



Onto new horizons

Learnings from the WeObserve project to strengthen awareness, acceptability and sustainability of Citizen Observatories in Europe

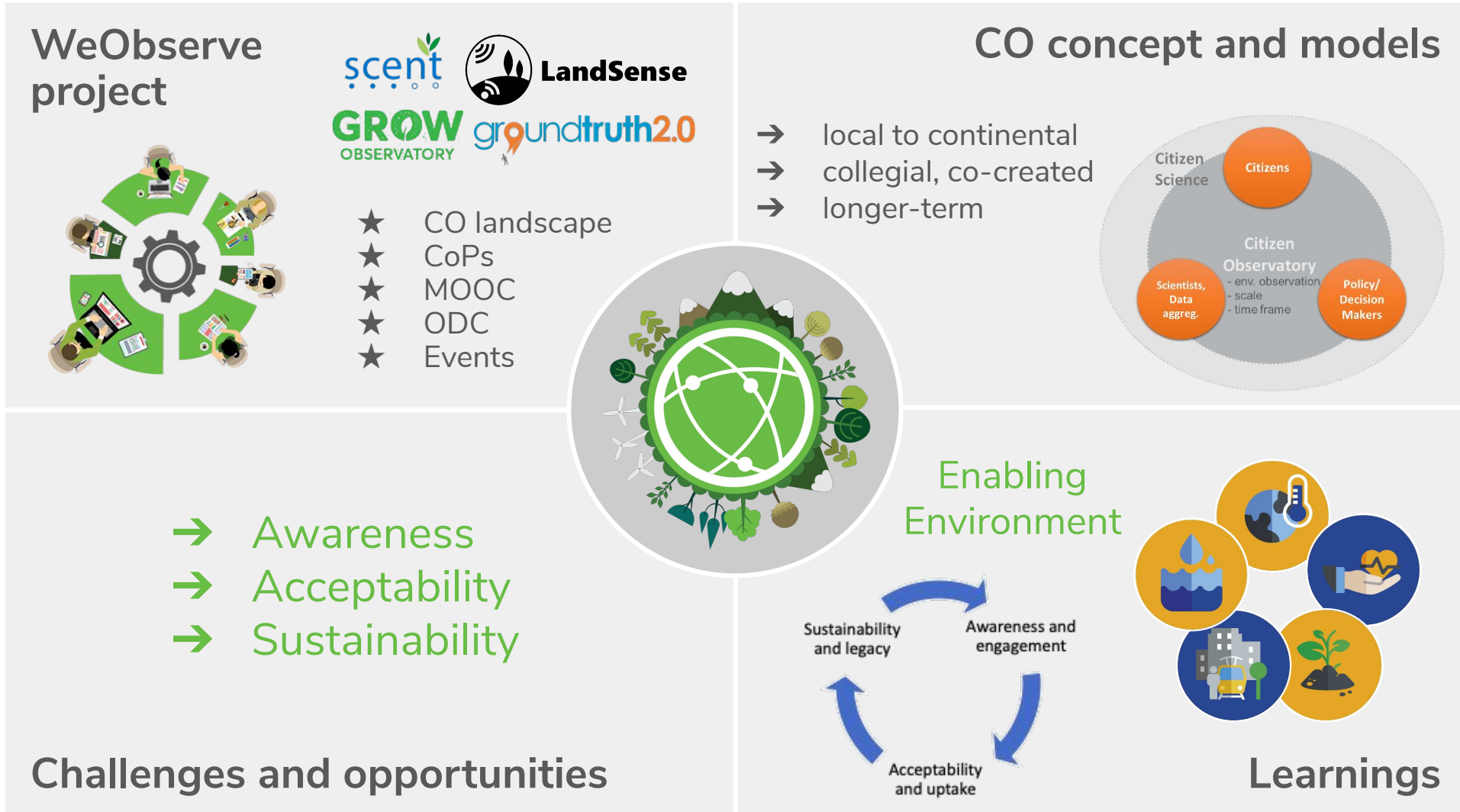
Gerid Hager (IIASA), ECSA conference 2020

Margaret Gold (ECSA), Izabela Freytag (EC), Dahlia Domian (IIASA), Joan Masó (CREAF), Inian Moorthy (IIASA), Linda See (IIASA), Valantis Tsiakos (ICCS), Uta Wehn (IHE Delft), Mel Woods (University of Dundee), Steffen Fritz (IIASA)



The project WeObserve has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 776740.

Onto new horizons: learnings from the WeObserve project to strengthen awareness, acceptability and sustainability of Citizen Observatories in Europe



Starting point



Citizen Observatories

“Community-based environmental monitoring and information systems that build on innovative and novel Earth observation applications for citizens to help and be engaged in observing our environment.” (EC)

Global citizen observatory - The role of individuals in observing and understanding our changing world.

Speech Published 25 Feb 2009 — Last modified 13 Apr 2011

Lecture by Prof. Jacqueline McGlade, Executive Director, European Environment Agency. Annual Earthwatch lecture - Citizen Science, Oxford, 16th February 2009 .

