



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



NEWS FEATURE • 23 OCTOBER 2018

No PhDs needed: how citizen science is transforming research

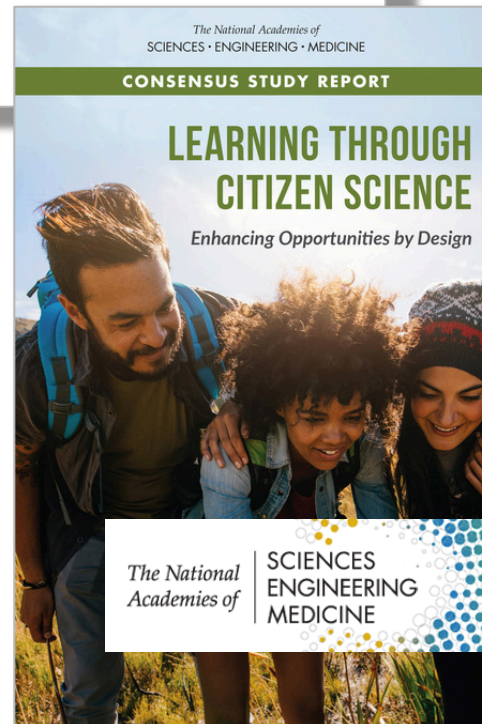
Projects that recruit the public are getting more ambitious and diverse, but the field faces some growing pains.



UCLPRESS

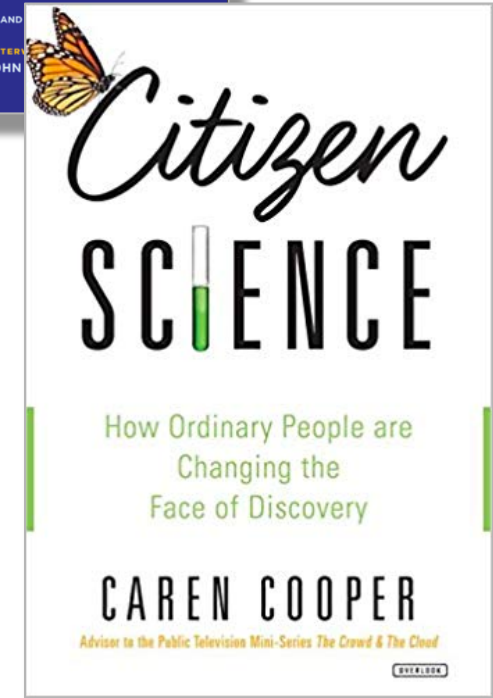
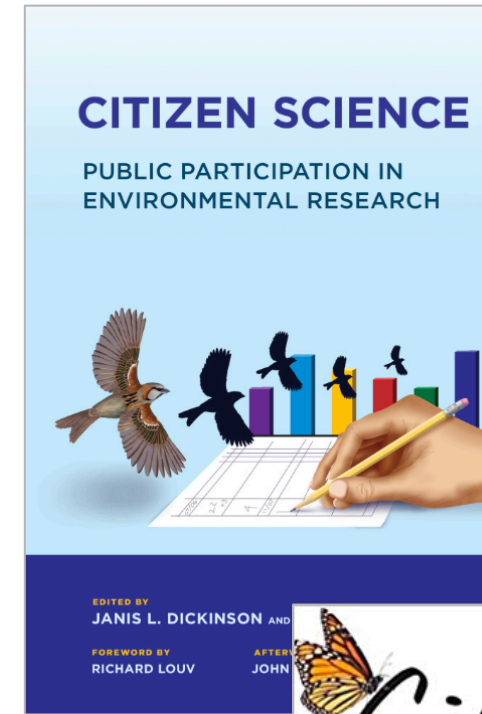
Edited by Susanne Hecker, Muki Haklay,
Anne Bowser, Zen Makuch,
Johannes Vogel and Aletta Bonn

UCLPRESS

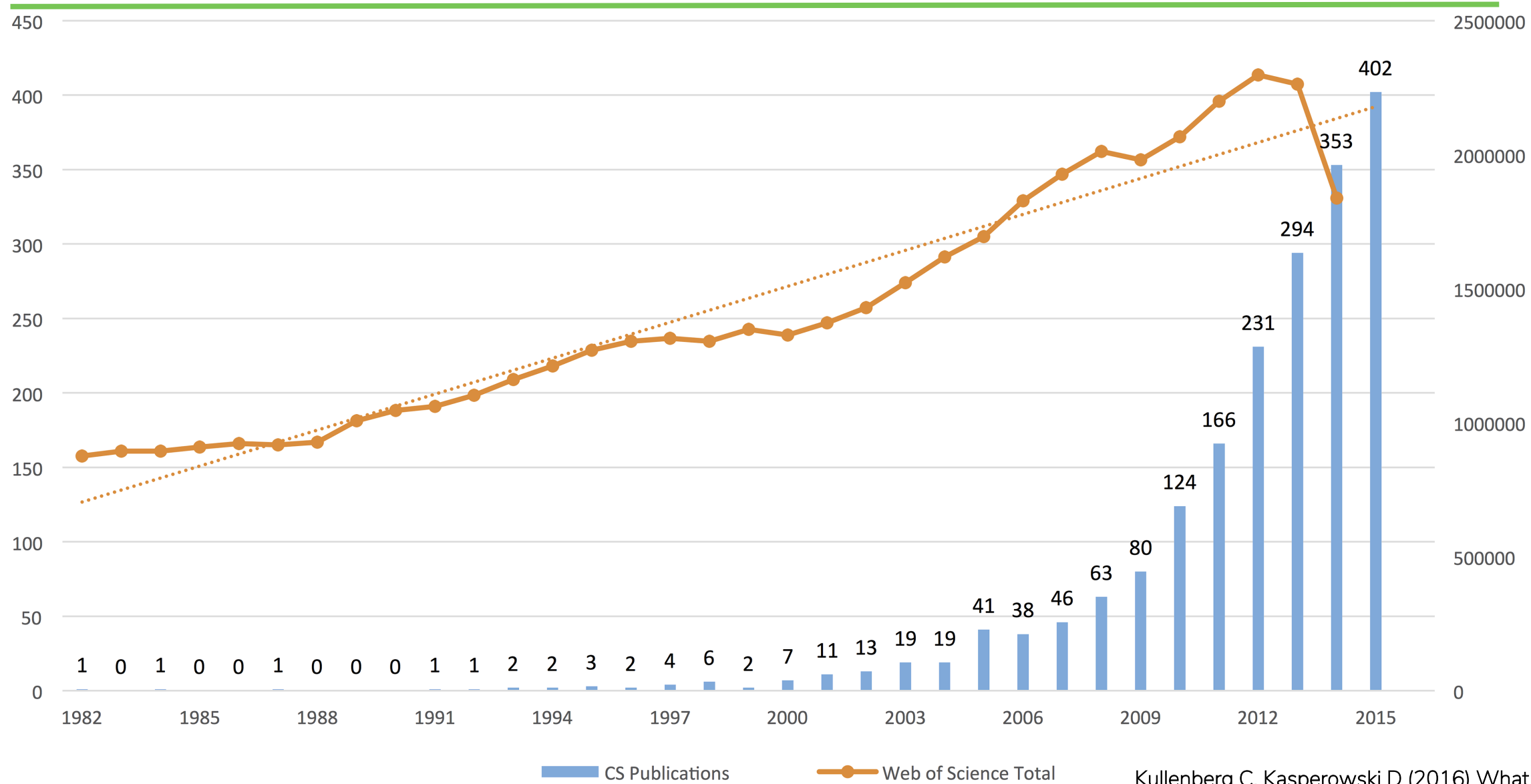


The National
Academies of

SCIENCES
ENGINEERING
MEDICINE



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-Analysis.

Professionalisation of Citizen Science



Citizen Science Platforms & Knowledge Exchange





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.

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

Journal of Environmental Monitoring

Cite this: *J. Environ. Monit.*, 2011, **13**, 2687

www.rsc.org/jem



PERSPECTIVE

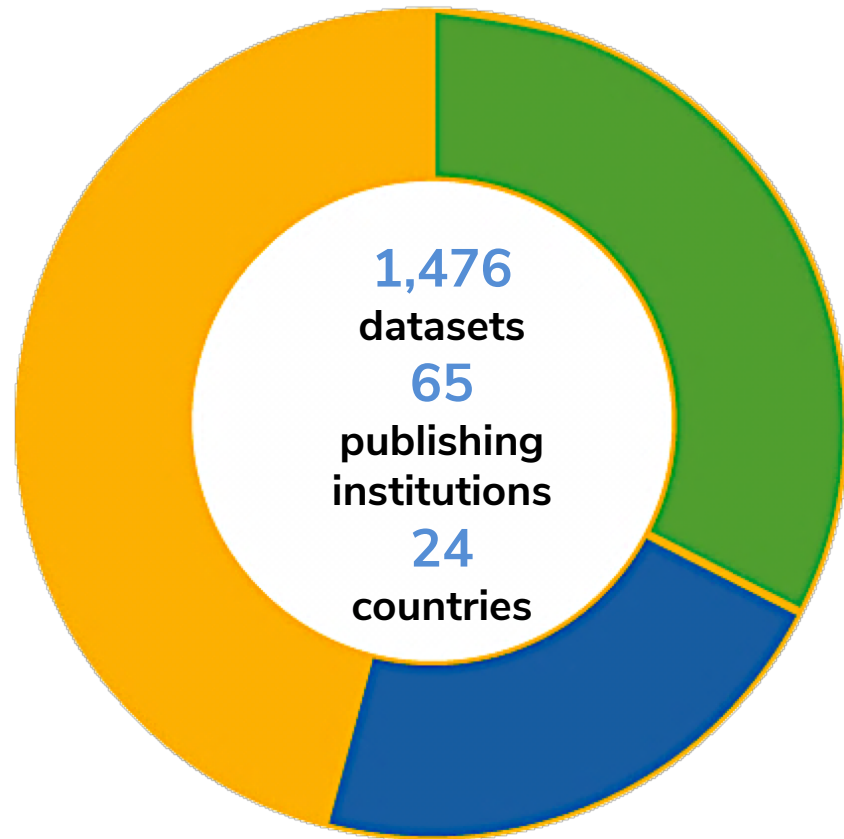
The role of 'Big Society' in monitoring the state of the natural environment

