European Commission

Mutual Learning Exercise on Citizen Science Initiatives – Policy and Practice

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Research and Innovation

Mutual Learning Exercise on Citizen Science Initiatives – Policy and Practice
Policy brief

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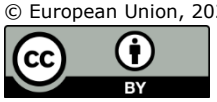

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EUROPEAN COMMISSION

Mutual Learning Exercise on Citizen Science Initiatives – Policy and Practice

Policy brief

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Directorate-General for Research and Innovation
Horizon Europe Policy Support Facility

Over the past decade, great advances have been made in applying innovative participatory and inclusive research practices across a wide range of domains. These have involved increasing numbers of citizens in monitoring, observing and co-researching societal issues such as climate change impacts on the environment and public health, sustainable mobility, and plastic pollution in rivers and oceans. Important outcomes have been achieved: from fundamental scientific discoveries[1] to data that support evidence-informed policy[2].

These innovative and diverse practices, encapsulated in the umbrella term 'Citizen Science', are becoming increasingly recognised by the European Commission (EC) as essential to achieving the strategic aims of the European Green Deal. They are woven throughout the funding instruments of Horizon Europe, including the European clusters and missions, and the New European Bauhaus. Citizen Science is also being embedded by the EU Member States in their national science policies to involve stakeholders across the quadruple helix in Research & Innovation (R&I).

The field of Citizen Science is now entering a more productive phase, with real potential for helping to achieve the strategic ambitions of Member States. The Policy Support Facility (PSF) within the Directorate-General for Research and Innovation (DG R&I) therefore commissioned and supported a Mutual Learning Exercise (MLE) on Citizen Science Initiatives, Policy and Practice.

The main aim of the MLE has been to **identify and promote good practices, experience and lessons learned, in addition to policies and programmes for Citizen Science** among 11 participating countries (Austria, Belgium, France, Germany, Hungary, Italy, Norway, Portugal, Romania, Slovenia and Sweden)**.** The MLE therefore aims to achieve **greater societal impact and increase trust in science** through the leveraging of collective societal capabilities and insights, and to enlarge the scope and impact of Research and Innovation **through increased societal relevance, responsiveness and transparency.**

[1] For specific examples, see the Citizen Science approaches within fundamental research recently profiled by the European Research Council https://erc.europa.eu/news-events/events/showcase-projects-citizen-science

[2] For specific examples, see: Schade, S., Pelacho, M., van Noordwijk, T., Vohland, K., Hecker, S., Manzoni, M. (2021). *Citizen Science and Policy*. In The Science of Citizen Science. Springer, Cham. https://doi.org/10.1007/978-3-030-58278-4_18; and Turbé, A., Barba, J., Pelacho, M., Mugdal, S., Robinson, L.D., Serrano-Sanz, F., Sanz, F., Tsinaraki, C., Rubio, J.-M. and Schade, S., 2019. *Understanding the Citizen Science Landscape for European Environmental Policy: An Assessment and Recommendations*. Citizen Science: Theory and Practice, 4(1), p.34. DOI: http://doi.org/10.5334/cstp.239

Realising the full potential of Citizen Science requires a culture change across the entire scientific landscape - not only to embrace the principles of Open Science, within which Citizen Science is one of the key pillars, but also to value and support societal engagement within future science policy and practice at the highest levels of government and science.

The Final Report of the MLE presents a summary of the learning and recommendations generated throughout the year-long process[3] as an inspiration, guide and resource for national policy makers and other key actors in the national science landscape. Discussion Papers and Thematic Reports covering the topics of the MLE contain further examples of best practice, and recommendations for further development:

- **Topic 1**: Introduction and overview of Citizen Science
- **Topic 2**: Ensuring good practices and impacts
- **Topic 3**: Maximising the relevance and excellence of Citizen Science
- **Topic 4**: Enabling environments and sustaining Citizen Science
- **Topic 5**: Scaling up Citizen Science

Due to the plurality of Citizen Science practices, and the importance of their cultural embeddedness within a specific research and innovation context, rather than offering a common roadmap for maximising the potential of Citizen Science, we encourage countries to co-create their own national vision for Citizen Science. This should be in keeping with their national context and previous experience of participatory research practices. It should also draw together key national stakeholders. From this, a range of action lines can be developed to move from the current state-of-play towards the national vision, putting key enabling and supportive elements into place as needed.

