



# Blueprint for #CitSciComm with and for policymakers



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# Foreword

*We live in unpredictable and ever-changing times, where the decision-making process is more challenging than ever. Our society struggles with complex problems that affect all aspects of our well-being and economic development. The 2030 Agenda for Sustainable Development recognises this, and provides policy makers, companies, scientists and citizens an useful universal framework to strengthen collective action towards common goals.*

*However, challenges such as climate change, loss of biodiversity, food security, ageing or global pandemics are polarising the policy process and public opinion. Against this backdrop, science-informed policy making along with scientific communication have steadily gained prominence in the public agenda.*

*Now citizen science opens a new paradigm to improve scientific literacy and to improve the policy making process with better data. NEWSERA has outlined a new methodology to improve the science – policy interface by bringing citizens at the heart of the policy and scientific processes.*

**Raquel Saiz, Director of Analysis and Strategy ASEBIO**

*Citizen science seems to me to be one of the most interesting paths for advancing not only the communication of science and science itself, but also for the full development of society. I think it is key to disseminate citizen science so that science journalists understand what it is. And for that it would be perfect for us to participate in specific projects, not only as journalists but as citizens.*

**Victoria Toro, Directora de Comunicación de AMIT y periodista para El País**

*Nowadays, public institutions aim to be close to citizens in order to increase legitimacy, accountability and good governance. Additionally, citizens demand to be more involved in the policymaking process as a way to increase democratic participation (science is one more dimension, not the only one, of policy making and policy debates). Lastly, science-informed policymaking is also gaining momentum in advanced democracies.*

*Policymakers are being more open to engage with citizen science projects since citizens' inputs can offer an irreplaceable understanding of the problems and potential solutions. Citizen science projects may be able to provide evidence for policymaking, and generate valid ideas for innovative policies or public services. NEWSERA Policymakers Lab explored the state of the art of the communication of citizen science projects, facilitating discussions with policymakers and public sector professionals, understanding where the gaps are when it comes to communications among citizen science projects and policymakers and issued recommendations on how to better communicate with this key stakeholder.*

**Leire Leguina, Izaskun Lacunza and Ana Elorza, FECYT  
FECYT Partner Leader for the policymakers CitSciComm Lab**

*I always say that **doing Citizen Science is not an easy task**. You need knowledge, expertise, time and resources, and interdisciplinarity is key. As a Chemical Engineer expert in odour pollution, when I first had the idea of using citizen science for its monitoring I thought “I just need an App. Citizens have the best sensor, their own noses. I just need to provide them with a tool to collect their odour perceptions”. And that’s how OdourCollect was born. But I soon realised that the most important thing in a citizen science project is to achieve the engagement of communities. You can have the best App in the world, but without engaged citizens, you have nothing. In fact, a piece of paper is more than enough for data collection (and you better shall consider this as an alternative if you want to be inclusive).*

*Then I started to realise more things. One of the main objectives of the D-NOSES Project was to advocate for a common policy framework to protect European citizens suffering odour pollution, since it is an under regulated issue and the second cause of environmental complaints after noise. But how can we researchers reach policy makers? Which is the right governance level? Our answer was the development of a multi-level governance model that allowed multi-level engagement of European, national and local decision makers. Not an easy task either.*

*And what about industries? Would they be comfortable with an open data model which will point out the potential origin of odour emissions? Would they be willing to trust citizen generated data to identify the situations of maximum impact for their neighbours and act upon them? And what about fellow scientists? Would they rely on a new odour monitoring methodology? Would they trust the produced data sets? All **quadruple helix stakeholders** are part of the problem and also part of the solution, but they **have different interests, agendas, priorities and timings**, meaning that **communication is key** to engaging them all in the process. **And this was how NEWSERA was born.***

*NEWSERA has been working with **39 Citizen Science projects in Spain, Italy and Portugal** for the last three years, co-creating innovative Science Communication strategies to effectively reach quadruple helix stakeholders through our **#CitSciComm Labs**, while developing a useful and replicable **impact evaluation framework**. We have identified a common lack of knowledge in science communication and a lack of resources (I was not alone, our pilots have not been alone anymore), and the NEWSERA team has been naturally evolving towards a mentoring role with the pilots. Specific training has also been offered within the Labs once the need for capacity building was made evident. We have been researching recognition of the practice as part of the solution, something that both Science Communication and Citizen Science share as scientific disciplines, and that we hope*