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



Citizen Observatories (COs)

- 5 CO projects funded in FP7 programme (Research and Innovation Actions)
- 4 CO projects funded in Horizon 2020 programme (Innovation Actions)
- 1 CO Coordination and Support Action in H2020 (WeObserve)
- Other funding calls in H2020 supporting CO concept (e.g., Farmland biodiversity SFS-1, SC5-2017-18: Novel in-situ observation systems) and supporting CO coordination and service development (e.g., COS4CLOUD)
- Multiple opportunities in H2020 Green Deal call (officially released during R&I days in Sept 2020)

| 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 |





VISION

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

MISSION

To move citizen science into the mainstream by building a sustainable ecosystem of Citizen Observatories and related activities



WeObserve “sister” CO projects

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>scent</p> <p>Citizen-driven land cover use monitoring for efficient flood management</p> <p>VIEW</p> |  <p>GROW OBSERVATORY</p> <p>Soil and food cultivation management</p> <p>VIEW</p> |
|  <p>groundtruth2.0</p> <p>Environmental knowledge discovery of human sensed data</p> <p>A new approach to citizen observatories</p> <p>VIEW</p> |  <p>LandSense</p> <p>A Citizen Observatory and Innovation Marketplace for Land Use and Land Cover Monitoring</p> <p>Earth observation through Satellite imagery for urban landscape dynamics, agricultural land use and forest and habitat monitoring</p> <p>VIEW</p> |



Key Challenges



AWARENESS
Generating awareness to build and sustain a critical mass to support citizen science initiatives



ACCEPTABILITY
Showcasing the added value of citizen-driven science to decision and policy makers



SUSTAINABILITY
Creating an ecosystem that can support and scale-up citizen science to various sectors

What are COs and how can I participate?
What is the use and why should we support it?

What value can we gain and does it help us to tackle problems? Can we trust the data? Are the methods suitable and ethical and do they comply with regulation?

How can a CO be sustained? What is required for tech maintenance, community building, transition governance and ongoing funding?



Instruments

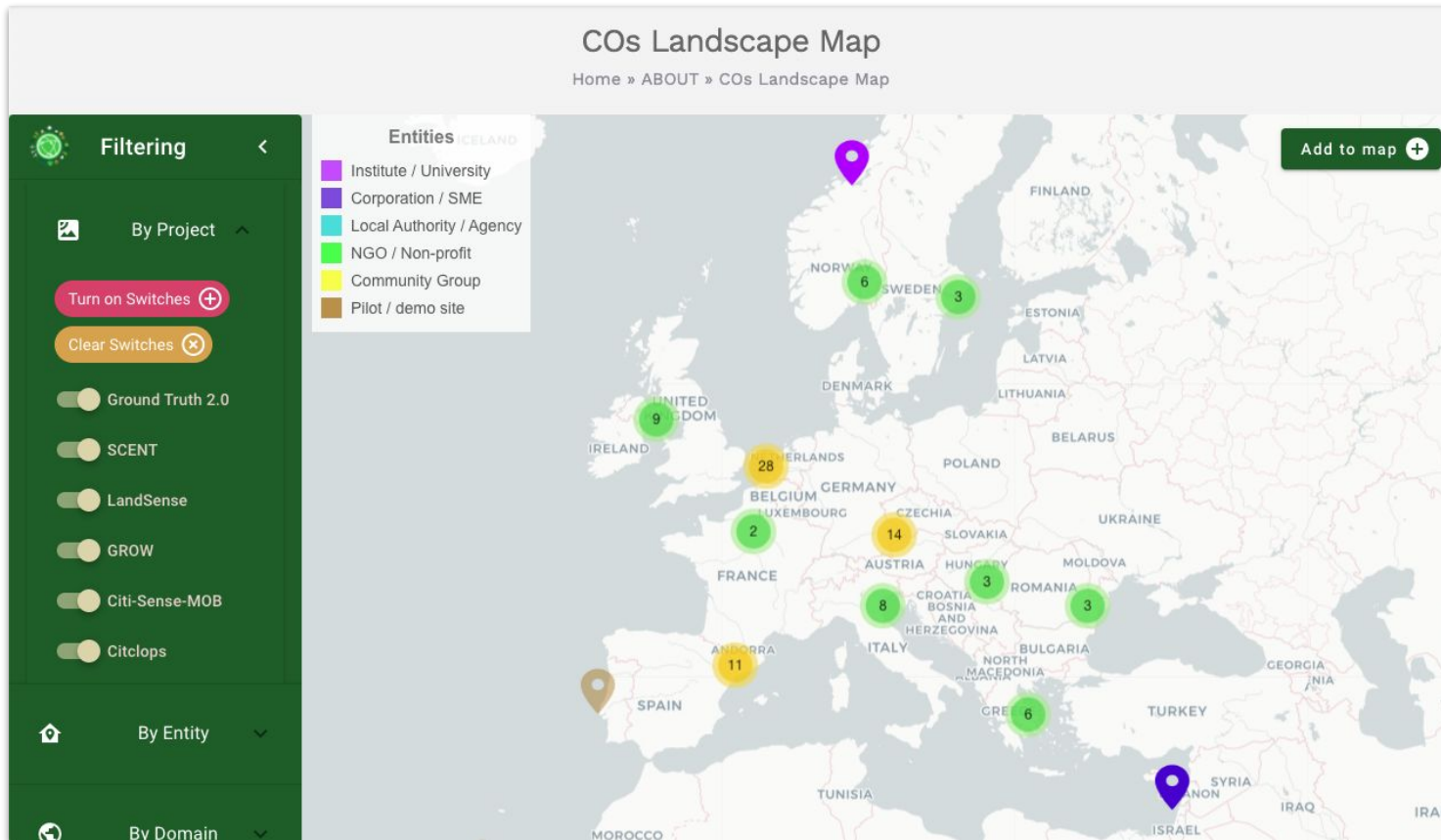
(amongst others...)