To achieve this, the Final MLE Meeting and Final Report introduce the 'backcasting' strategic planning technique, as illustrated in Figure 1 below. Working from vision to challenges to recommendations, the outputs of this MLE thus do not suggest one route for all countries, but recommend a more flexible, context-specific but also ambitious approach that builds on the substantial foundation for cross-national learning and inspiration that this MLE provides.

[3] The full repository of Thematic Reports, Discussion Papers, workshop presentations, and the MLE factsheet can be found on the PSF website: https://ec.europa.eu/research-and-innovation/en/statistics/policy-support-facility/psf-challenge/mutual-learning-exercise-citizen-science-initiatives-policy-and-practice .

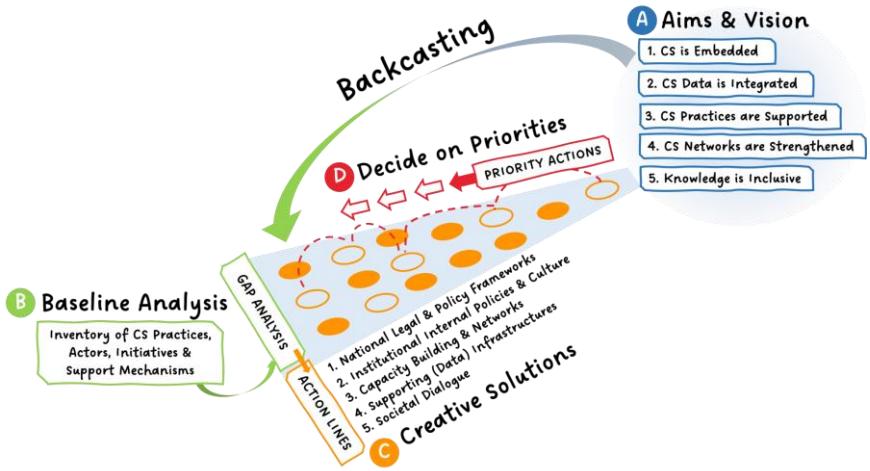

Figure 1: The Backcasting planning approach, first coined by John Robinson in 1982, applied in the MLE for developing a national strategic roadmap for Citizen Science, following the A-B-C-D method developed by The Natural Step

Backcasting is often applied as a planning approach for long-term complex issues that involve many aspects of society as well as technological innovations and culture change. This makes it a useful and highly relevant tool for developing a course of action to more fully embed and support Citizen Science at the national level. In the context of this MLE, the first step of the backcasting approach has been to establish the long-term goals for Citizen Science as a practice, the value it can deliver, and the national vision for the partnership between Science, Policy & Society.

Together with representatives from the participating countries in the MLE, we identified **five key elements to achieving a national strategic vision** for Citizen Science:

1. **Embed Citizen Science** as part of mainstream research, funding, education and innovation processes.
2. **Integrate Citizen Science Data** into mainstream processes for research, policy making and decision making.
3. **Support Citizen Science Practices** by identifying and addressing the needs of the wide range of different actors initiating, leading, and participating in Citizen Science.
4. **Strengthen Citizen Science Networks** and enable an active national community of Citizen Science practitioners who collaborate closely with other key stakeholders across the quadruple helix, exchanging knowledge and know-how, and furthering innovation in the field.
5. **Make Knowledge Production Inclusive** such that all stakeholders interested in the outcomes of scientific research and innovation have the opportunity to participate in open and collaborative processes of scientific knowledge creation, evaluation, and communication, in all domains of research.

These five strategic aims describe the desirable future end-state or vision for Citizen Science at that national level, and this is the first step of the backcasting approach (**Step A = Aims & Vision)**.

The second step (**Step B = Baseline Analysis**) takes an inventory of the landscape of Citizen Science practices, actors, and support mechanisms already present and thriving in order to conduct a gap analysis of where further support and infrastructure is needed, and then works backwards to identify the steps and solutions necessary to achieve those aims.

In order to co-creatively design actions to address these gaps and needs for Citizen Science (**Step C = Creative Solutions**) and devise a plan to address them (**Step D = Decide on Priorities**), the MLE built on the framework of the 'Enabling Environment' and 'Enabling Factors'[4] that have been explored throughout the MLE.