Colin Mackechnie,^a Lindsay Maskell,^b Lisa Norton^b and David Roy^c

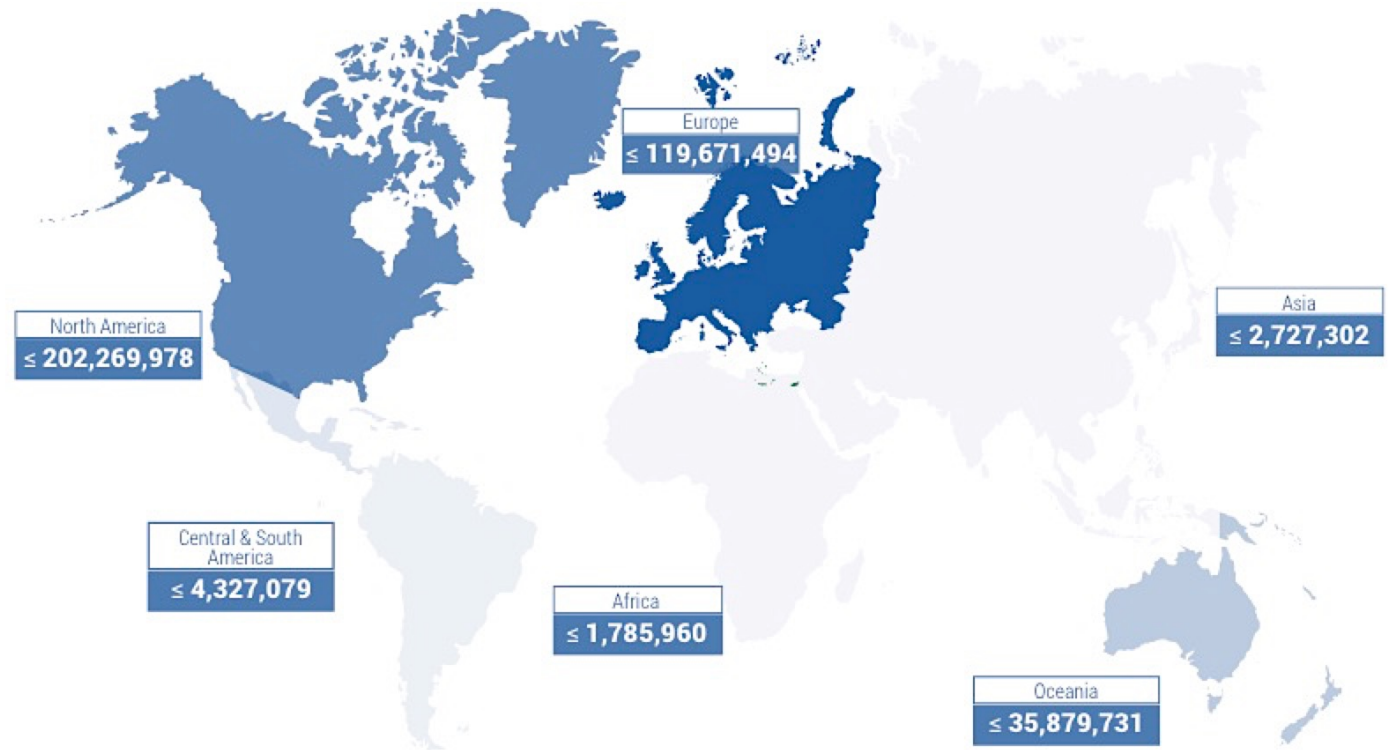
Terrestrial biodiversity surveillance in UK involved **> 30 different organizations**, to which volunteer contributions had an estimated value of **£20 million**, for a government investment of £7 million.

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

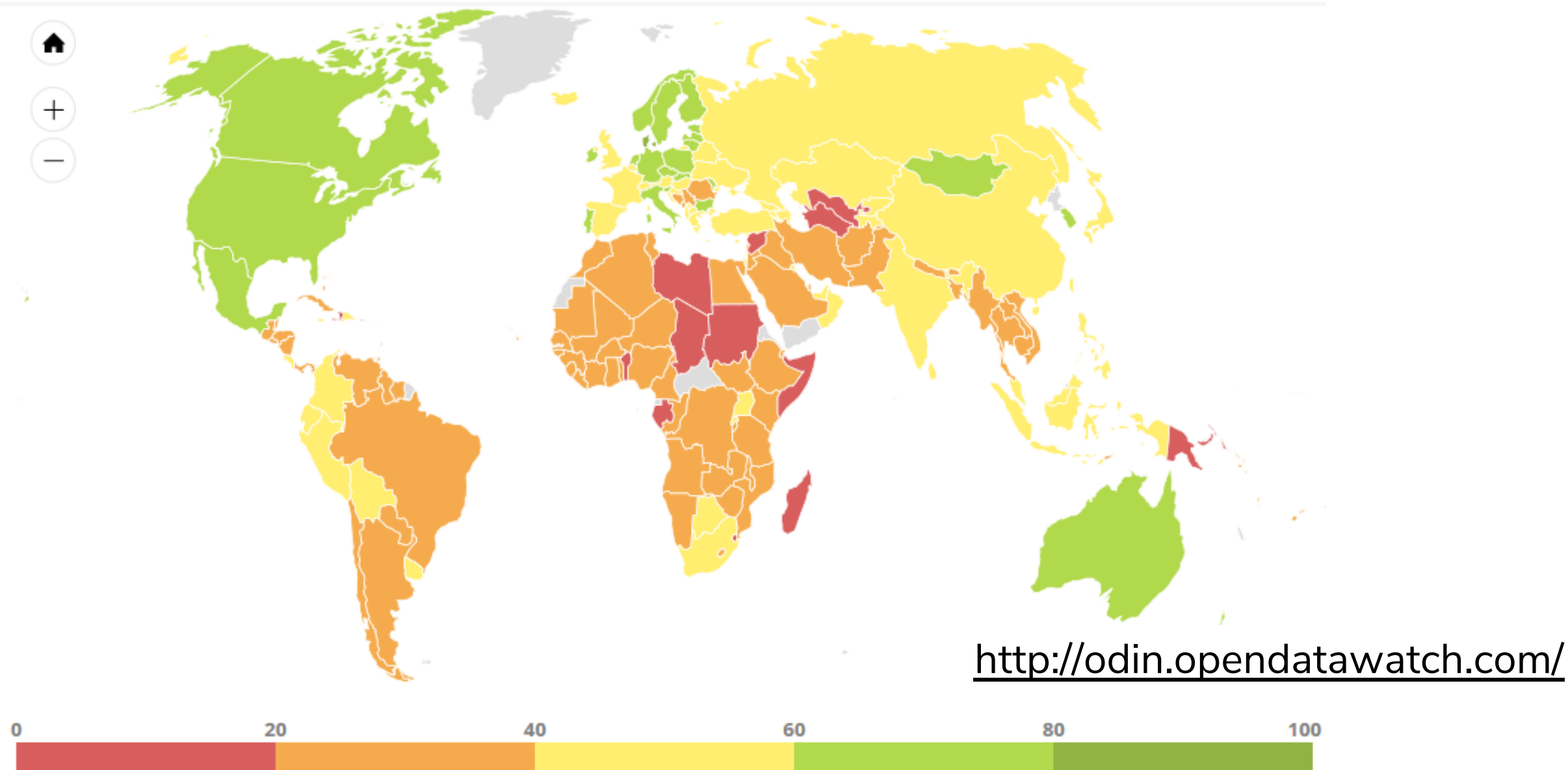


Analysis as of 1 March 2016



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](https://doi.org/10.1016/j.biocon.2016.09.004)