Communities of Practice



CO landscape

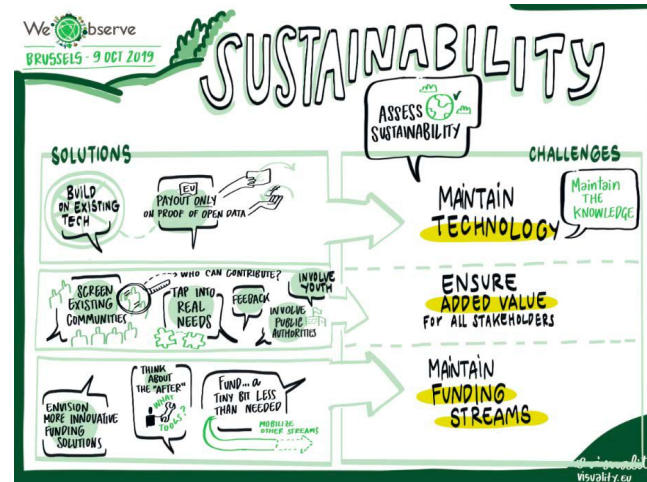
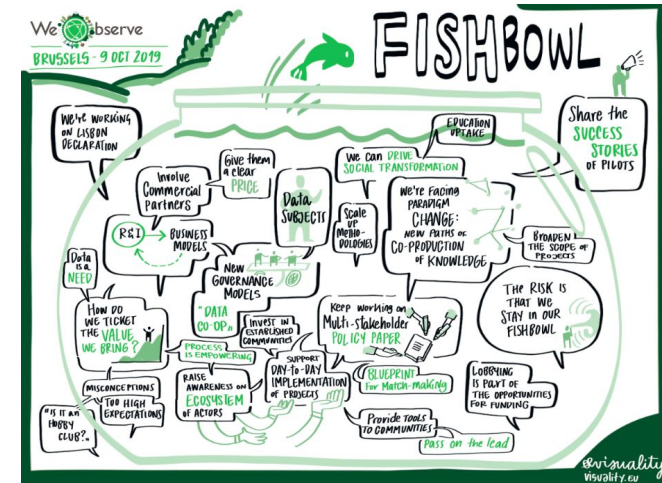
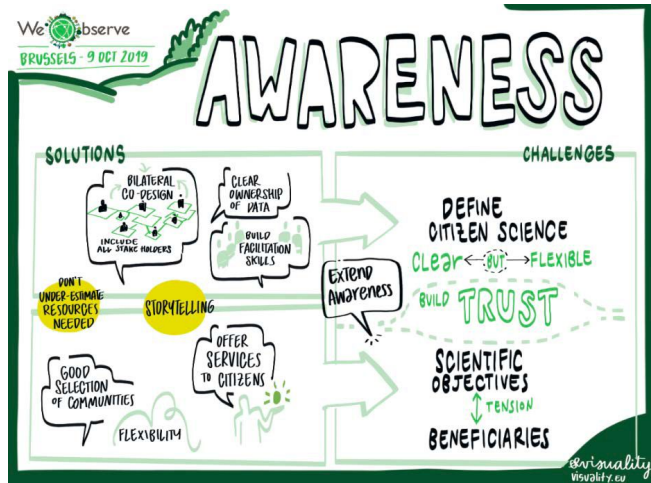


Add yourself to the map!

Stay tuned for the new CO landscape report - coming soon!

