Carpathian Journal of Earth and Environmental Sciences
February 2027, Vol. 22, No. 1, p. 5 – 14;
https://doi.org/10.26471/cjees/2027/022/383

Scaling citizen science for climate adaptation: lessons from the ScienceUs Open Call

Ioan-Cristian Iojă [1,*], Rafaella Lenoir-Improta [2], Diana-Andreea Onose [1], Noémie Maughan [3], Marius Oesterheld [4], Nikos Arsanoglou [5], Nadia Bates [4], Leticia Martinez Garcia [3]

[1] *Center for Environmental Research and Impact Studies, Romania; cristian.ioja@geo.unibuc.ro*
[2] *Universidad Autónoma de Madrid, Madrid, Spain*
[3] *Université Libre de Bruxelles, Bruxelles, Belgium*
[4] *Museum of Natural History of Berlin, Berlin, Germany*
[5] *National and Kapodistrian University of Athens, Athens, Greece*
* *Corresponding author: cristian.ioja@geo.unibuc.ro*

Abstract: Citizen science is increasingly recognized as a valuable mechanism for generating knowledge, fostering public participation, and supporting climate adaptation. However, many initiatives still face challenges related to scalability, long-term sustainability, stakeholder engagement, and policy uptake. This paper analyzes the design, implementation, and outcomes of the ScienceUs Open Call, a cascade-funding scheme developed under the Horizon Europe WIDERA program to support citizen science initiatives. The study examines the eligibility and evaluation framework, dissemination strategy, project profiles, and the Seed–Flourish–Harvest support pathway. The Open Call attracted 60 applications from 29 countries, highlighting the diversity of the European citizen science landscape. Results show that combining financial support with mentoring, networking, and capacity-building activities helped identify projects with strong scaling potential and societal relevance. Eligible projects addressed climate adaptation challenges such as biodiversity and ecosystem monitoring, marine and coastal ecosystems, inland water and aquatic ecosystems, urban resilience and green infrastructure, and sustainable mobility, energy, and resource management. The findings highlight the originality of the ScienceUs approach, which prioritizes scaling existing citizen science initiatives rather than funding new ones. The findings emphasize the importance of pairing funding with structured support mechanisms that strengthen governance capacities, stakeholder networks, and policy relevance. The paper concludes that future citizen science programs should place greater emphasis on scalability, transnational collaboration, and dedicated funding instruments for mature initiatives. The ScienceUs experience offers valuable lessons for strengthening citizen science's contribution to climate adaptation across Europe.

Keywords: citizen science, climate change adaptation, scalability, capacity building

1. INTRODUCTION

The need to support citizen science initiatives is steadily increasing due to their growing recognition as an effective mechanism for strengthening democratic participation (Jordan et al., 2012; Robinson et al., 2018; Fritz et al., 2019; Austen et al., 2024), fostering closer connections between citizens and governance processes to address societal challenges and sustainability transitions (Hecker et al., 2018; Sauermann et al., 2020; Breuste et al., 2023), promoting open and inclusive science, and encouraging public engagement in both scientific research and policy development (Kieslinger et al., 2018; Maccani et al., 2020; Vohland et al., 2021). As citizen science gains visibility and credibility, scientists are increasingly seeking to make research more accessible and collaborative (Mitincu et al., 2023; Hossu et al., 2024; Slave et al., 2025), while citizens are becoming more interested in contributing to knowledge production and decision-making processes (Jordan et al., 2012; Fritz et al., 2019; Austen et al., 2024).

In response, more funding opportunities have emerged to support both new and established citizen science initiatives (Hölscher et al., 2025). These funding mechanisms are provided by national, regional, and

local governments—often through research and innovation agencies (e.g., OPAL in the UK, Top Citizen Science in Austria, explicit funding schemes in Germany, Innoviris in Belgium) (Kieslinger et al., 2018; Vohland et al., 2021; Goosse et al., 2025). In addition, numerous non-governmental organizations, philanthropic foundations, and private-sector actors are investing in citizen science projects that address biodiversity conservation, environmental sustainability, climate change adaptation, public health, or community development (Roy et al., 2018; Niță and Iojă, 2020; Rahimi et al., 2025). Recognizing the growing importance of citizen science, the European Commission has also funded several experimental initiatives designed to address persistent challenges related to relevance, feasibility, sustainability, and societal acceptance. Projects such as IMPETUS (Albert et al., 2023) and CROPS (Sprinks et al., 2024) have tested innovative methods to support citizen science practitioners, strengthen stakeholder networks, improve the uptake of citizen-generated data, and create enabling conditions for the wider institutionalization of citizen science across Europe.

