

# MICS

Measuring Impact of Citizen Science

## Developing metrics and instruments to evaluate citizen-science impacts on the environment and society

Citizen science is defined as work undertaken by civic educators and scientists together with citizen communities to advance science, foster a broad scientific mentality, and/or encourage democratic engagement, which allows people in society to join the debate about complex modern problems. Currently, however, we do not have the tools to measure how citizen science contributes to scientific discoveries and benefits society overall.

The MICS project develops the approaches and tools to evaluate citizen-science impacts that are needed to plan and implement projects in ways that lead to more powerful scientific outcomes. The testing and validation of these tools focus on river restoration as an aspect of nature-based solutions (NBSs).

### Objectives:

- 1 Provide comprehensive and inclusive metrics and instruments to evaluate citizen science impacts
- 2 Implement an impact-assessment knowledge-base through toolboxes for methods application, information visualisation, and delivery to decision makers, citizens and researchers
- 3 Improve the effectiveness of nature-based solutions through test-site development and citizen-science tool validation
- 4 Generate new approaches that strengthen the role of citizen science in supporting research and development
- 5 Foster a citizen-science approach to increase the extent to which scientific evidence is taken up by policy makers through recommendations and guidelines

### Nature-based solutions

Nature-based solutions (NBSs) are defined by the International Union for Conservation of Nature (IUCN) as “actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits”.

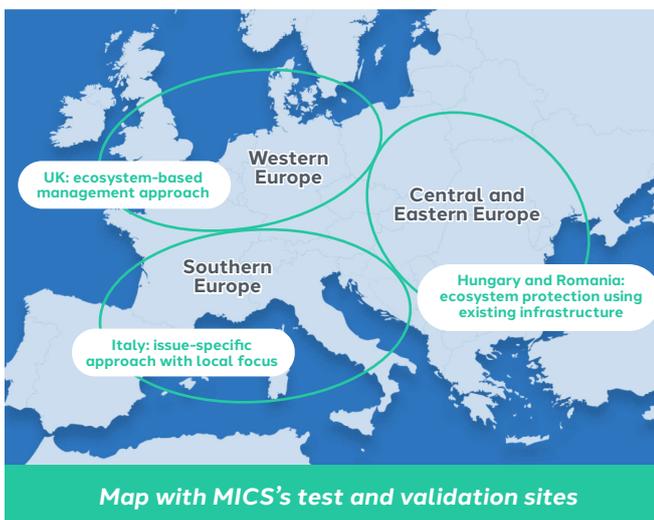
The NBS concept builds on and supports other closely related concepts, such as the ecosystem approach, ecosystem services, ecosystem-based adaptation / mitigation, and green and blue infrastructure. NBSs, however, have a distinctive set of premises: (i) some societal challenges stem from human activities that have failed to recognise ecological limitations; (ii) sustainable alternatives to those activities can be found by looking to nature for design and process knowledge. They therefore involve the innovative application of knowledge about nature, inspired and supported by nature, and they maintain and enhance natural capital. NBSs are positive responses to societal challenges, and can have the potential to simultaneously meet environmental, social and economic objectives. The MICS project uses NBSs as the common context for **evaluating the impacts** of different citizen-science approaches.

## Expected results and impact

There is a clear need for viable strategies and tools to evaluate the impact of citizen science on science and society, and the MICS project aims to do this, by developing metrics and instruments to measure costs and benefits of citizen science, in the **domains** of: (1) society; (2) democracy; (3) the economy; (4) the science related to NBSs; (5) citizen-science projects themselves; and (6) the individual citizen scientists involved in the activities.

The result is an integrated platform where these metrics and instruments are available for use by anyone involved in a citizen-science project wanting to understand its impact, whether at the planning stage or several years after the project's conclusion.

This platform is validated by pilot testing in four test and validation sites across Europe. These sites explore the applicability of MICS impact-assessment tools in **regions with differing needs, contexts, and approaches to nature-based solutions**, and with various levels of citizen-science application. For example, in **Western Europe**,



river restoration is increasingly carried out within an ecosystem-based management framework at river or catchment scale; in **Southern Europe**, river restoration tends to be issue-specific with some ecosystem relevance; in **Central and Eastern Europe**, river restoration is about ecosystem protection and related to existing infrastructure. The four test and validation sites selected are in the UK, Italy, Hungary and Romania.

The new MICS metrics and instruments also help to measure the impact of citizen science with respect to the **sustainable development goals (SDGs)**. Particular consideration is given to:

**Goal 3: Good health and well-being for people**

**Goal 4: Quality education**

**Goal 6: Clean water and sanitation**

**Goal 11: Sustainable cities and communities**

**Goal 12: Responsible consumption and production**

**Goal 15: Life on land**

**Goal 16: Peace, justice and strong institutions**

Citizen science raises the accessibility of (socially relevant) scientific knowledge and accelerates the production of new knowledge, but it does not play a uniform role in the **research and innovation cycle**: it contributes to data collection and project design, but too rarely to the monitoring and evaluation of the effects of different strategies and techniques. The deep analysis of the involvement of citizens in NBSs carried out in the project is ideal to demonstrate how citizen science can have a constructive role in different phases of research and development, how the sustainability of NBSs can be improved, and how citizen science can be confirmed as an important policy pathway for decision makers.

## Project information

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**MICS involves six European partners from five countries:**

- Earthwatch Europe [UK]
- Stichting IHE DELFT Institute for Water Education [Netherlands]
- Autorità di Bacino Distrettuale delle Alpi Orientali [Italy]
- Geonardo Environmental Technologies Ltd [Hungary]
- River Restoration Centre [UK]
- Institutul National de Cercetare Dezvoltare pentru Geologie si Geocologie Marina [Romania]

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