Open Data Watch – Open Data Inventory 2017



JAN
2018

DIGITAL AROUND THE WORLD IN 2018

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

TOTAL
POPULATION



7.593
BILLION

URBANISATION:
55%

INTERNET
USERS



4.021
BILLION

PENETRATION:
53%

ACTIVE SOCIAL
MEDIA USERS



3.196
BILLION

PENETRATION:
42%

UNIQUE
MOBILE USERS



5.135
BILLION

PENETRATION:
68%

ACTIVE MOBILE
SOCIAL USERS



2.958
BILLION

PENETRATION:
39%

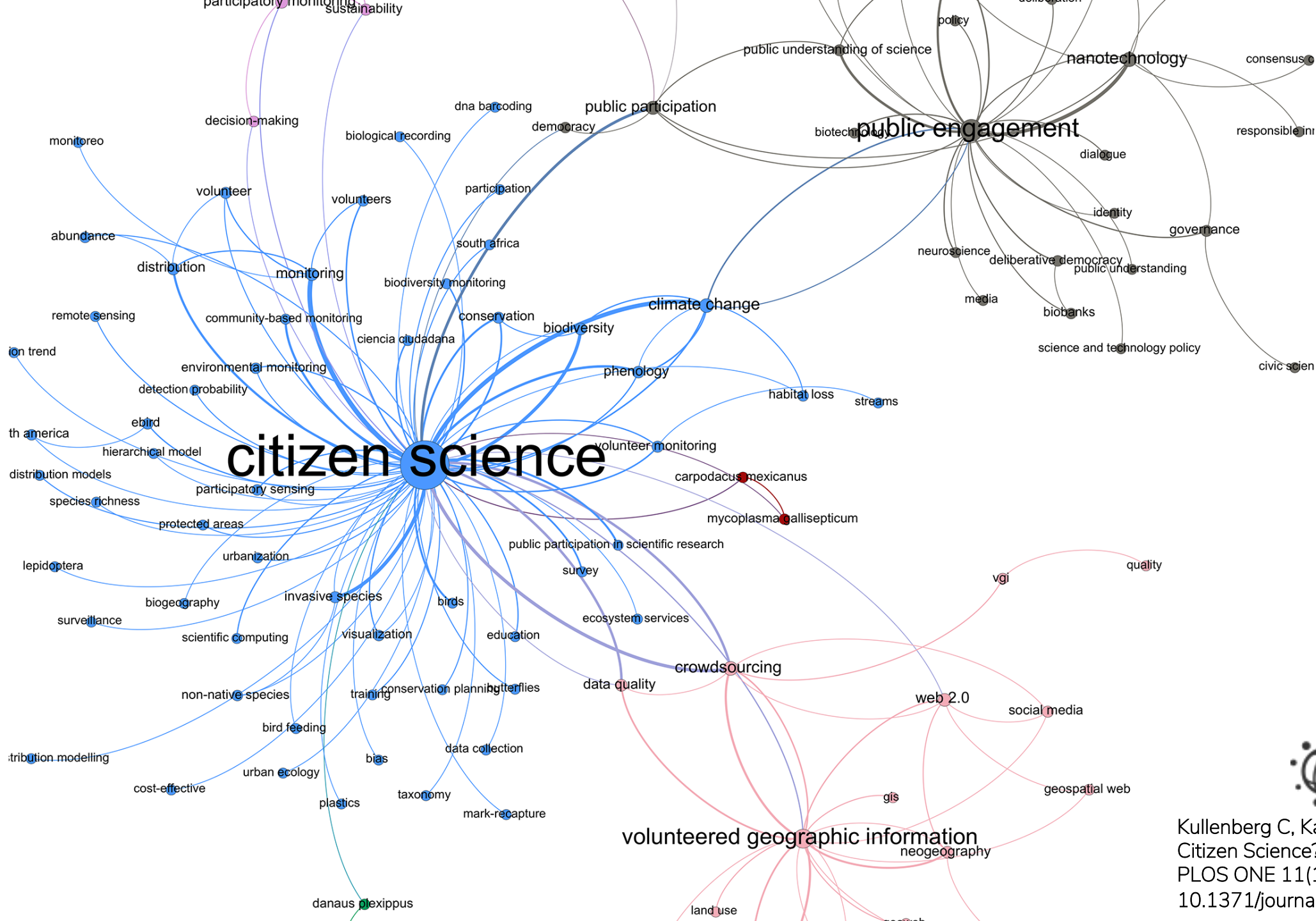
we
are
social



we
are
social



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).



Citizen Science

community-based monitoring

volunteer based monitoring

volunteer monitoring

participatory monitoring

participatory sensing

participatory science

public engagement

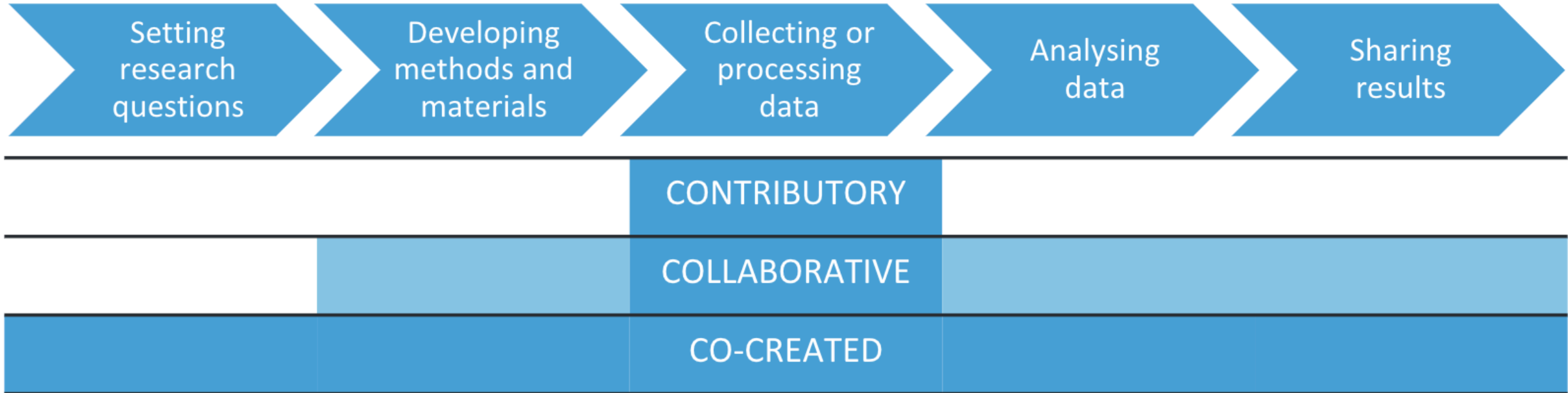
popular epidemiology

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)



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



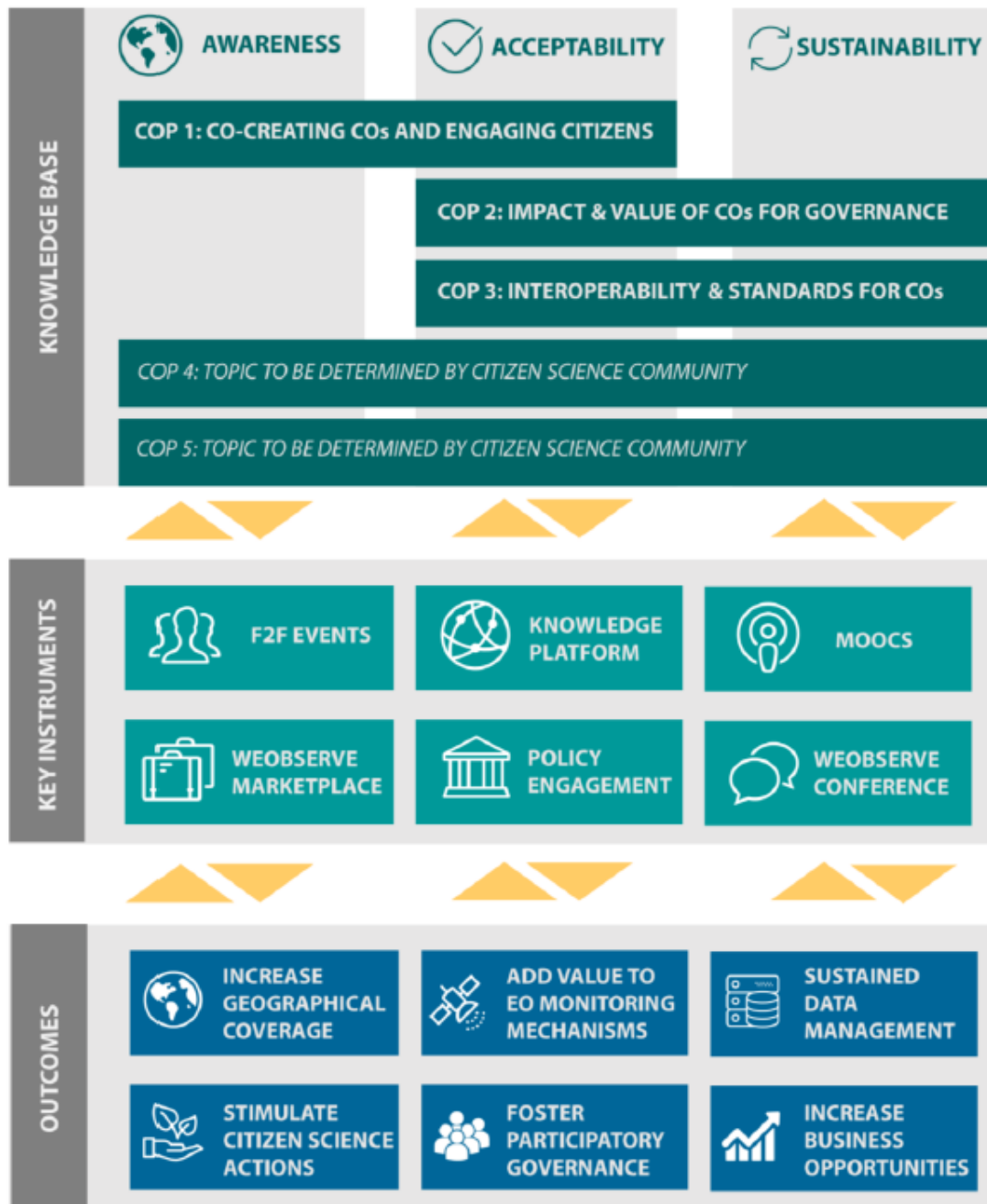


Figure 1: WeObserve Concept

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



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 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”

2013

CITI-SENSE

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

2014

ALAN GRAINGER

“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.”

