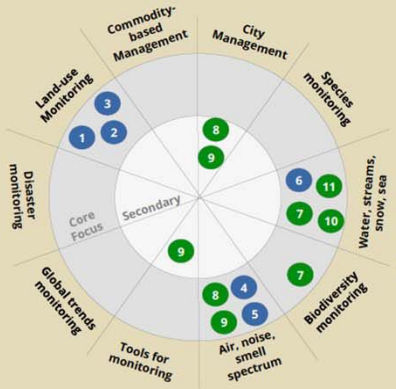
- PARTICIPATION OF CITIZENS 'IN-SITU'
- MOBILE + WEB TECHNOLOGIES
- ENVIRONMENTAL MONITORING
- BI-DIRECTIONAL DATA & INFO

EVALUATION

1. Geographic scope
2. Type of participants
3. Network establishment mechanism
4. Revenue stream
5. Communication Paradigm
6. Effort required
7. Platform support
8. Data accessibility, availability & quality

Source: Ghaesifard, Wehn, & van der Zaag, 2017
Towards benchmarking Citizen Observatories: Features and functioning of online amateur weather networks.
Journal of Environmental Management.

DESCRIPTION



H2020 COs
1. Ground Truth 2.0
2. GROW
3. LandSense
4. Scent
5. D-Noses
6. Monocole

FP7 COs
7. COBWEB
8. Ominscientis
9. Citi-Sense
10. WeSenseIt
11. Citiclops

LANDSCAPE

Calling all CO Practitioners

We are now compiling project details on as wide a range of initiatives in Europe as possible. Please share project information with us via this online form.

What data would YOU like to see captured?

https://tinyurl.com/COlandscape


Add your Citizen Observatory to the WeObserve Landscape of COs across Europe

Thank-you for sharing information about your Citizen Observatory with the greater community. We would like to share this information on the WeObserve website, and in our Landscape reports, which will contribute greatly to the shared learning amongst practitioners of COs in ongoing research, and towards developing future projects. At the end of this form we will ask your permission to do so.

This template has been developed within the WeObserve project for the purpose of describing COs across a range of aspects, for the purpose of evaluation and comparison, and also to map the landscape of COs in Europe according to their characteristics.

The full report describing these frameworks is available for download online at: https://www.weobserve.eu/wp-content/uploads/2018/08/D2.1-776740-WeObserve-EU-Citizen-Observatories-Landscape-Report-Frameworks.pdf

You can stay informed of our progress by subscribing to the WeObserve Newsletter at http://lists.weobserve.eu/cgi-sys/subscribehere.html

* Required

Thank-you for taking the time to make this valuable contribution - you can continue to edit your CO information at any time.

WeObserve

PROJECT OVERVIEW

JOIN the WeObserve Communities of Practice - https://tinyurl.com/WOCoPs

This work is part of the WeObserve project. WeObserve has received funding from the European Union's Horizon 2020 research & innovation program under Grant Agreement No 776740.

Content reflects only the author's view and European Commission is not responsible for any use that may be made of the information it contains.