Despite this expanding funding landscape, many citizen science initiatives still face limited scalability because of challenges related to long-term financial sustainability, capacity building, stakeholder networks, and the effective integration of citizen-generated knowledge into governance and policy processes (ECSA, 2016; Maccani et al., 2020).

To avoid this uncertainty, more permanent and predictable funding frameworks are needed to support citizen science initiatives beyond short-term project cycles (Vohland et al., 2021).

2. SCIENCEUS PROJECT: SCALING CITIZEN SCIENCE

The ScienceUs project, funded under the Horizon Europe WIDERA program, proposes an innovative approach to support existing citizen science initiatives related to the EU Mission on Adaptation to Climate Change (European Commission: European Research Executive, 2025), in increasing their scalability, transferability, and long-term impact. While many citizen science projects generate valuable local knowledge and successfully engage communities, they often struggle to move beyond their initial geographic or thematic scope.

ScienceUs addresses this gap by developing and testing a structured framework that enables citizen science initiatives to share experiences, co-create solutions, strengthen stakeholder engagement, and scale successful approaches across regions and sectors. By facilitating collaboration among researchers, citizens, policymakers, and practitioners, the project seeks to turn locally successful citizen science activities into more sustainable, impactful models that can address broader societal challenges.

The ScienceUs project developed a three-stage support program to identify, strengthen, and scale citizen science initiatives contributing to the EU Mission on Adaptation to Climate Change (Figure 1).

The consortium, composed of six partner institutions from five European countries, designed and implemented the ScienceUs Open Call to identify and support ongoing citizen science initiatives contributing to climate change adaptation across Europe. The Open Call consisted of several successive stages: (i) Launch and application phase (60 applications from 29 countries, highlighting the diversity and vitality of the European citizen science landscape), (ii) Eligibility screening (48 projects were declared eligible), (iii) Evaluation and selection of the Seed Phase portfolio (the selection of 25 projects from 15 countries that entered the Seed Phase of the ScienceUs support program), (iv) Capacity building through the Seed Phase (the selected projects received financial support and participated in the ScienceUs Upscaling Academy, where they developed transnational citizen science campaigns and upscaling plans), (v) Selection of high-potential initiatives for Flourish and Harvest phases (five projects were selected to progress to the Flourish and subsequently Harvest phases).

The Seed phase focused on identifying 25 ongoing citizen science initiatives. The Flourish phase selected the five most promising initiatives from the 25 projects supported during the Seed Phase with significant scalability and replicability potential. These projects participated in a tailored mentoring and capacity-building program to strengthen project design, enhance community engagement, and increase sustainability and long-term impact. The Harvest phase supported the same five initiatives in implementing scaling strategies through scaling up (expanding reach and resources), scaling in (strengthening organizational capacities and learning processes), and scaling deep (fostering cultural, behavioral, and policy change) (Maccani et al., 2020). This stage aimed to maximize their contribution to climate adaptation policies and to increase the uptake of citizen-generated knowledge in decision-making processes. Selected

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projects received financial support of up to €40,000 across the Seed (€1,000), Flourish (€25,000), and Harvest (€14,000) phases, complemented by training, mentoring, and networking opportunities to strengthen scalability and impact.

