Concept Note - Citizen Science in the Service of Science and Technology

- News - General news -

Publication date: Wednesday 26 March 2025

Sommaire

1. Introduction

General context:

Participatory Science is a particularly engaging format among the various possibilities offered by Citizen Science. It represents a research approach where non-scientist citizens are actively involved in the co-creation of scientific projects, data collection, and result analysis.

Initially impactful in education due to its hands-on learning format, strongly driven by values such as open science, innovation, the culture-art-science link, or human rights, this concept, first realized by a young Swiss in 1992 on the shores of Lake Geneva, has now gained momentum worldwide as a full-fledged research format. It has demonstrated a consistent ability to produce genuine scientific results at a time when environmental, social, and technological challenges demand broader collaboration between researchers and civil society.

Given their various aspects, adaptability, the knowledge they produce, and what they offer citizens in terms of self-determination and critical thinking, Participatory Science could play a key role in advancing peace globally.

Justification:

The growing public involvement in science is not only beneficial for large-scale data collection but also strengthens the link between science and society, while empowering individuals. By leveraging diverse skills, Participatory Science allows for tackling complex issues with a more inclusive and diversified approach, encouraging self-reliance and the ability to take initiative.

Today, work methods enable non-scientists to contribute directly to the production of scientific results, complementing those of academic and private research, both fundamental and applied.

The emergence of these results and the expansion of these alternative research formats raise the question of their integration into scientific efforts and the role this form of citizen science can play in advancing the sciences.

Objectives of the note:

This concept note aims to explore the contributions of Participatory Science to scientific progress. It highlights the mechanisms through which this approach enriches research, while also addressing the challenges and opportunities it presents for researchers and citizens.

2. Theoretical and Conceptual Framework

Key definitions:

Participatory Science refers to any scientific research that includes the active participation of non-scientists in one or more stages of the research process, in a hands-on, engaging format, typically involving experiments, data collection, analysis, or project development.

Going even further, Participatory Research involves citizens and civil society in all stages of research without exception, including defining the research question and utilizing the results.

Literature review:

The literature on Participatory Science shows a growing trend towards public inclusion in various fields such as ecology, astronomy, medicine, digital worlds, and many others. Increasingly numerous initiatives in astronomy, coastal zone management, ornithology, paleontology, biodiversity, technologies, climate, water, energy, health... have demonstrated the effectiveness of this approach in extending research capacity and fostering innovation.

Initial assumptions and guiding principles:

The foundation of Participatory Science is based on the idea that collective intelligence and citizen involvement can not only accelerate scientific discoveries but also make science more accessible and transparent, allowing contributions to policy and society in general. This is made possible through the training and support of facilitators, as well as the capacity-building and mobilization of the involved public.

3. Situation Analysis

Identification of key challenges:

Major challenges include the need for:

- large-scale data collection,
- understanding complex phenomena requiring diverse perspectives,
- strengthening public trust in scientific processes,
- building scientists' confidence in this new aspect of their profession and in the quality of the collected information (quality of experiments, observations, consideration of the bibliography).

Potential impact:

Participatory Science has repeatedly demonstrated, in many concrete cases, its ability to improve the quality, consistency over time, and quantity of collected data, as well as to encourage innovation through diverse viewpoints, and to strengthen the integration of science into society while educating the public on critical scientific issues.

Contributing factors:

Technological and digital advances, such as online platforms and mass communication tools, facilitate citizen engagement in Participatory Science.

Moreover, the growing public desire to contribute to solving major societal challenges supports the rise of these projects.

Finally, the long-standing tradition of informal education worldwide, when combined with information science, communication science, and educational methods, has collectively enabled citizen involvement across all ages and backgrounds, allowing a transition from Citizen Science projects to Participatory Science projects, or even Participatory Research.

4. Objectives and Expected Outcomes

General and specific objectives:

" Improve public understanding of scientific processes and societal challenges,
" Prepare scientists for Participatory Research methods during their academic and professional careers,
" Strengthen data collection capacity in scientific projects through citizen engagement,
" Accelerate scientific discoveries through diverse perspectives and collective involvement,
" Develop partnerships between citizens and scientists at the international level,
" Use Participatory Science projects to support Development or International Solidarity initiatives from citizen to citizen.

Expected outcomes:

" A larger and more diverse database, enabling better analysis of the studied phenomena,
" Confident scientists taking the lead in this new format of Participatory Research,
" Open science due to citizen involvement, with greater data sharing and even open access scientific publications,
" Scientific results that can guarantee a country's scientific independence,
" Better integration of science into society, with a more educated and engaged public,
" Significant scientific advances through close collaboration between researchers and citizens,
" Increased mobility of researchers, both towards countries hosting major research centers and through the return of talent to their home countries, driven by Participatory Science projects developed to address Development Goals.

Secondary and indirect outcomes:

" Strengthened scientific and technological skills among participants,
" Increased critical thinking capacity among citizens,
" Creation of engaged communities around scientific and environmental issues.

5. Methodological Approach

Methods:

" Use of digital platforms, mostly open source, for data collection and analysis,
" Organization of events, conferences, seminars, training sessions to mobilize and train facilitators (scientists, teachers, educators, facilitators),
" Integration of tools and methods into existing public or private training curricula (e.g., teacher training),
" Organization of workshops and training sessions to educate and involve participants,
" Collaboration with educational institutions and NGOs to maximize the reach of scientific projects.

6. Partnerships and Collaboration

Key partners:

" Public departments responsible for sectors relevant to Participatory Research (Education, Research, Environmental Transition, Development, International Solidarity, Energy...),
" Universities and research institutes for project development and for establishing diploma programs,
" Specialized organizations in Participatory Research,
" Fab Labs and community spaces for stakeholder collaboration,
" Non-governmental organizations (NGOs) for connections with local communities,
" Intergovernmental organizations (IOs) and UN system organizations for connections with states and governments,
" Technology companies for developing data collection and analysis tools.

7. Budget and Resources

Estimated costs: (example for a specific pilot project)

" Digital tool development: 100,000 CHF
" Training and workshops for facilitators: 190,000 CHF to train 60 facilitators and teachers over 3 sessions of 4 days each
" Organization and supervision of participant activities: 90,000 CHF for 20 participants over 15 days with accommodation
" Project monitoring and evaluation: 80,000 CHF
" Pre-project communication and post-project public awareness: 50,000 CHF

Sources of funding:

" Government grants for scientific research,
" University and Higher Education funding for training their teams (facilitators, scientists...),
" NGO and community funding for training their members,
" Partnerships with technology companies,
" Local government grants for their target audiences,
" Crowdfunding and donations from the public interested in these projects.