*will eventually change in the years to come - specially because of the push that the European Commission is giving to public engagement and co-creation in all Clusters and Missions of Horizon Europe, and because we need an active and more informed society to deal with global crisis such as the COVID-19 pandemic or the climate emergency. In addition, we have been exploring two new concepts: **Citizen Science Communication** (including how citizen scientists become science communicators themselves using their own means and channels when actively involved in science) and **Citizen Science Journalism** (as citizen generated data have a huge potential to produce newsable stories of societal relevance, and data journalism tools can help).*

*To compile the main project findings, the NEWSERA team has produced **five blueprints**, one addressed to each one of the stakeholders from the quadruple helix (citizens, academic scientists, the public sector, and industries and SMEs) and one addressed to data journalists, for any citizen science project that has the need (as we had) to reach any of their target audiences for a more effective engagement, and consequently, an increased impact. We hope that our results will be useful for building capacity in Science Communication within the Citizen Science community and beyond, to be able to engage more and more European citizens in science for a better future for all, to produce evidence-informed policies aligned with society, to increase academic recognition and trust of both disciplines, and to engage more industries and SMEs and produce new business models that will contribute to the sustainability and mainstreaming of the practice. You are not alone anymore. We are a community with a common need and we hope that this blueprint will help you shed light in your way.*

**Rosa Arias**  
**NEWSERA Project Coordinator**

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# Target Audience

**This blueprint is addressed for the following target audiences:**

- Citizen science project practitioners
- Citizen science project communication managers
- Citizen science newcomers
- Citizen science researchers
- Citizen scientists

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# Summary

NEWSERA Blueprints for citizen science communication (#citscicomm) with and for quadruple helix stakeholders (citizens and society at large, academic scientists, public sector and policymakers, industry and SMES) and science and data journalists is an instrument that can serve a general audience, including those who are planning to start a citizen science (CS) project, those who want to improve and/or rethink their communication strategies in order to increase specific target audiences, or those who want to enlarge their scope of action by involving the different actors of the quadruple helix model and the media.

The road for CS projects establishment and sustainability is long and there are many barriers to be faced. But you are not alone!

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**The road for CS projects establishment and sustainability is long and there are many barriers to be faced. But you are not alone!**

Together with 39 CS projects from Italy, Spain and Portugal, the NEWSERA Pilots, we have tested the NEWSERA methodology for the co-design, implementation, iterative assessment and validation of communication strategies directed to each of the quadruple helix stakeholders and science and data journalists. This was performed through our #CitSciComm Labs, dedicated to each individual stakeholder, consisting of three rounds of workshops, replicated in each of the participating countries, throughout three years.

In this series of five blueprints, NEWSERA brings the learnings of this co-created process together with our pilots, invited stakeholders and science communication experts (NEWSERA Sounding Board) that was complemented with mentoring, capacity building and networking sessions, generating knowledge, recommendations and useful resources.

In this blueprint, dedicated to **policymakers as target stakeholder**, you will find, more in depth, the importance to address this stakeholder, good practices on the co-design of targeted communication plans, elements of co-design, mutual benefits of CS project-stakeholder, and indicators. Furthermore, a description and details of messages, innovative tools, channels and specific case-studies from the NEWSERA Pilots are included.

Finally, we shared a series of recommendations to efficiently engage with quadruple helix stakeholders and science and data journalists for wider impact and ensure replicability of the NEWSERA findings and science communication strategies in citizen science projects and beyond.

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# Introduction

Citizen science (CS) initiatives are changing the paradigm of science communication. Not only the embedded bottom-up methodology considers people's questions and needs, aligning science and society interests, but also allows citizens and other key stakeholders to become data generators and, as such, to become themselves the source of scientific news. Non-experts participation in CS projects also implies the potential to strengthen science literacy and, for these reasons, opening science and innovation to society.

To fulfil these potentials and to achieve societal impact, CS initiatives may face different challenges. Effectiveness and long-term sustainability of a CS project requires the creation and maintenance of a complex ecosystem, in which the participation of quadruple helix stakeholders (citizens and society at large, academic scientists, public sector and policymakers, industry and SMES) (Carayannis et al., 2009) is crucial. When we consider challenges in terms of science communication we can name: using a wide variety of specific communication tools and strategies for each target group, including digital, traditional and face to face activities to increase participation, providing the required continuous feedback to each stakeholder group to maintain engagement throughout project execution, and involving all stakeholders in every phase of the research. Another often neglected aspect is related to internal communication.

Interdisciplinarity, another intrinsic characteristic of CS projects, is also a challenge, and communication among the different disciplines involved can be a key asset for mutual understanding and collaboration. Science and data journalists also play a key role in mainstreaming CS processes and results, and at the same time raising new questions that can shine a light on critical issues, gaps, and potential biases. Ultimately this can increase trust among the whole range of stakeholders and open new opportunities to contribute to public knowledge. All these challenges might be considered also on the other way round: CS can benefit from communication but CS can bring fresh new perspectives for improving science communication.