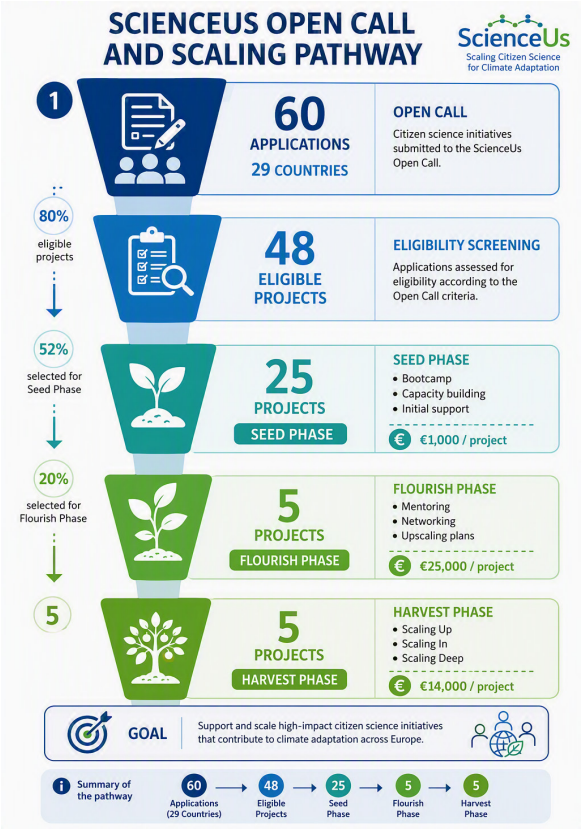

Figure 1. Main steps in ScienceUs project.

The paper evaluates the design, implementation, and outcomes of the ScienceUs citizen science Open Call and identifies evidence-based recommendations for enhancing future citizen science funding programs.

3. MATERIALS AND METHODS

The paper adopts the impact assessment framework proposed by Kieslinger et al. (2018), which conceptualizes citizen science as a multidimensional process that can generate impacts across scientific, social, environmental, economic, and governance dimensions. The paper uses the framework to analyze how the ScienceUs competition supports the development of impact-generating capacities, including stakeholder engagement, empowerment, social learning, knowledge co-creation, institutional collaboration, and policy relevance.

The methodology is organized around four successive steps of the ScienceUs (Open Call and support process), reflecting the pathway through which citizen science initiatives were identified, attracted, assessed, and further supported.

First, we focus on the design of the ScienceUs Open Call and selection framework. This includes defining eligibility criteria, thematic priorities linked to the EU Mission on Adaptation to Climate Change, the evaluation framework, and the Seed–Flourish–Harvest support pathway.

Second, it examines the communication and dissemination strategy implemented to promote the ScienceUs Open Call in all eligible countries. The description considers the communication channels employed, the types of dissemination events organized, the target audiences reached, and the participation achieved. This assessment provides insights into the effectiveness of outreach activities in engaging diverse citizen science communities, civil society organizations, research institutions, public authorities, and practitioners working on climate adaptation challenges.

The third stage analyzes the characteristics of the 48 eligible applications in the Open Call and the 25 citizen science initiatives selected and evaluated in the Seed phase. The assessment focuses on the profile of participating projects, including their geographical distribution, institutional background, organizational type, thematic focus, and relevance to climate adaptation objectives.

Fourth, it evaluates the specificity of the five most promising initiatives that entered the mentoring and capacity-building program.

4. RESULTS

4.1. ScienceUs Open Call Overview

The eligibility criteria were only partially aligned with the Kieslinger et al. (2018) framework, inspired by Horizon Europe requirements and adapted to the ScienceUs project's specific objectives. Applicants had to demonstrate that they were implementing an ongoing citizen science initiative clearly relevant to the climate and environmental challenges the project addressed. To ensure the initiatives' maturity and operational capacity, applicants also had to provide evidence of existing datasets, monitoring activities, or other tangible project outputs. A key eligibility condition was that applicants had to be established legal entities, such as NGOs, research institutions, universities, public authorities, or other organizations, while applications submitted by individuals were not eligible. These criteria narrowed the

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applicant pool to 25. For the Seed phase, the evaluation focused on assessing the maturity, relevance, and future scalability of the 25 remaining citizen science initiatives. The criteria considered were: (i) the quality and usability of the existing data generated by the project, (ii) the evidence of active citizen engagement, and (iii) the demonstrated capacity to sustain participation over time (Table 1). Particular attention was given to (iv) the project's potential for scaling and replication in other regions, (v) its contribution to climate change adaptation objectives, and (vi) the strength of existing collaboration networks involving Quadruple Helix members (Schütz et al., 2019).