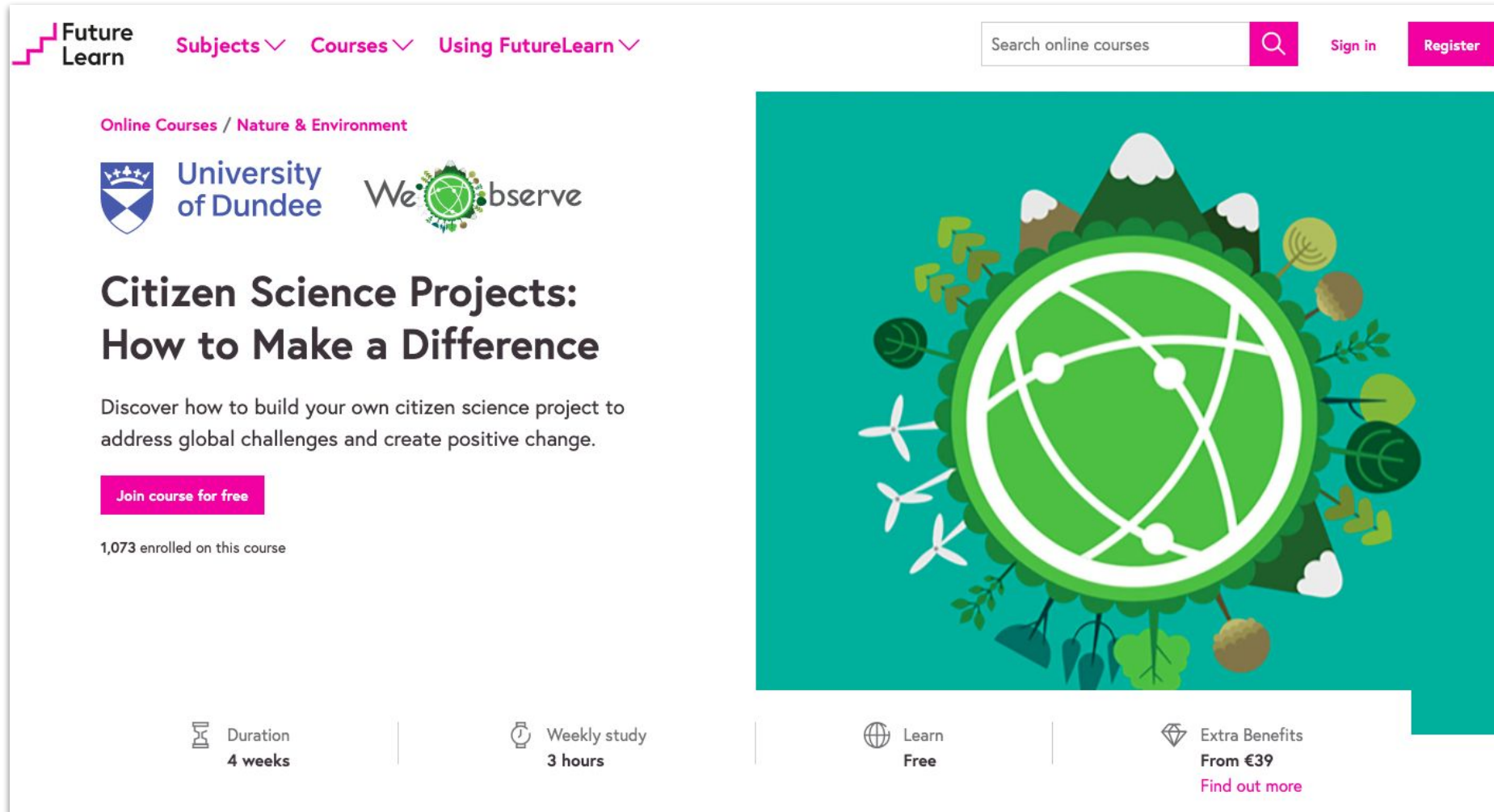


4 CO projects events and CO4EO workshops



WeObserve MOOC

Enroll now for
5 Oct 2020!



The screenshot shows the FutureLearn website interface. At the top left is the FutureLearn logo. Navigation links include 'Subjects', 'Courses', and 'Using FutureLearn'. A search bar contains the text 'Search online courses'. On the right are 'Sign in' and 'Register' buttons. The main content area features the University of Dundee logo and the WeObserve logo. The course title is 'Citizen Science Projects: How to Make a Difference'. Below the title is a short description: 'Discover how to build your own citizen science project to address global challenges and create positive change.' A pink button says 'Join course for free'. Below that, it says '1,073 enrolled on this course'. At the bottom, there are four feature boxes: 'Duration 4 weeks', 'Weekly study 3 hours', 'Learn Free', and 'Extra Benefits From €39 Find out more'. A large green circular graphic with a network diagram and nature icons is on the right side of the course card.

FutureLearn

Subjects ▾ Courses ▾ Using FutureLearn ▾

Search online courses

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University of Dundee WeObserve

Citizen Science Projects: How to Make a Difference

Discover how to build your own citizen science project to address global challenges and create positive change.

Join course for free

1,073 enrolled on this course

Duration 4 weeks

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Learn Free

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WeObserve challenges @ INSPIRE hackathon

Challenge 6: Integrating INSPIRE with Citizen Science and EO authentication systems



Earth observation + Citizen Science = Empowered Society



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Challenge 7: Establish the connection of Citizen Observatories resources with central catalogue

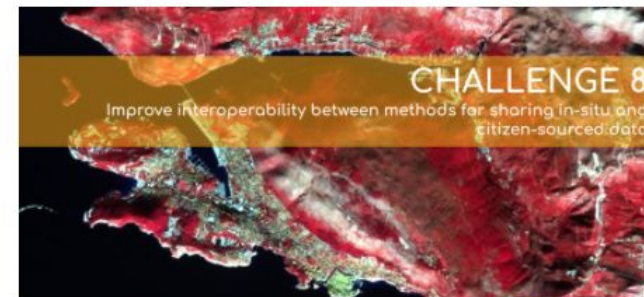


Earth Observation + Citizen Science = Empowered Society



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Challenge 8: Improve interoperability between methods for sharing in-situ and citizen-sourced data



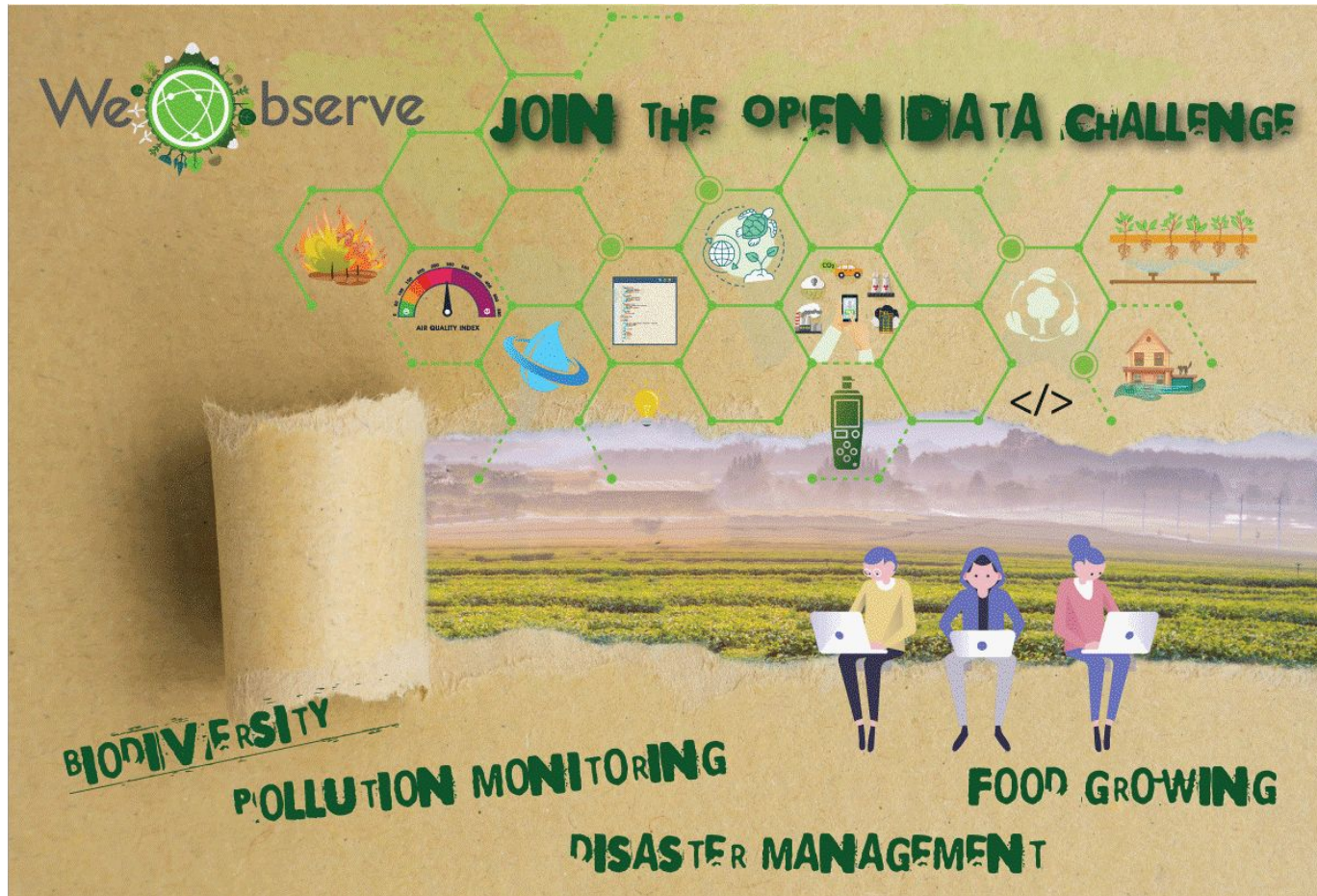
Earth Observation + Citizen Science = Empowered Society