2017

COMMON ELEMENTS



**PARTICIPATION OF
CITIZENS ‘IN-SITU’**



**MOBILE + WEB
TECHNOLOGIES**



**ENVIRONMENTAL
MONITORING**

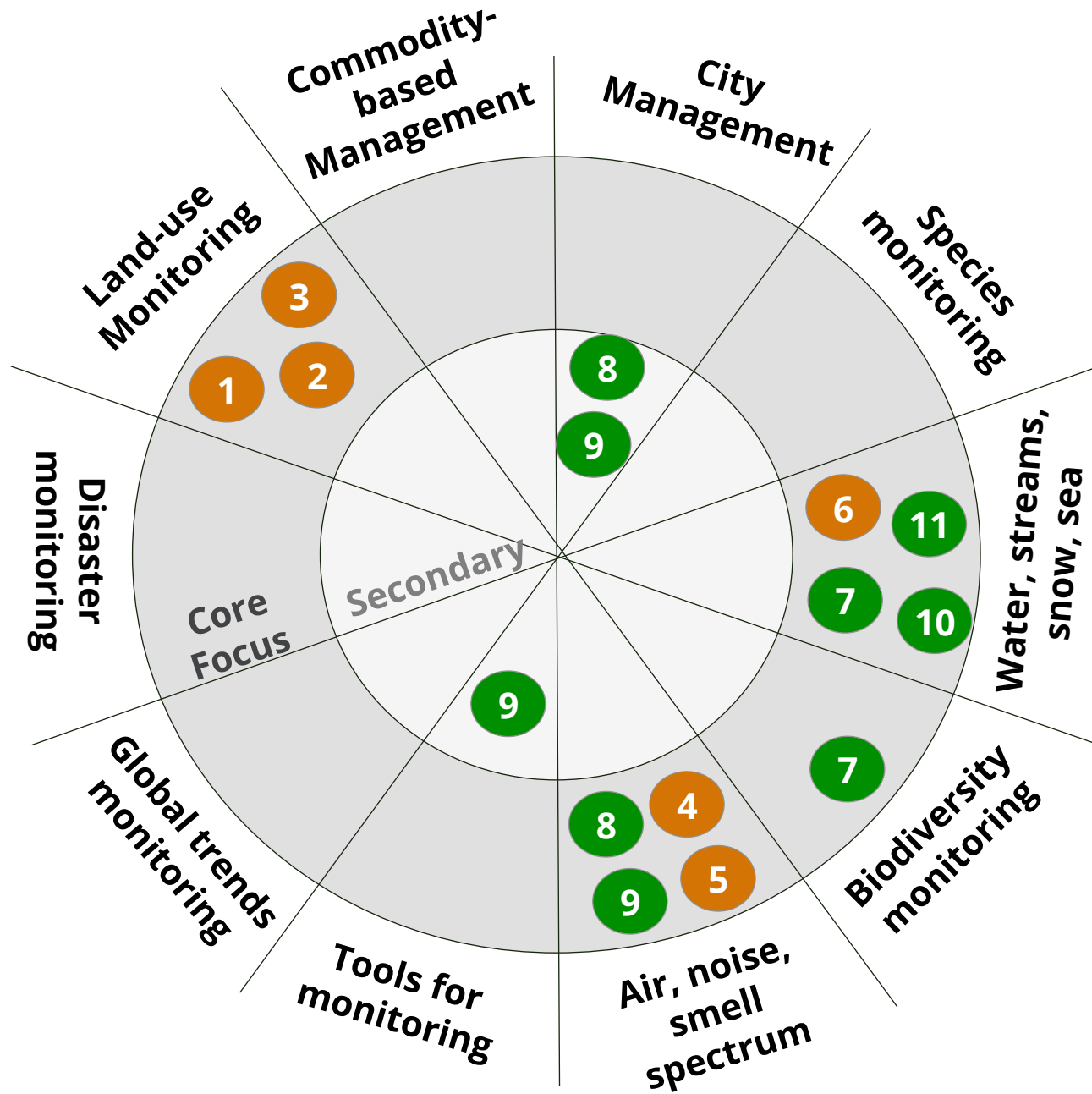


**BI-DIRECTIONAL DATA
& INFO**

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
WeSenselt	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

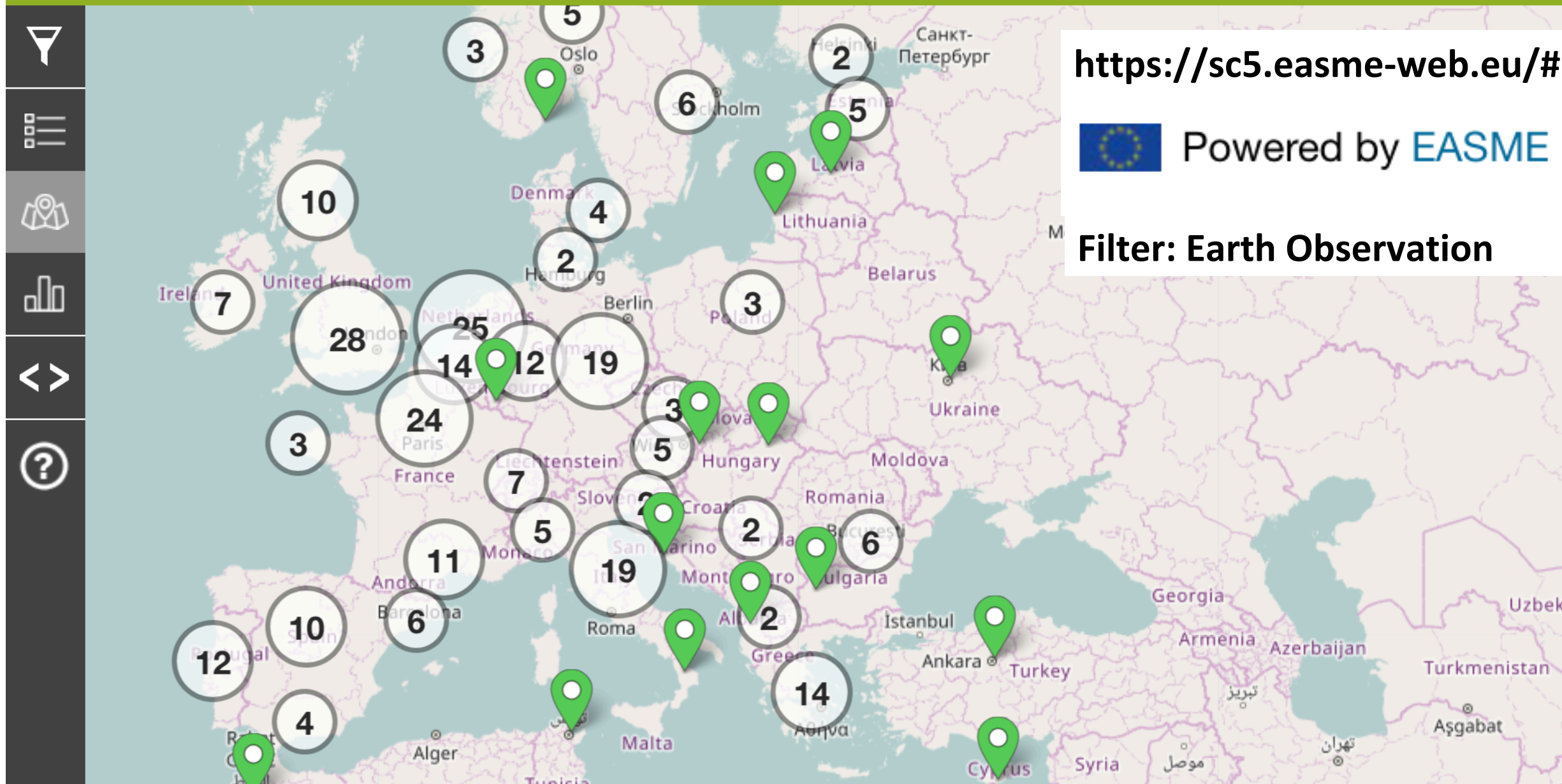
1. Ground Truth 2.0
2. GROW
3. LandSense
4. Scent
5. D-Noses
6. Monocle

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.



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



Environmental Citizen Science & the UN SDGs

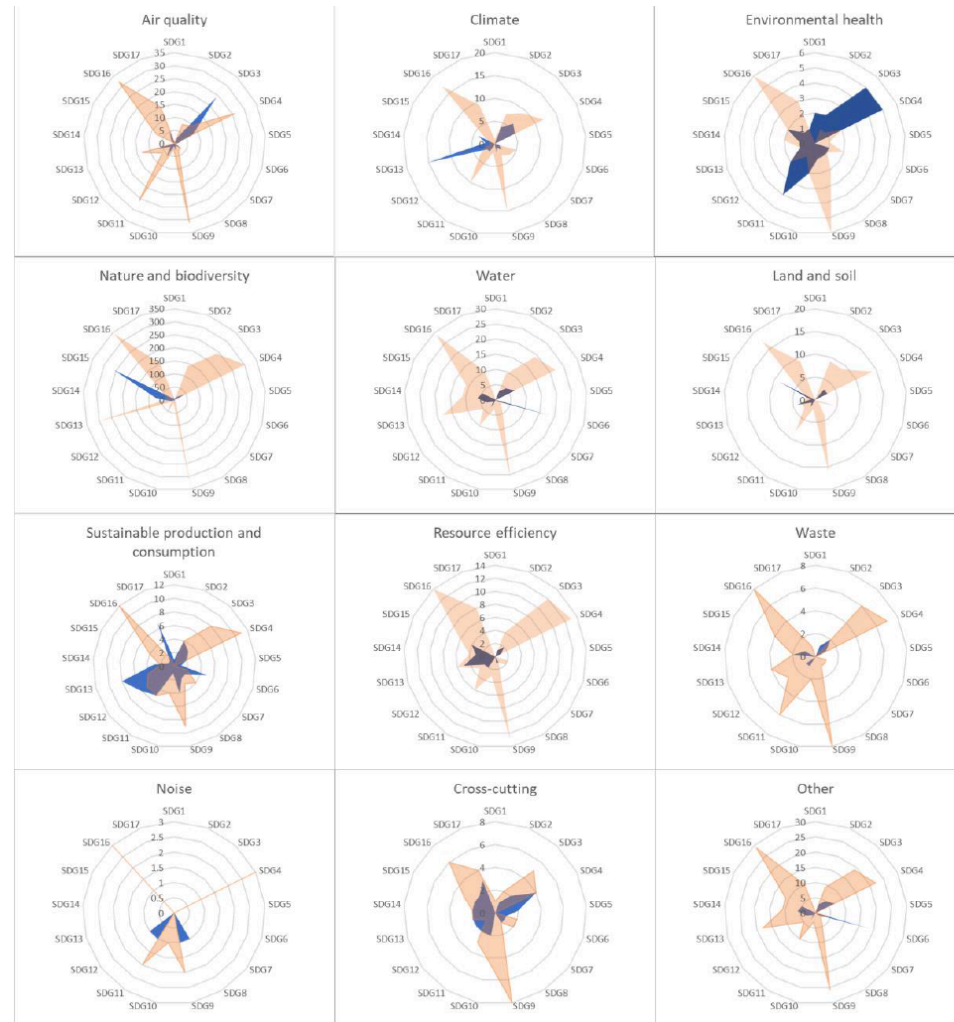
Inventory of Citizen Science activities for environment policies

>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...