Table 1. Integration of Kieslinger et al. (2018) framework in ScienceUs Open Call.

Dimension	Process and feasibility	Eligibility criteria	Evaluation criteria
Scientific	Scientific objectives	+	+
	Data and system	+++	+++
	Evaluation and adaptation	o	++
	Collaboration and synergies	o	++
Participant	Target group alignment	++	++
	Degree of involvement	o	+++
	Facilitation and communication	o	+++
Socio-ecological & economic	Target group alignment	o	+++
	Active involvement	o	+++
	Collaboration and synergies	o	+++

o-no integration, +low integration, ++medium integration, +++high integration

4.2. Dissemination and Communication Strategy of ScienceUs Open Call

The dissemination and communication strategy of the ScienceUs Open Call was designed to attract high-quality ongoing citizen science initiatives relevant to the EU Mission on Adaptation to Climate Change. Rather than relying solely on online promotion, the project adopted a multi-channel approach that combined info days, social media campaigns, the project website, newsletters, targeted email campaigns, stakeholder networks, and direct communication with potential applicants. The strategy aimed not only to increase visibility but also to clarify eligibility requirements, support applicants throughout the process, and reach diverse stakeholder groups from academia, NGOs, public authorities, and community organizations. The consortium further expanded its outreach through partner networks, the Stakeholder Advisory Board, and established European citizen science and climate-related projects.

The consortium placed particular emphasis on interactive dissemination activities, which proved most effective in attracting potential applicants. Scientific conferences, stakeholder meetings, webinars, and the dedicated ScienceUs Info Day provided direct opportunities to engage with organizations already active in citizen science and climate adaptation. These events helped participants better understand the Open Call's objectives, discuss eligibility and evaluation criteria, and explore upscaling opportunities. A dedicated helpdesk and a frequently updated FAQ section also provided support, reducing uncertainty and improving application quality.

4.3. Seed Phase Applicant Project Profile and Selection/Evaluation

4.3.1. Applicant Profiles

The effectiveness of the communication philosophy is reflected in the level of engagement achieved, with participants from numerous ongoing citizen science initiatives across Europe and a final pool of 60 applications from 29 countries, including 21 EU Member States, confirming a broad European and neighboring-country interest in citizen science initiatives linked to climate change adaptation. Spain submitted the most applications (12 projects), followed by Romania (6), Italy (5), and Belgium (4). After the eligibility check, 48 projects were declared eligible, representing 80% of the submitted applications.

Among the 48 eligible projects, the geographical distribution remained very diverse, but with a clear concentration in several countries. Spain had the most eligible projects, with 12 applications, followed by Italy with 4, Romania and Belgium with 3 each, and Portugal, Greece, and France with 2 eligible projects each (Figure 2). In terms of applicant profile, the overall call was dominated by NGOs and civil society organizations, which represented 63% of applicants, followed by universities with 25%, research institutes with 8%, and private companies with 3%. This profile indicates that the call was not limited to academic

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actors, but attracted a wide range of legal entities already involved in citizen engagement, environmental monitoring, science communication, education, and local sustainability actions.

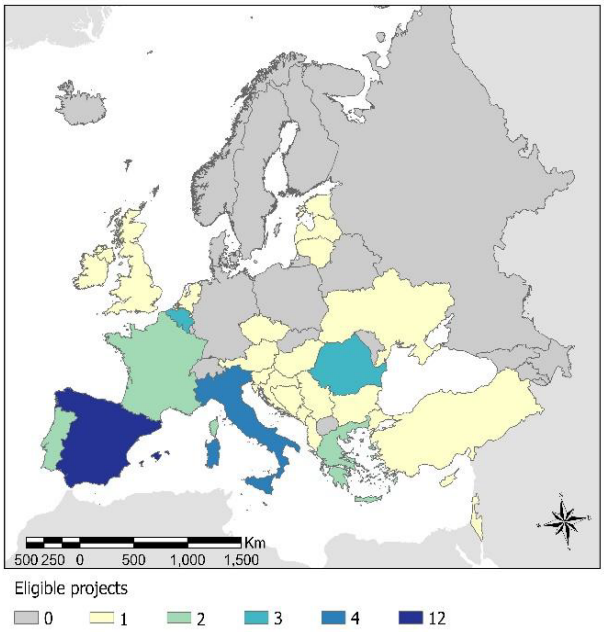

Figure 2. Distribution of the eligible projects in ScienceUs Open Call by country.