[DOWNLOAD THE FINAL REPORT](#)



Open Data Challenge



Uptake of CO data

Value and use of CO data

Open source downstream applications

44 registrations
9 submissions

Two winning teams and
one runner up



Publications

WeObserve
Policy Brief #1
JULY 2020

A Roadmap for Citizen Science in GEO

The essence of the Lisbon Declaration

Key Messages for policy makers

- To secure the integration of Citizen Observatories into GEOSS, the recommended:
- Support the consolidation of federation as a common technical strong governance, privacy and continuity in the Europ. Association (ECSA).
- Connect the Citizen Science federations into the GEOSS structure and to the GEOSS platform making support infrastructure.
- Create and support an EuroGEO Science that continues the Horizon 2020 projects.

Earth Observation
Data and information collected about atmospheric, oceanic or terrestrial, based or remotely-sensed data, as research and citizen science in-situ analysis. Earth Observation data can be used to better understand the issues that more effective policies.

Citizen Science
Citizen Science is an umbrella term for public participation in scientific research including community-based monitoring, participatory action research and other forms.

Citizen Observatories
Citizen Observatories are participatory engage citizens in community-based monitoring, often with close links to policy. The European Union framework for Citizen Observatories is the 7th Framework for Citizen Observatories to function and

Mission Sustainable: Fostering an enabling environment for sustainable Citizen Observatories

Executive Summary
Citizen Observatories are initiatives that engage citizens and other stakeholders in community-based environmental monitoring. They address major issues such as global warming, biodiversity decline, and natural disasters by providing valuable data that are often not available from conventional sources. They are uniquely placed to engage stakeholders across the Quadruple Helix (science, policy, industry, and society) to address societal challenges. However, Citizen Observatories face a number of challenges unique to their particular characteristics, such as the longer period of time over which an engaged community of participants is built, and the use of innovative data collection tools and technologies. European policy makers and funders can improve the conditions that allow Citizen Observatories to thrive and sustain their activities. Based on a range of inputs from practitioners, this policy brief makes four specific recommendations to European and national funding bodies and policy makers for fostering an enabling environment that can contribute to the generation, execution and sustainability of Citizen Observatories and therefore maximise their impact.

Summary of recommendations for policy makers & funders

1. Provide greater flexibility within funding schemes for co-design of Citizen Observatories.
2. Encourage the use of open source software, shared code bases, and sustainable hardware, and support ongoing technology development via iterative user feedback.
3. Explicitly include Citizen Observatories in mission-driven research funding schemes as a means for stakeholder engagement.
4. Provide longer term funding support for Citizen Observatories.

OGC Citizen Science Interoperability Experiment Engineering Report

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Editor: Joan Masó

Title: OGC Citizen Science Interoperability Experiment Engineering Report

OGC Engineering Report
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EUROGEO 2019 CITIZEN SCIENCE ROADMAP "LISBON DECLARATION"

This document has been created by the community of Citizen Observatories and Citizen Science practitioners, as well as key contributors to the EuroGEO Workshop taking place in Lisbon (Portugal), The Foundation for Science and Technology (FCT).

The Lisbon Declaration was edited by Joana Masó and Steffen Fritz (IIASA).

Introduction

This document summarizes the current vision, and objectives, identifies issues to be addressed, and proposes a shared vision that will pave the way to progress towards citizen science into a federation of data services in the GEO work program that represent the list of recommendations to the European Engineering Report should not be taken as a regional strength and competences within the GEO work program.

Scope

This document is structured as follows:

- Summarizes the state of play of citizen science
- Introduces the current situation of citizen science
- Outlines a roadmap towards a shared vision
- Offers recommendations to the European Engineering Report

State of play

In 2014, Citizen Science had no visibility in the EC 7th Framework program (FP7). Citizen Science is now a priority in the EC 8th Framework program (FP8).