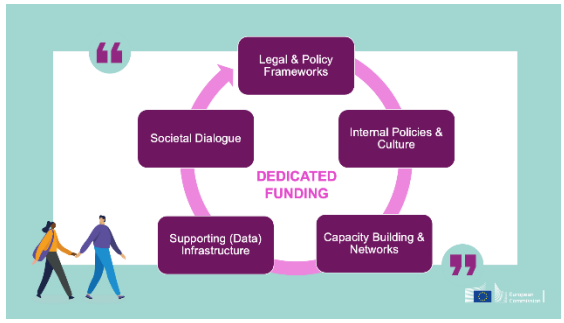

Figure 2: The five categories of enabling factors

The 5 categories of enabling factors are:

1. National Legal & Policy Frameworks,
2. Institutional Internal Policies & Culture,
3. Capacity Building & Networks,
4. Supporting (Data) Infrastructures, and
5. Societal Dialogue.

Also crucial to Steps C and D are identifying the actors who are able to implement or influence the establishment of enabling factors, according to their sphere of influence, as illustrated in Table 1 below.

Spheres of Influence → / Strategic Aims ↓	Ministries	RFOs	RPOs	RSOs	HEIs
1 (a) Embed Citizen Science as part of mainstream research and innovation processes	✓	✓	✓✓	✓	✓
1 (b) Embed Citizen Science as part of mainstream funding	✓	✓✓			
1 (c) Embed Citizen Science as part of mainstream education	✓	✓	✓		✓✓

[4] See: the Topic 4 Discussion Paper on Enabling Environments https://ec.europa.eu/research-and-innovation/sites/default/files/rio/report/Discussion%20Paper%20Topic%204%20Enabling%20Environments%20FINAL_BT.pdf ; and Topic 4 Thematic Report on Enabling Environments and Sustaining Citizen Science https://op.europa.eu/en/publication-detail/-/publication/28235058-6646-11ed-b14f-01aa75ed71a1/language-en/format-PDF/source-275091694

Spheres of Influence → / Strategic Aims ↓	Ministries	RFOs	RPOs	RSOs	HEIs
2 (a) Integrate Citizen Science Data into mainstream processes for research, policy making and decision making.	✓✓	✓		✓	
2 (b) Build Citizen Science data and technology infrastructure	✓	✓	✓	✓	
3 Support Citizen Science Practices	✓	✓	✓✓	✓✓	✓
4 Strengthen Citizen Science Networks	✓	✓✓	✓	✓	✓
5 Make Knowledge Production Inclusive	✓	✓	✓	✓	✓

Table 1: Areas of recommended actions within the Strategic Vision, and the key actors within the national science landscape (with double checkmarks indicating the stronger sphere of influence where several actors play a role)

Actors may include the National Ministries for Science and Education, (but also Environment, Transport, Agriculture, Food, Health, and others), regional, local and other sectoral policy makers, Research Funding Organisations (RFOs), Research Performing Organisations (RPOs), Research Supporting Organisations (RSOs) such as eScience Centres and computing infrastructure providers, and Higher Education Institutions. For example, RFOs are uniquely placed to provide dedicated funding instruments for Citizen Science, but all actors can play a role in supporting multi-stakeholder engagement and Citizen Science practices.

Of all these recommendations for action, the four most impactful recommendations that have been supported across all the thematic topics are to:

1. Ensure that Citizen Science practitioners - in academia (top-down), in society (bottom-up), in policy (collaborative) and in the private sector (collaborative) - are supported by a **national network of practitioners** to share knowledge, form partnerships, and further develop best practice.
2. Ensure that **dedicated funding instruments** can provide financial support to the places where it is most needed (especially to societal partners) in order to enable new initiatives to get off the ground and to provide ongoing funding or scaling-up funding for successful initiatives. These instruments should allow sufficient flexibility for co-creational approaches to be implemented.
3. Enable the **culture change** required to open up science and the scientific process more fully to the participation of citizens, societal actors, and civil society organisations for the benefit of research quality, policy impact, and improved societal welfare.
4. Enable the establishment and ongoing iterative development of key **supportive infrastructure** such as data-gathering tools and platforms, data analysis and visualisation tools, data hosting and archiving, and domain-specific research infrastructures.

The participating countries made great progress towards implementing new measures to support and sustain citizen science, with the MLE serving as an important source of motivation, information and exchange of good practices. These have included explicitly naming Citizen Science in the national ERA Action Plan (Austria), writing Citizen Science into

national research programmes (Belgium and Romania), explicit inclusion of Citizen Science in the national Action Plan on Open Science (Slovenia), and the launch of new national practitioner networks or research centres for Citizen Science (Belgium, Germany, Hungary, & Romania).

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The policy brief offers an overview of the MLE process and key findings. It specifically focuses on the policy messages and key recommendations for action to be taken towards establishing an enabling environment for support, sustaining and scaling up Citizen Science.

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