The eligible projects covered a broad spectrum of topics directly connected to the EU Mission on Adaptation to Climate Change and to the ScienceUs objective of scaling ongoing citizen science initiatives. The main thematic areas included climate risk, health and community resilience (27%) and biodiversity and ecosystem monitoring (17%) (Figure 3).

These initiatives also addressed different socio-ecological systems, including urban and metropolitan areas, freshwater ecosystems, marine and coastal environments, forests, agricultural landscapes, and mountain regions.

4.3.2. Evaluation and selection

The 25 projects entering the Seed Phase of the ScienceUs Open Call were selected through a competitive evaluation process designed to identify ongoing citizen science initiatives with strong potential to enhance their contribution to climate change adaptation. Applications were assessed using quality criteria covering 1) the relevance of the challenge addressed, 2) the maturity of the citizen science approach, 3) the quality and usability of the data generated, 4) stakeholder engagement, and 5) the potential for scalability and long-term impact.

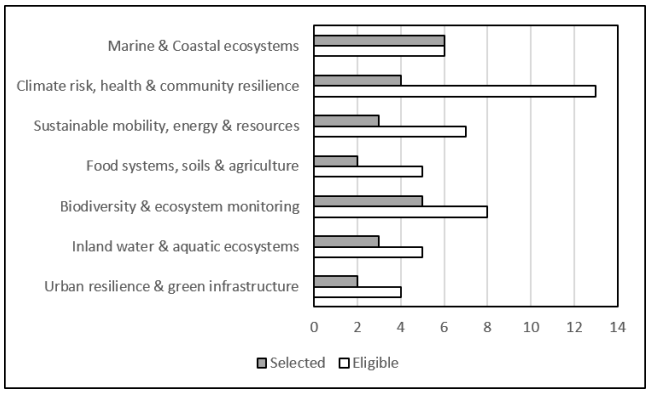

Figure 3. Main topics covered by the eligible applications submitted to the ScienceUs Open Call.

To ensure a fair, robust assessment, an internal evaluator from the ScienceUs consortium and an external independent evaluator from the Stakeholder Advisory Board reviewed each eligible proposal. When significant differences emerged between the two assessments, a mediator reviewer provided an additional evaluation to support the final decision. This multi-step process helped ensure transparency, consistency, and the selection of a diverse portfolio of projects with high potential to benefit from the ScienceUs support program.

The 25 projects selected for the Seed Phase represented a highly diverse portfolio of citizen science initiatives distributed across 15 countries, reflecting both the geographical breadth and thematic richness of climate adaptation efforts in Europe. Spain had the strongest representation, with 8 selected projects (32%), followed by Italy with 4 projects (16%). Portugal and Romania each contributed 2 projects (Figure 4).

4.4. Flourish Phase Project Profile

After the Seed Phase, which included a two-day bootcamp organized by the Museum of Natural History of Berlin, the 25 participating projects developed detailed Citizen Science Transnational Campaign and Upscaling Plans, which the ScienceUs consortium and external experts evaluated. The selection for the Flourish Phase was based on multiple criteria, including 1) the quality and feasibility of the proposed upscaling strategy, 2) the maturity of the existing citizen science initiative, 3) stakeholder engagement capacity, 4) expected policy impact, and 5) the potential to establish transnational collaborations. As a result, five projects were selected to enter the Flourish Phase and receive intensive mentoring, networking support, and funding to implement their upscaling plans. Particular attention was