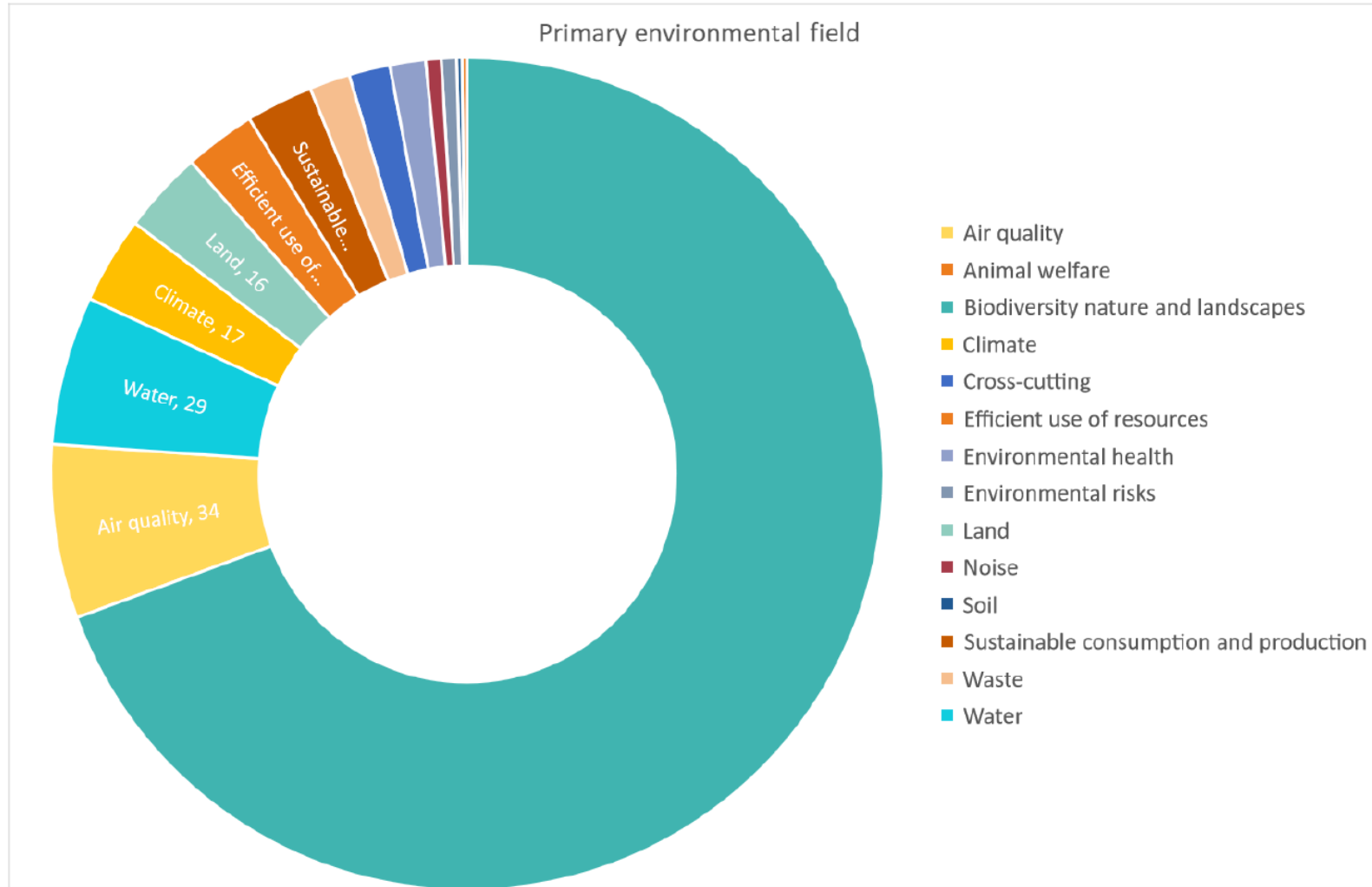


Study on an inventory of citizen science activities for environmental policies

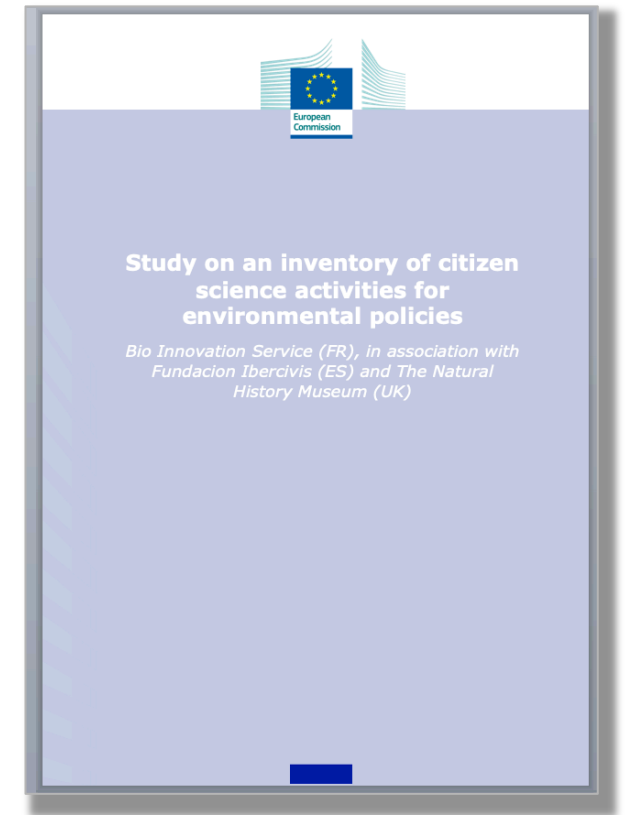


https://ec.europa.eu/easme/sites/easme-site/files/documents/sept_13.zip

Inventory – Fields Covered

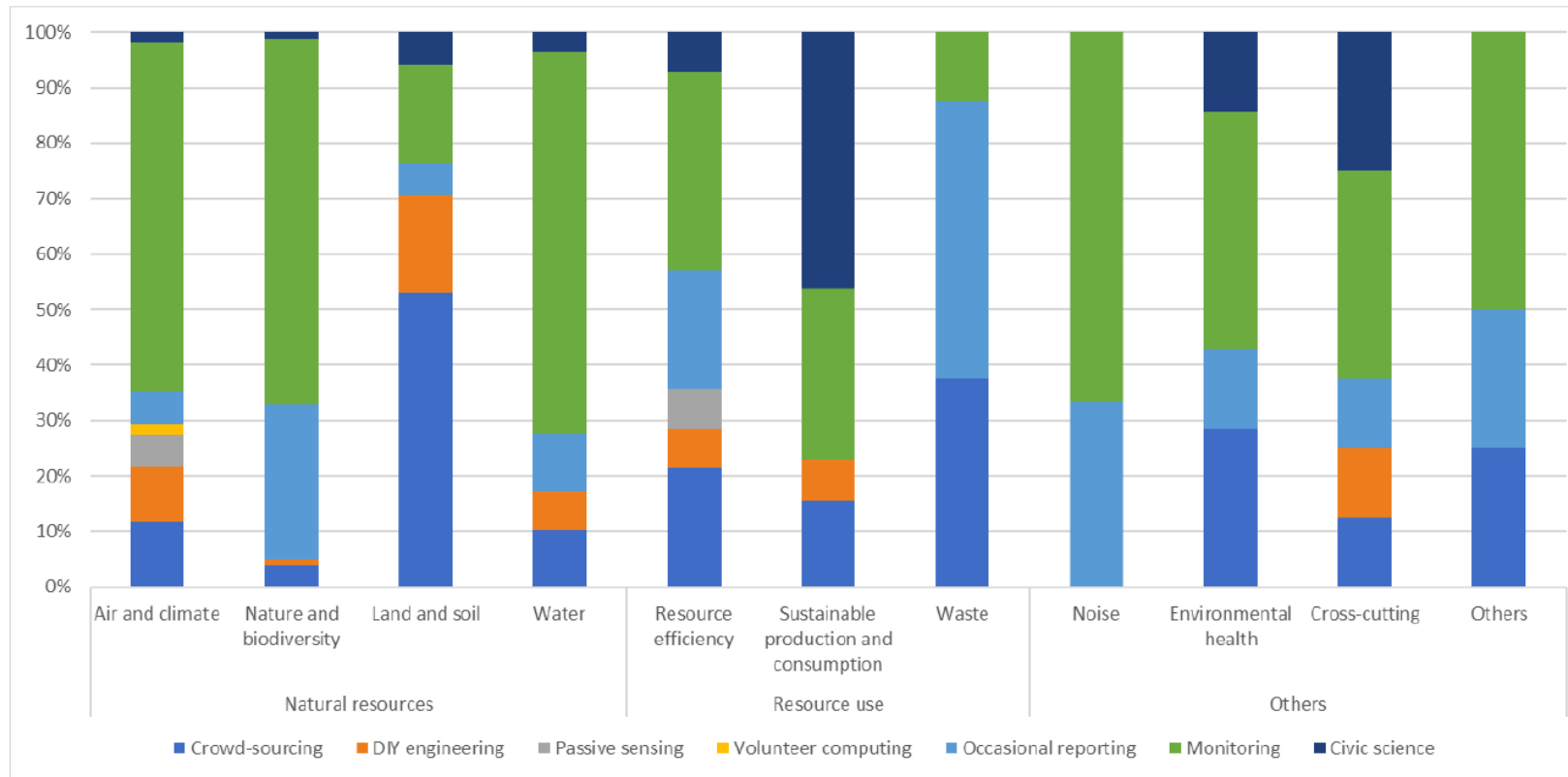


Study on an inventory of citizen science activities for environmental policies



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

Inventory – Type of Projects

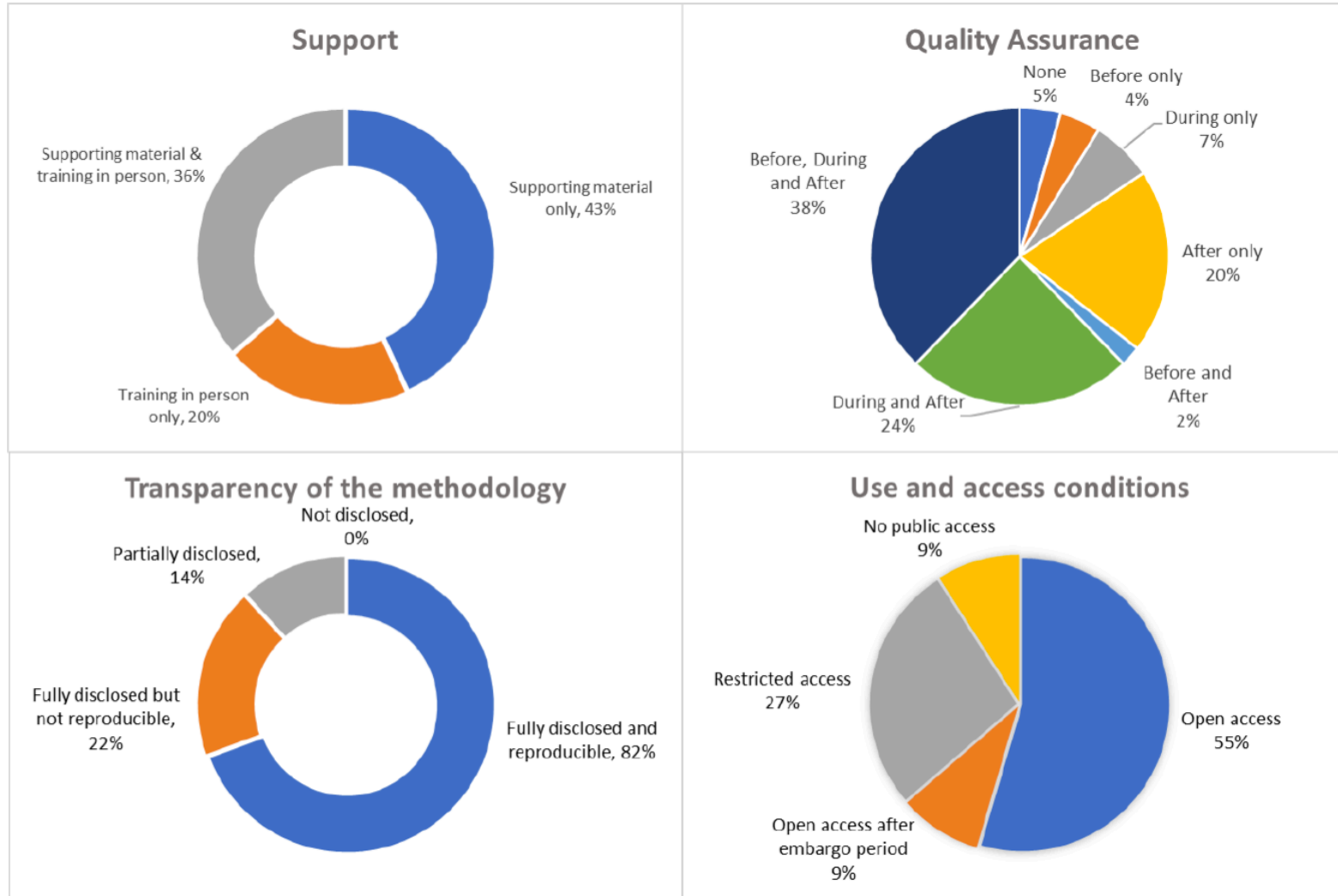