PERSPECTIVE

<https://doi.org/10.1007/978-3-030-33033-7>

nature
sustainability

Corrected: Author Correction

Citizen science and the United Nations Sustainable Development Goals

Steffen Fritz^{1*}, Linda See², Tyler Carlson³, Mordechai (Muki) Haklay⁴, Jessie L. Oliver^{5,6}, Dilek Fraisl^{7,8}, Rosy Mondardini⁹, Martin Brodeur¹⁰, Uta Wehn¹¹, Tommaso Abrate¹², Janet Anstee¹³, Jillian Campbell¹⁴, Jessica Espey¹⁵, Margaret Gold¹⁶, Angel Hsu¹⁷, Deborah Long^{18,19}, Joan Masó²⁰, Michael Obersteiner²¹, Alison J. Parker²², Maik...

Traditional data sources are not sufficient for measuring progress towards the United Nations Sustainable Development Goals (SDGs). Citizen science is a promising new source of data that could be used for SDG reporting and monitoring. However, information is still lacking regarding the current and potential contributions of citizen science to the SDG indicator framework. Through a systematic review of the metadata and work plans of the 244 SDG indicators, as well as the identification of past and ongoing citizen science initiatives that could directly or indirectly provide data for these indicators, this paper presents an overview of where citizen science is already contributing and could contribute data to the SDG indicator framework. The results demonstrate that citizen science is "already contributing" to the monitoring of 5 SDG indicators, and that citizen science "could contribute" to 76 indicators, which, together, equates to around 33%. Our analysis also shows that the greatest inputs from citizen science to the SDG framework relate to SDG 15 Life on Land, SDG 11 Sustainable Cities and Communities, SDG 3 Good Health and Wellbeing, and SDG 6 Clean Water and Sanitation. Realizing the full potential of citizen science requires demonstrating its value in the global data ecosystem, building partnerships around citizen science data to accelerate SDG progress, and leveraging investments to enhance its use and impact.

Abstract
Advances in technology and the proliferation of data are providing new opportunities for monitoring and tracking the progress of the United Nations (UN) Sustainable Development Goals (SDGs). As the latest framework for assessing and monitoring the alleviation of poverty, inequalities and environmental degradation, progress on meeting the 17 SDGs is evaluated through reporting on a hierarchy of 169 targets and 232 indicators (Item 3). Here we argue that data produced through citizen science, which is the involvement of citizens in scientific research and knowledge production, can complement and ultimately improve the SDG reporting process. We demonstrate the value of using data from citizen science into official SDG reporting at global and national levels, with a proposal for supporting activities to the local level.

Keywords Sustainable Development Goals (SDGs) · Citizen science · SDG indicators · Tier classification for SDG indicators · Crowdsourcing · Community-based monitoring

Sustainability Science
<https://doi.org/10.1007/978-3-030-33033-7>

ORIGINAL ARTICLE

Mapping citizen science contributions to the UN sustainable development goals

Dilek Fraisl^{1,2*}, Jillian Campbell³, Linda See⁴, Uta Wehn⁵, Jessica Wardlaw⁶, Margaret Gold⁷, Inian Moorthy⁸, Rosa Arias⁹, Jaume Piers¹⁰, Jessica L. Oliver^{11,12}, Joan Masó¹³, Marianne Penker¹⁴, Steffen Fritz¹⁵

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Abstract
The UN Sustainable Development Goals (SDGs) are a vision for achieving a sustainable future. Reliable, timely, comprehensive, and consistent data are critical for measuring progress towards, and ultimately achieving, the SDGs. Data from citizen science represent one new source of data that could be used for SDG reporting and monitoring. However, information is still lacking regarding the current and potential contributions of citizen science to the SDG indicator framework. Through a systematic review of the metadata and work plans of the 244 SDG indicators, as well as the identification of past and ongoing citizen science initiatives that could directly or indirectly provide data for these indicators, this paper presents an overview of where citizen science is already contributing and could contribute data to the SDG indicator framework. The results demonstrate that citizen science is "already contributing" to the monitoring of 5 SDG indicators, and that citizen science "could contribute" to 76 indicators, which, together, equates to around 33%. Our analysis also shows that the greatest inputs from citizen science to the SDG framework relate to SDG 15 Life on Land, SDG 11 Sustainable Cities and Communities, SDG 3 Good Health and Wellbeing, and SDG 6 Clean Water and Sanitation. Realizing the full potential of citizen science requires demonstrating its value in the global data ecosystem, building partnerships around citizen science data to accelerate SDG progress, and leveraging investments to enhance its use and impact.

Keywords Sustainable Development Goals (SDGs) · Citizen science · SDG indicators · Tier classification for SDG indicators · Crowdsourcing · Community-based monitoring

Introduction

In September 2015, the United Nations Sustainable Development Summit adopted an international framework to guide global development efforts, entitled "Transforming our world: the 2030 Agenda for sustainable development" (UN 2015). The Agenda includes 17 Sustainable Development Goals (SDGs) and 169 targets relating to global challenges including poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. The UN General Assembly (UN 2017).

Assembly tasked a group of technical and statistical experts with developing a global monitoring framework that would allow the tracking of each SDG target, while at the same time keeping in mind the feasibility and reporting burden of such a monitoring framework. This led to the creation and adoption of the current list of 244 SDG indicators by the UN General Assembly (UN 2017).

The SDG indicator framework is developed based on the existence of a global methodology and data availability. Each SDG indicator was placed into one of three tiers to track progress towards operationalizing the indicator framework. A simplification of the tiering framework is: Tier I: existence of an agreed methodology and good data coverage (at least 50%); Tier II: agreed methodology, but data are lacking (less than 50% data coverage), and Tier III: no established methodology (UN n.d.). The monitoring of the SDGs is expected to happen at the sub-national, national, regional, and global level to ensure the vertical coherence of policies and actions. In terms

Handled by Yuya Kajikawa, Tokyo Institute of Technology, Japan.