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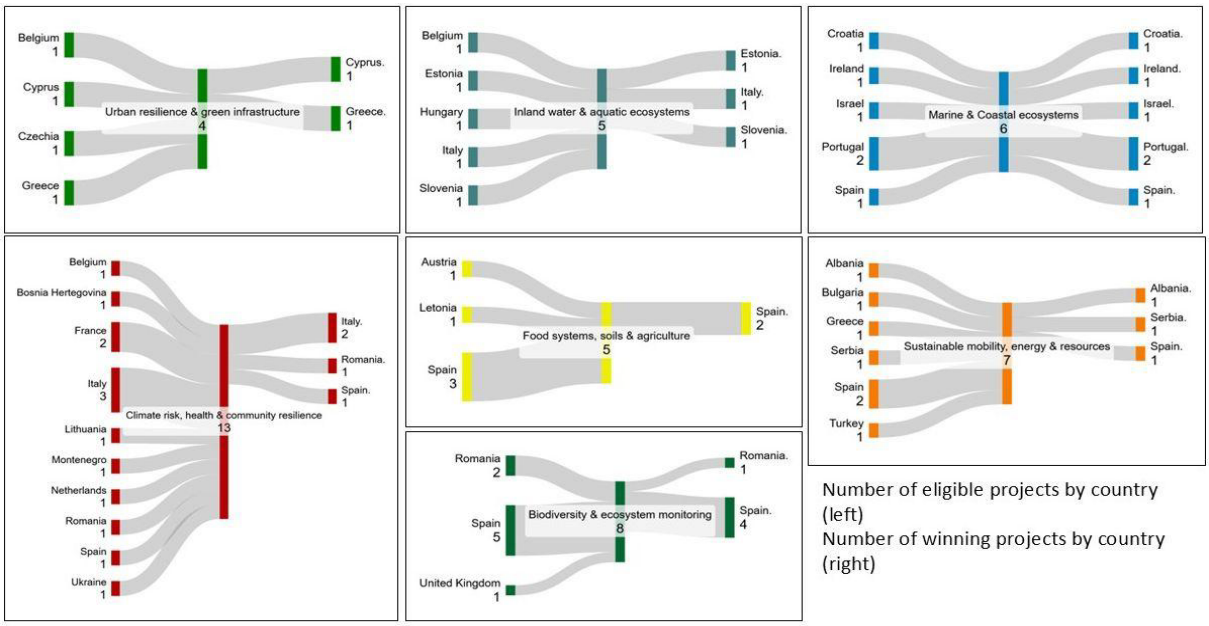

Figure 4. Success rate of the applications submitted to the ScienceUs Open Call by topics and countries.

Table 2. The projects selected for the Flourish phase.

Project	Country	Organization	Main climate adaptation focus
Blue-Green Tops: Adapting Building Roofs for Climate Resilience	Greece	University of Patras	Citizen engagement for rooftop greening, urban heat island mitigation, stormwater management, and climate-resilient urban planning.
Aqua Sorgente	Italy	Club Alpino Italiano (CAI)	Citizen-based monitoring of springs and freshwater resources, supporting water security, hydrological knowledge, and ecosystem protection.
Coastal Resilience: Action Through Citizen Science	Ireland	University College Dublin	Coastal erosion monitoring through citizen participation and innovative Smart Pebbles technology to support coastal adaptation strategies.
Alleviating Energy Poverty in Vulnerable Households	Spain	Spanish Red Cross	Reducing climate vulnerability through citizen monitoring of household energy conditions, improving resilience to heatwaves and extreme temperatures.
The Future is Climate	Spain	Demos Lab	Participatory climate governance, citizen deliberation, and co-creation of solutions that strengthen societal capacity for climate adaptation.

paid to ensuring both geographical diversity and thematic diversity, allowing ScienceUs to address complementary dimensions of climate adaptation. The selected initiatives covered adaptation challenges ranging from urban heat mitigation and freshwater protection to coastal resilience, energy poverty, and participatory climate governance (Table 2).

5. DISCUSSIONS

5.1. Insight of ScienceUs project

The ScienceUs Open Call provides important insights into how citizen science funding schemes can move beyond supporting project implementation and instead focus on scalability, transferability, and long-term impact. Unlike many funding programs that prioritize new initiatives (Hölscher et al., 2025), ScienceUs deliberately targeted ongoing citizen science projects with demonstrated citizen engagement, existing datasets, and operational experience. This orientation reduced the risk associated with funding experimental concepts and allowed resources to be directed toward initiatives that had already proven their relevance and societal value (Kieslinger et al., 2018).