Study on an inventory of citizen science activities for environmental policies



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

Analysis – Scientific Data Quality

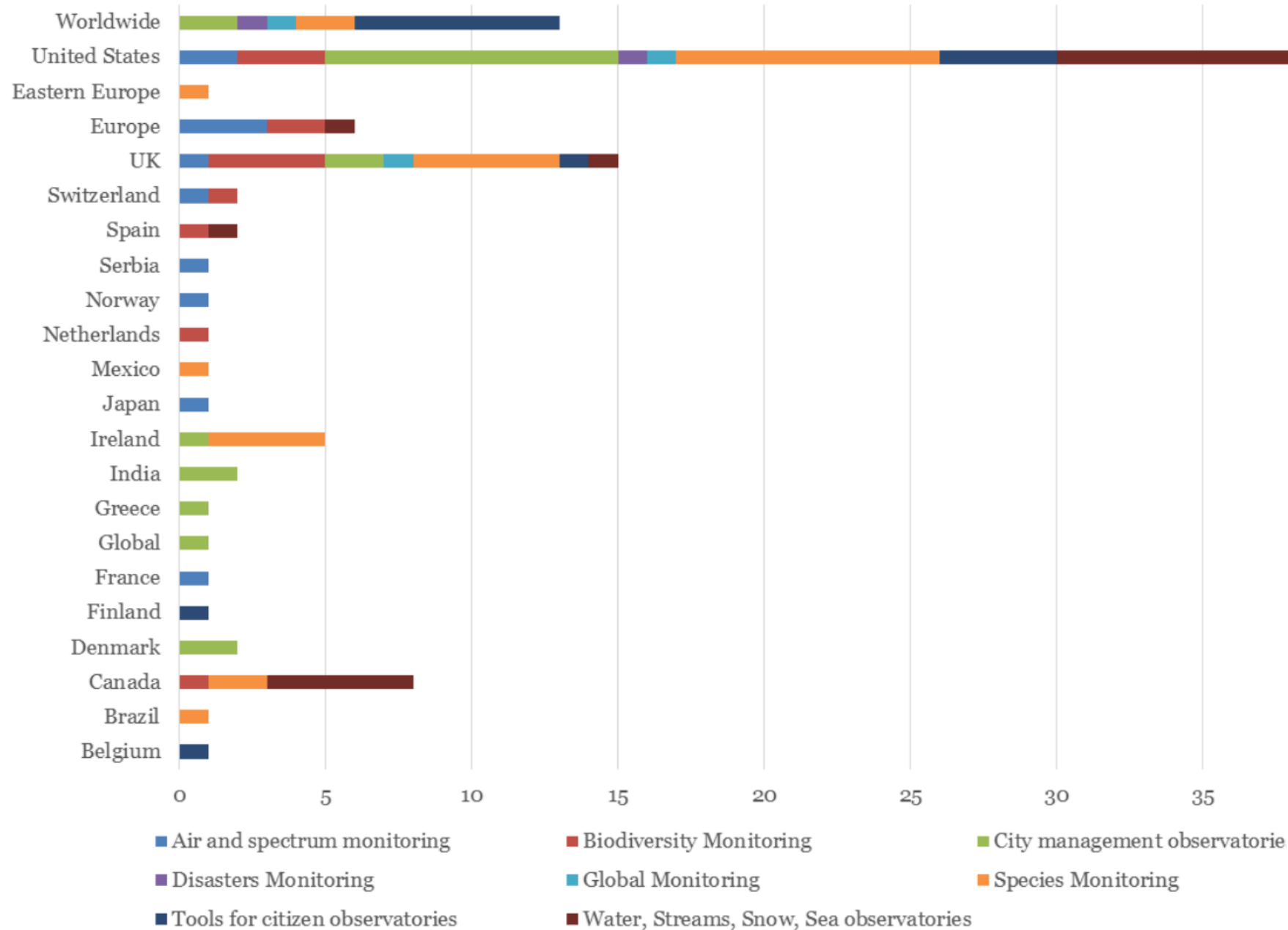


Study on an inventory of citizen science activities for environmental policies

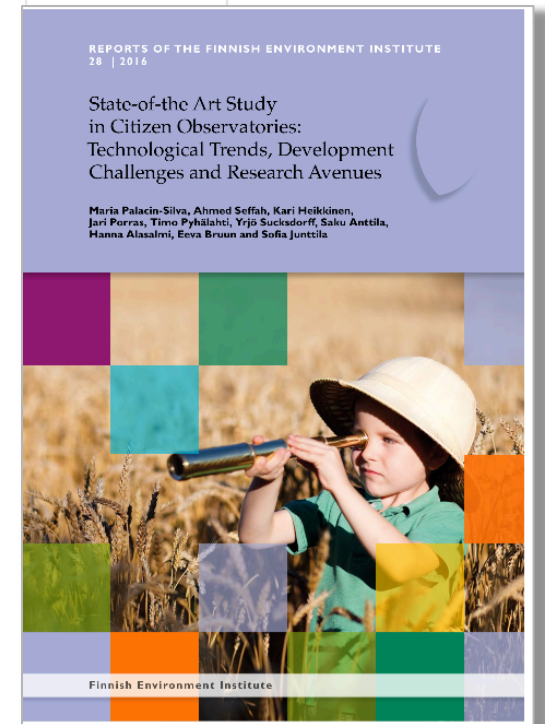


https://ec.europa.eu/easme/sites/easme-site/files/documents/sept_13.zip

Citizen Observatories Focus by Location

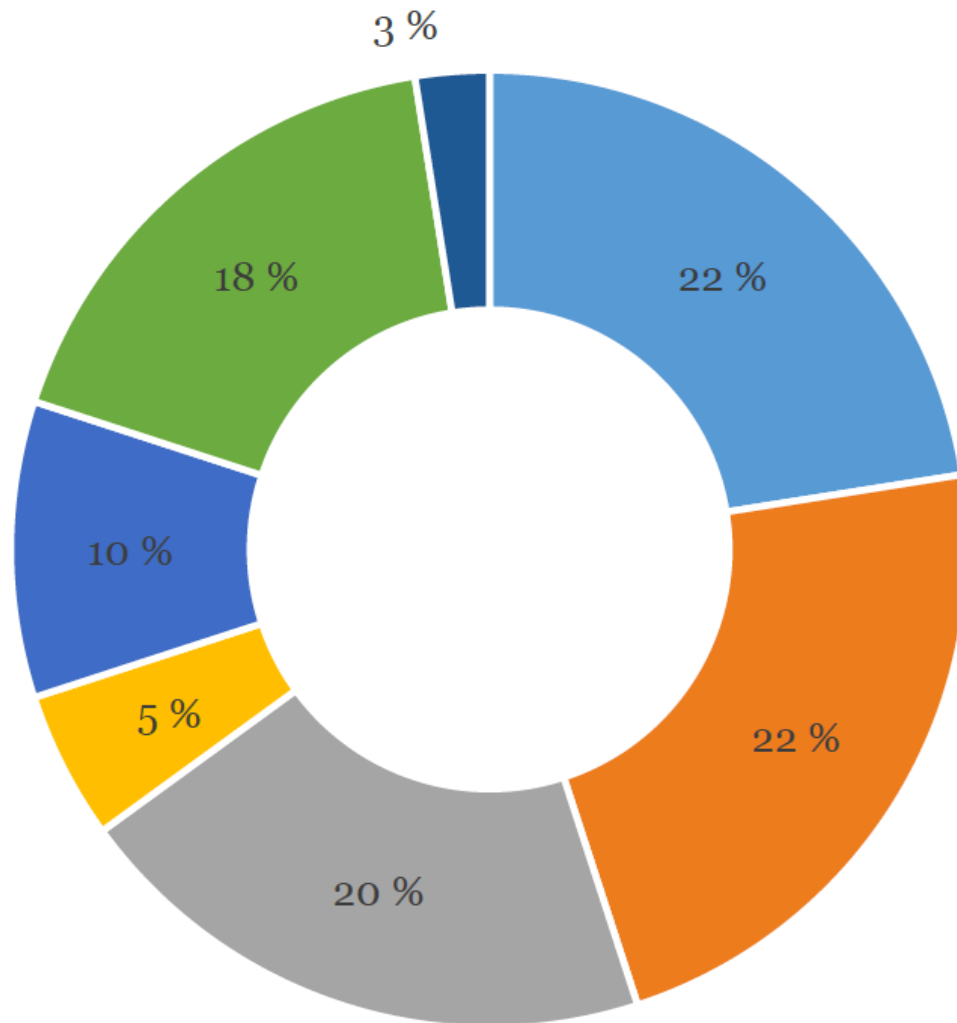


State-of-the Art Study in Citizen Observatories