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/978-3-030-33033-7>) contains supplementary material, which is available to authorized users.

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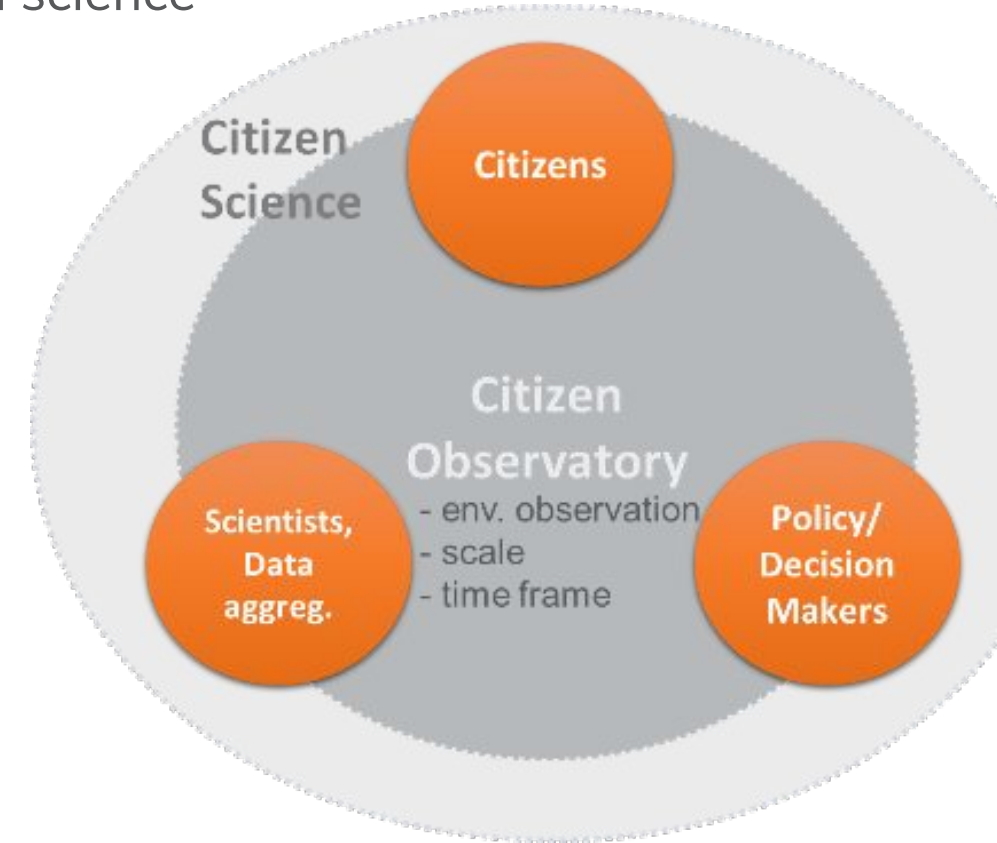
Springer

Learnings



Evolution of CO concept and models

- Moving beyond being “a European artefact” within citizen science
- COs as particular form of citizen science
 - Place-based participation of citizens
 - Use of web and mobile applications
 - Environmental monitoring, management and governance
 - Societal relevance beyond science
 - Bi-directional flow of data and information
 - Longer-term, or defined timeframe to address a specific issue/situation
 - Actions across a network of stakeholders
- Range of CO models
 - Contributory
 - Collegial, or collaborative
 - Co-designed



Source: Engage and Impact CoP Inception reports (2018)

CO impacts and impact potential

- Improved scientific knowledge and EO ground truthing
- Educational impact and citizen empowerment through data access
- Individual behaviour change
- Improved services and decision making tools
- Improved disaster and risk monitoring and management
- Newly established public-private dialogue, partnerships and active citizen groups
- Lower expenditure costs on in-situ data collection
- Change of institutional practice
- Support for and improved implementation of (new) policies

- Integration with GEOSS and EO data
 - Extending GEO database
 - “Ground truthing” and validation of EO data and satellite products
- SDGs
 - COs could contribute to monitoring of 40% of environmental indicators