The number of applications received (60 applications from 29 countries) confirms both the growing maturity of the European citizen science landscape and the considerable demand for dedicated funding opportunities focused on project development and expansion rather than project initiation. However, there was limited participation from countries with high experience in

citizen science (e.g., Germany, Austria, UK, Netherlands). This may reflect the maturity of their citizen science ecosystems rather than lower engagement (Hölscher et al., 2025). Organizations and citizen science initiatives in these countries often have access to diverse national and European funding schemes, well-developed support structures, and extensive institutional networks (Vohland et al., 2021). Consequently, the relatively modest financial support offered through the ScienceUs competition (€40,000/project) may have been less attractive compared to other funding opportunities. In contrast, organizations from countries with emerging citizen science communities may have perceived the call as a valuable opportunity to gain visibility, strengthen capacities, and access international networks (Jordan et al., 2012).

One of ScienceUs's most innovative features is the combination of financial support and structured capacity-building activities. Rather than providing funding as an isolated intervention, the project linked grants to a progressive pathway composed of Seed, Flourish, and Harvest phases (Ioja et al., 2025). This approach reflects recommendations from the citizen science literature, which emphasizes that scaling requires not only financial resources but also mentorship, stakeholder engagement, organizational learning, and opportunities for peer exchange (Maccani et al., 2020). This approach addresses a major weakness often identified in citizen science projects: the difficulty of transforming successful local initiatives into sustainable, transferable models (Kieslinger et al., 2018; Austen et al., 2024).

The diversity of projects selected during the Seed and Flourish phases further demonstrates the importance of citizen science flexibility as a climate adaptation mechanism. Importantly, ScienceUs did not limit climate adaptation to environmental monitoring activities but recognized social innovation, behavioral change, and participatory governance as equally important dimensions of adaptation. The final selection of Flourish projects reflected this perspective, combining environmental, social, and governance-oriented approaches. Such diversity increases the potential for cross-learning between sectors and demonstrates that citizen science can contribute to climate resilience and sustainability through multiple pathways (Sauermann et al., 2020).

5.2. Lessons for future citizen science funding programs

ScienceUs's experience also highlights several lessons for future citizen science funding programs.

First, the quality of dissemination and communication activities proved critical in attracting mature and relevant projects. Evidence from the ScienceUs Open Call participants indicates that interactive engagement formats, such as info days, stakeholder meetings, webinars, and tailored support mechanisms, were significantly more effective than passive communication channels alone (e.g., webpages). These activities not only increased awareness of the call but also helped potential applicants better understand its objectives, requirements, and expected outcomes.

In addition, targeting diverse audiences was essential to broaden participation and ensure a varied pool of applications. Reaching different stakeholder groups, sectors, and geographical areas helped attract projects with diverse experiences, capacities, and thematic focuses, ultimately strengthening the overall quality and representativeness of the selected portfolio.

Second, combining scientific quality criteria with criteria related to stakeholder engagement, policy relevance, and scaling potential enabled the identification of projects capable of generating broader societal impacts (Kieslinger et al., 2018).

Third, project selection processes should consider geographical and thematic diversity as a complementary element. While excellence and relevance must remain the primary selection criteria, evaluation frameworks should also acknowledge the diversity of citizen science ecosystems across countries, regions, and thematic domains (Hölscher et al., 2025). Applying excessively rigid criteria may unintentionally disadvantage promising initiatives operating in emerging or less-established citizen science contexts. Therefore, once the highest-quality and most relevant projects have been identified, diversity considerations can help ensure a balanced portfolio that reflects different societal challenges, geographical settings, experience levels, and implementation approaches. Such diversity enhances opportunities for knowledge exchange, mutual learning, and the transfer of good practices, ultimately increasing the program's overall value and impact.