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

European Citizen Observatories



- Species Monitoring
- Biodiversity Monitoring
- Air and spectrum monitoring
- Tools for citizen observatories
- Water, Streams, Snow, Sea monitoring
- City management monitoring
- Global Monitoring

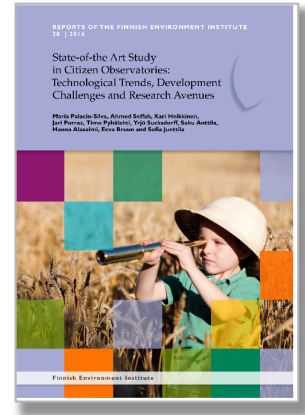


Figure 32: Citizen Observatories Focus Areas in Europe

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

Citizen Observatories Technologies

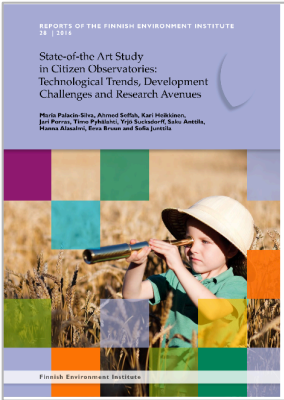
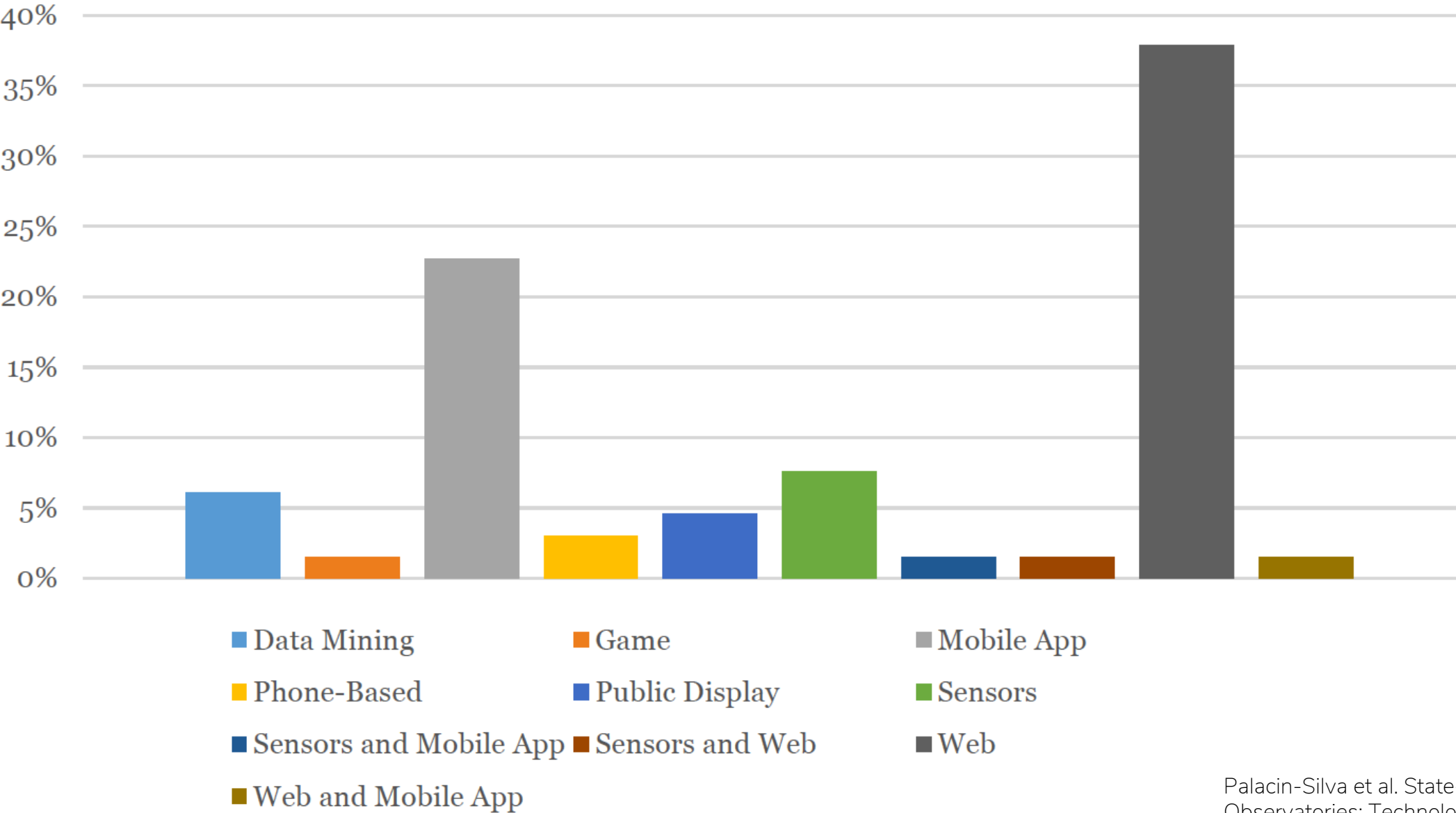