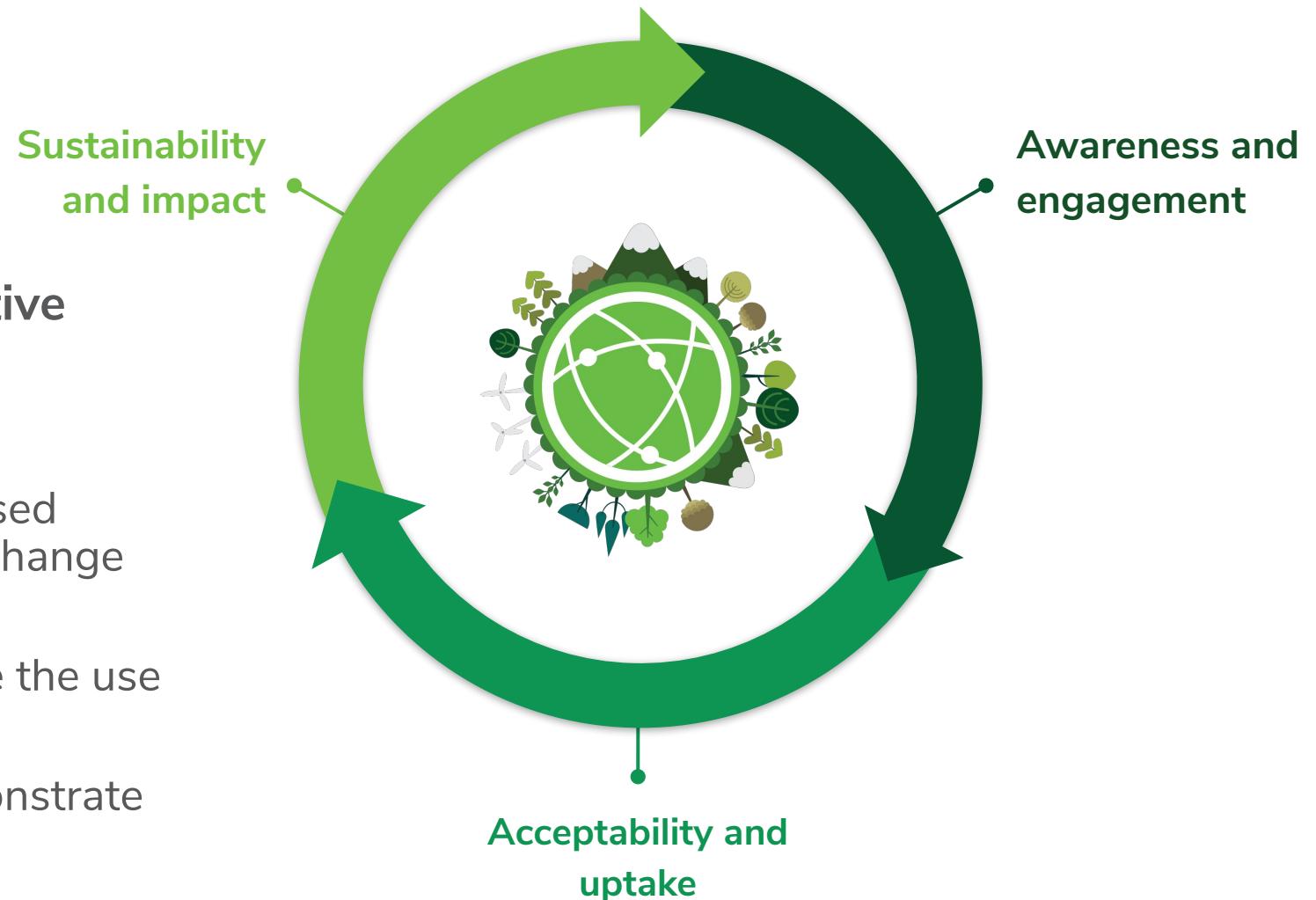


Interlinked challenges and solutions

COs design that reinforces a positive feedback loop

From the onset:

- Engage established, place-based communities and facilitate exchange across stakeholders
- Foster data quality and ensure the use and accessibility of data
- Communicate value and demonstrate impact
- Design for sustainability



The enabling environment

“The sum of conditions that enable a CO to function, deliver value and impact and sustain its activities”

- Network of stakeholders and active place-based community, linkage with other networks and communities of practice
- Skills, capacity building, training and knowledge sharing capabilities
- Suitable and reliable technology, data infrastructures and standards
- Legal, policy and funding frameworks that support flexibility, sustainability, and impact and value delivery



Horizon Europe: opportunities for COs

- **Mission orientation**
 - Achieving goals with impact for society, policy making and relevance for a wide range of European citizens
- **Aims**
 - Widening participation and relating EU's research and innovation better to society and citizens' needs
 - Enhancing the European R&I system through citizen science, RRI and Open Science
- **Thematic clusters 1, 5 and 6**
- **Research and data infrastructures**
 - Consideration of CO requirements
- **Innovation and new markets**
 - Explore CO business models and value creation

Pillar 2
Global Challenges and European Industrial Competitiveness

Clusters

- Health
- Culture, Creativity and Inclusive Society
- Civil Security for Society
- Digital, Industry and Space
- Climate, Energy and Mobility
- Food, Bioeconomy, Natural Resources, Agriculture and Environment

Horizon Europe
THE NEXT EU RESEARCH & INNOVATION INVESTMENT PROGRAMME (2021 - 2027)

#HorizonEU

Based on the Commission Proposal for Horizon Europe, the common understanding between co-legislators and the Partial General Approach, both approved in April 2019

European Commission

Research and Innovation

COs: opportunities for Horizon Europe

The CO concept provides a suitable and well tested mechanism that can support the delivery of the Horizon Europe ambition across the entire R&I programme.

- Citizens' and stakeholder involvement and participation
- Delivering on citizen's priorities
- Addressing socio-ecological challenges
 - Data gaps and EO ground truthing
 - Multi-stakeholder processes
 - Circular information flow to support decision-making
 - Evidence-based policies
- Helping to monitor and achieve the SDGs



Recommendations

for shaping Horizon Europe and other future funding calls

Detailed recommendations

- Policy briefs -
- Lisbon Declaration -
- Publications and reports -

Support outreach, communication and engagement

- Encourage strong communication and media plans, and appropriate consortium composition
- Engagement of policy, stakeholders, place based communities and community organisations from the start

Strengthen networks and build sustainable infrastructures

- Continued support of established networks and CoPs (linking across all relevant actors: eg ECSA, UN, GEO, OGC, UNESCO etc)
- Permanent e-infrastructure to federate CS projects, integrate CS data, host and share services
- Connect the CS federation to the European Open Science Cloud (EOSC) and to the GEOSS platform
- Promote open source software, shared code bases, and sustainable hardware

Enable innovative funding conditions

- Flexibility to allow for iteration and co-design
- Innovative follow-up funding and support of governance transitions when meeting specific targets and when demonstrating impact
- Support link/transition into national funding schemes for local continuation
- Offer specific tenders to further develop proof-of-concept applications into open source tools in use





Thank you

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