To ensure project quality remained the primary selection principle, the team first grouped proposals by evaluation scores and overall assessment. The highest-rated projects were selected directly for their excellence and relevance to the call's objectives. Diversity considerations were applied only among projects with comparable evaluation outcomes, helping achieve balanced representation across geographical contexts,

thematic areas, and levels of citizen science maturity without compromising the overall quality of the selected portfolio. This approach enabled ScienceUs to support the strongest projects while fostering broader knowledge exchange across different citizen science ecosystems.

Another key challenge in designing an open call is balancing inclusiveness and relevance. Eligibility criteria must be clear enough to prevent applications outside the program's scope and objectives, while remaining broad enough to attract a diverse and substantial pool of applicants. Overly restrictive requirements may discourage participation and reduce geographical and thematic diversity, whereas overly broad criteria can generate many applications that do not align with the intended outcomes.

5.3. Challenges of ScienceUs

At the same time, several challenges became evident. The evaluation process revealed considerable variation in how Europe understands and implements citizen science. Some applicants presented strong environmental or educational projects, but lacked clear citizen participation in knowledge generation or scientific processes. This finding suggests a need for greater conceptual clarity on citizen science standards and practices, as Kieslinger et al. (2018) also highlight. Future programs may benefit from more explicit requirements concerning the degree of citizen involvement, data co-production, governance structures, and policy engagement pathways (Robinson et al., 2018; Maccani et al., 2020). In addition, many projects demonstrated strong scientific and societal value but had limited experience in scaling, fundraising, business models, or policy uptake, underscoring the need for continued mentoring and institutional support beyond the duration of individual funding calls.

Another important limitation is financial sustainability. Many citizen science projects remain highly dependent on short-term grants and volunteer efforts, as Vohland et al. (2021) and Albert et al. (2025) note. Although project-based funding supports experimentation and innovation, it rarely provides the stability needed to maintain long-term datasets, stakeholder networks, digital platforms, and community engagement activities. Citizen science initiatives that contribute to climate adaptation generate benefits that extend far beyond individual projects, including environmental monitoring, public awareness, social learning, and evidence-informed policymaking (ECSA, 2016). For this reason, mature initiatives need more predictable, continuous funding mechanisms to support them over longer periods (Hecker et al., 2018; Hölscher et al., 2025). Such mechanisms could include dedicated citizen science funding schemes, integration within adaptation and environmental policies, and stronger connections with public institutions responsible for monitoring and implementation activities.

6. CONCLUSIONS

The ScienceUs Open Call shows that targeted support for ongoing citizen science initiatives can strengthen citizen science's contribution to climate adaptation. By combining competitive funding with mentoring, networking, and capacity-building activities, the project created favorable conditions to identify and support initiatives with high societal relevance and scaling potential (Hecker et al., 2018; Vohland et al., 2021). The large number of applications, the diversity of participating projects, and the successful progression of selected initiatives through the Seed, Flourish, and Harvest phases underline the relevance of this approach.

ScienceUs's originality lies in its focus on scaling citizen science, moving beyond the traditional goal of funding individual projects to support organizational development, transnational learning, and long-term impact generation. The experience shows that successful scaling requires financial resources, stakeholder networks, governance capacity, policy engagement, and continuous learning opportunities (ECSA, 2016). Future funding programs can benefit from adopting similar multi-stage approaches that integrate evaluation, mentoring, and implementation support.

The ScienceUs experience reinforces the growing need for dedicated and stable funding instruments for citizen science. If citizen science is expected to contribute meaningfully to climate adaptation, biodiversity conservation, environmental governance, and sustainability transitions, funding mechanisms must evolve from short-term project support toward longer-term capacity-building and institutionalization strategies. Rather than repeatedly funding isolated pilot projects, greater societal benefits may be achieved by supporting the sustainability and scalability of proven citizen science initiatives. This approach also reinforces citizens' role in scientific knowledge production and climate adaptation governance.

ACKNOWLEDGMENTS

This work was supported by the ScienceUs Project, funded by the European Union's Horizon Europe Programme (WIDERA). Additional support was provided through project PN-IV-P8-8.1-PRE-HE-ORG-2025-0340, funded by the Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI), Romania. The authors gratefully acknowledge this financial support.

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Received: 12 September 2026
Revised: 5 October 2026
Accepted: 7 October 2026
Published: 19 October 2026