Figure 8: Citizen Observatories’ by technology use

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

Institutions Running Citizen Observatories

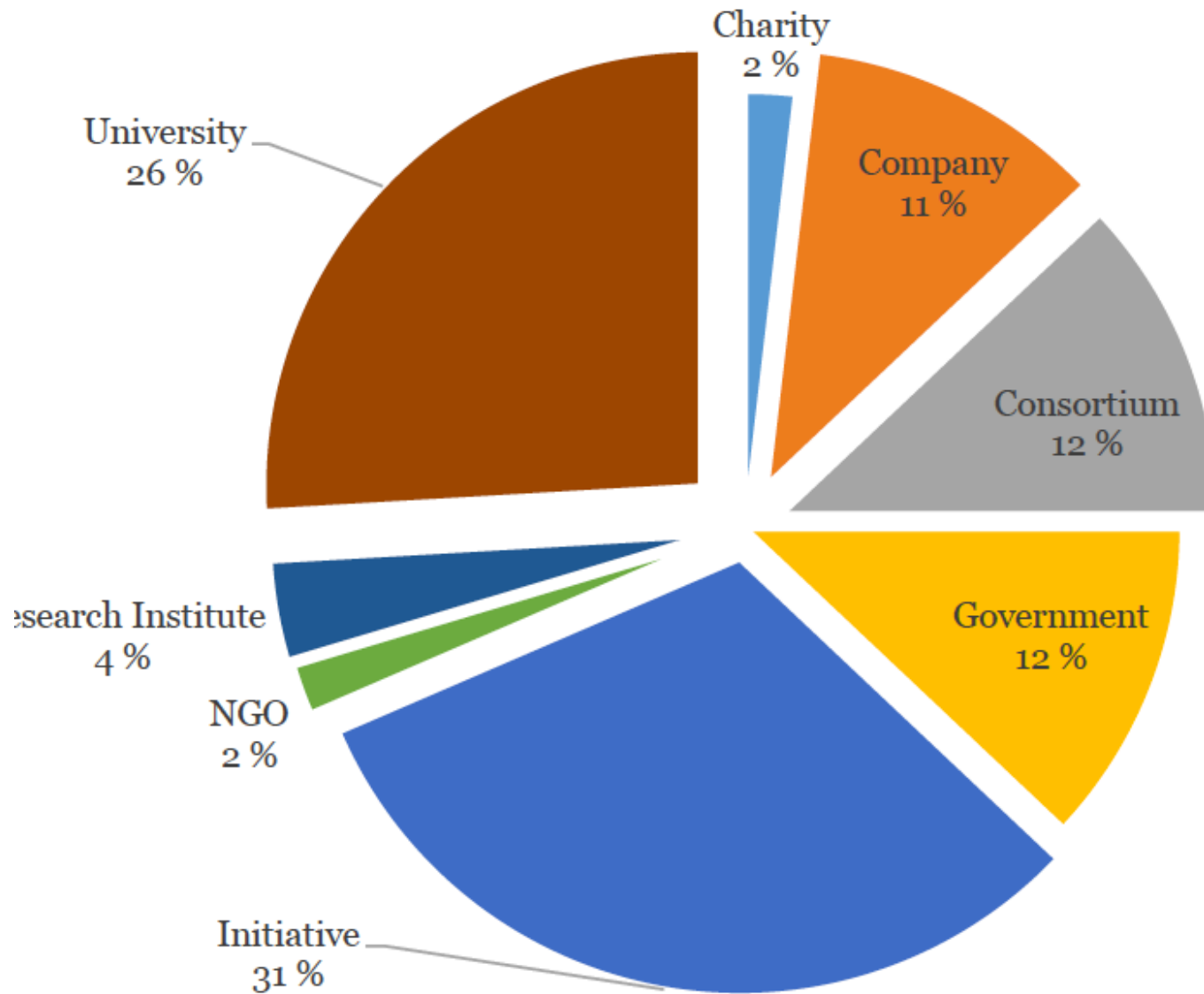
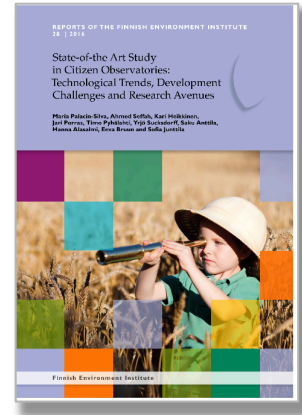


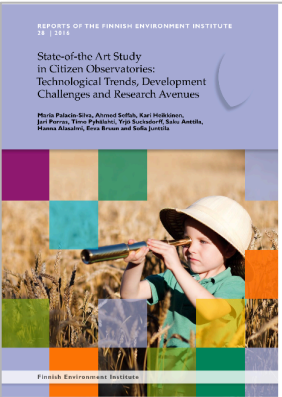
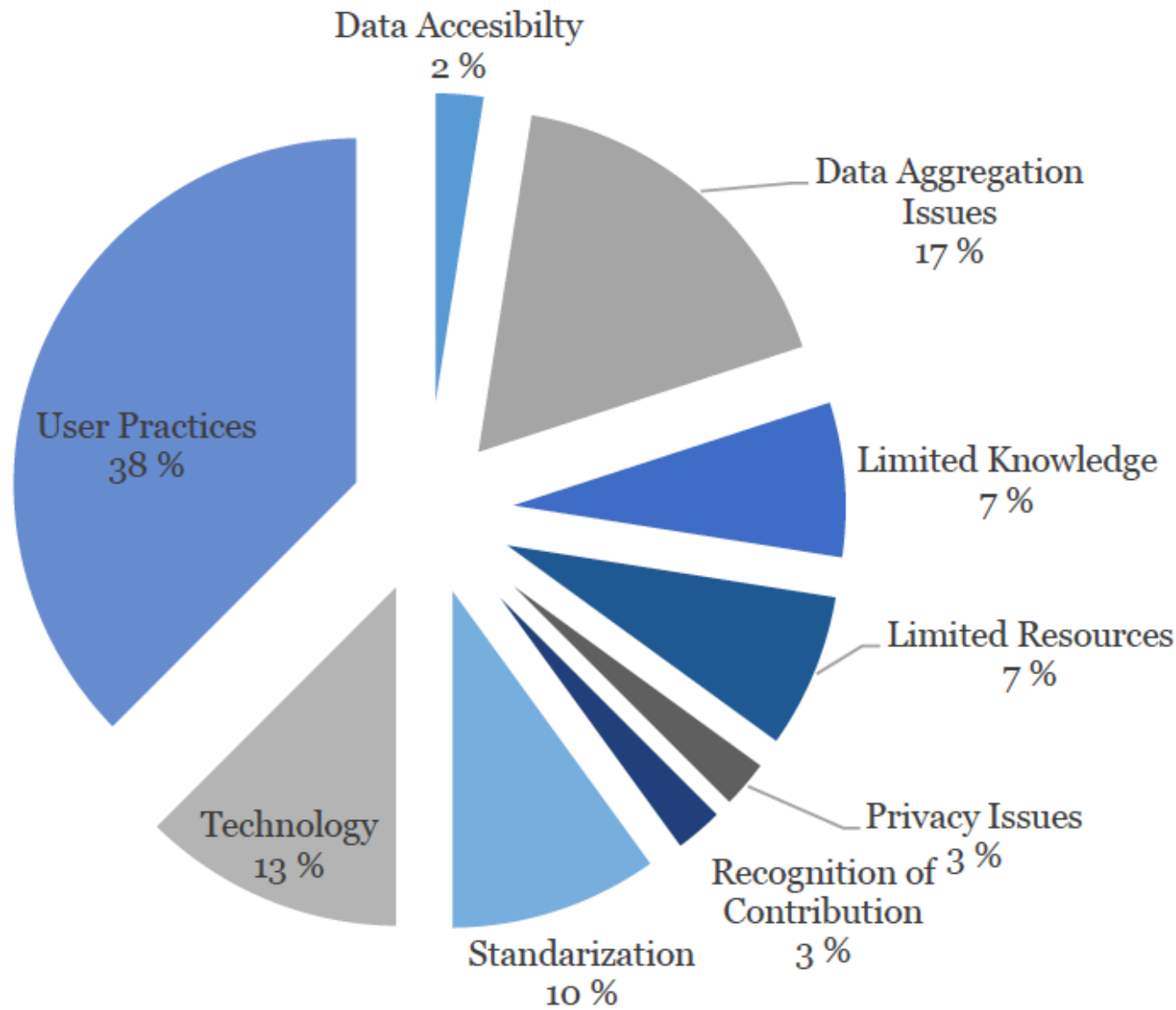
Figure 16: Institutions Running Citizen Observatories Worldwide



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

Citizen Observatories Problems and Limitations



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

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



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. Scott. 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> <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. Storey¹](#), [Arlan Wright-Stow¹](#), [Eileen Kin²](#), [Robert J. Davies-Colley¹](#) and [Rebecca Scott¹](#)

ABSTRACT. Recent freshwater p... making and management. Involvin... discuss this knowledge with pro... interactions rarely occur because, i... between volunteer (community gr... months, community groups and re... periphyton and benthic macroinve... Community groups achieved clos... conductivity, visual water clarity, a... 0.4, respectively). Volunteer asses... of thick periphyton growths (% str... for a macroinvertebrate biotic ind... difference was 12% of the index sco... and attentiveness to local and nati... community. Most groups had dev... engaging in freshwater decision m... reliable enough to augment profes... to engage in freshwater decision m...

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^{a,1}, Bilal Butt² and Mevin B. Hooten³

¹Natural Resource Ecology Lab, Department of Ecosystem Science and Sustainability, Colorado State University, Fort Collins, CO 80523-1499, USA; ²School for Environment and Sustainability, University of Michigan, Ann Arbor, MI 48103, USA; and ³U.S. Geological Survey, Colorado Cooperative Fish and Wildlife Research Unit, Departments of Fish, Wildlife & Conservation Biology and Statistics, Colorado State University, Fort Collins, CO 80523, USA





Menu



MyeXtend / Introduction to Citizen Science & Scientific C...

Introduction to Citizen Science & Scientific Crowdsourcing

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- Welcome to Introduction to Citizen Science and Scientific Crowdsourcing
Progress: 0 / 9
- Week 1: Introduction
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- Week 4: User Experience for Citizen Science II
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- Week 5: Citizen science data management issues
Progress: 0 / 26
- Week 7: Legal and ethical issues; citizen science with non-literate participants
Progress: 0 / 18
- Week 8: Evaluation in a new light
Progress: 0 / 21

[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.



The WeObserve Massive Open Online Course (MOOC) for COs

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.

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

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

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