In NEWSERA, we conducted an analysis of the communication tools and strategies used by 157 CS initiatives, across the European Union (EU), United Kingdom (UK), and Switzerland (Giardullo et al., 2023) portraying the state of the art of CS projects' communication strategies. We found out that most projects still see communication as a dissemination activity, to serve educational purposes rather than exploring it as a tool to involve other potential target audiences, such as those from the quadruple helix model. Moreover, most CS projects, regardless of their stage, keep the potential level of engagement quite low, with citizen scientists' main contribution as data collectors. The lack of strategies with defined target audiences seem to present a

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**this can increase trust among the whole range of stakeholders and open new opportunities to contribute to public knowledge**

repurposed top-down, one-to-many, unidirectional and oriented to a knowledge transfer science communication style, which clearly undermines the very own potential of CS.

Through its #CitSciComm Labs methodology (Magalhães et al., 2022), NEWSERA has analysed and evaluated the complex and multidirectional communication strategies, addressed to each of the quadruple helix stakeholders, and science and data journalists. The activities involved 39 CS projects from three Southern European countries (Italy, Spain and Portugal), the NEWSERA Pilots, for elaborating a new paradigm for science communication. Using a bottom-up approach, innovative strategies have been co-designed, implemented and validated to overcome barriers identified for each stakeholder group, in order to improve the science communication strategies of NEWSERA pilots' and, in turn, the impact of the projects themselves, contributing to the mainstreaming of citizen science.

Through the five blueprints, NEWSERA will share the knowledge, resources and recommendations obtained in the #CitSciComm Labs targeting each of the quadruple helix stakeholders, and science and data journalists.

## TARGET STAKEHOLDER: Policymakers

### What do we want to achieve?

The world is currently facing a **permacrisis**<sup>1</sup> (permanent and multiple crisis) that demands a joint effort from citizens, policymakers, and researchers to address environmental health, and socio-economic challenges. However, the importance of CS communication is not yet fully recognized by policymakers at all policy stages and territories. To tackle this issue, the NEWSERA project aimed at enhancing science communication with policymakers to address the permacrisis.

### What are the challenges?

The challenges of comprehending the workings of a supranational and complex institution like the European Union, as well as policy interlinks in its member states, regions, and local governments with their unique policymaking processes, are manifold. Moreover, the lack of official communication channels and policy-focused training may lead to scepticism among academia, which could exclude CS projects' outcomes from policy impacts.

### Who are the targets?

Policymaker stakeholders refer to government department members, parliamentarians, or other public organisations responsible for creating policies and laws at the local, regional, national and European level. Thus it may include public sector officials who develop ideas, plans and policies for a specific government.

### How did we do it?

To address these challenges, the #CitSciComm Lab for and with policymakers collaborated with the following NEWSERA pilot CS projects: GEOVACUI, Cities at Night, D-NOSES/OdourCollect, POSTORY, and the Spanish Observatory of Drought (OCS) - from Spain, Airt Heritage and Aliens in the Sea - from Italy, and GelAVista, Novos Decisores Ciência and Invasoras.PT - from Portugal. This Blueprint is based on the insights gained from these collaborations.

(1) [https://www.cidob.org/prensa/el\\_mundo\\_en\\_2023\\_la\\_guerra\\_en\\_ucrania\\_las\\_crisis\\_y\\_la\\_rivalidad\\_entre\\_potencias\\_marcaran\\_la\\_agenda\\_internacional](https://www.cidob.org/prensa/el_mundo_en_2023_la_guerra_en_ucrania_las_crisis_y_la_rivalidad_entre_potencias_marcaran_la_agenda_internacional)

# Good practices for targeted communication plans directed to policymakers

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## 1.

### **Co-designing communication plans, indicators and iterative assessment for impact**

In order to excel in communication, it is fundamental to understand what processes may hinder, challenge, or drive any communication efforts. On this basis it is important to pave the way for effective communication strategies that reach wider as well as diversified audiences according to projects' needs. This requires considering different aspects, such as defining clear objectives, identifying stakeholders groups of potential interest, and selecting key communication channels, formats, messages and actions, as well as other variables, such as inclusivity and gender (Magalhães et al., 2022).

Due to the complex nature of CS projects, an iterative approach and mutual exchange to communication strategies is essential, allowing flexibility and adjustments along the different phases of implementation (participants' recruitment, data collection, analysis, dissemination, etc.), depending on the level of engagement sought and the specific objectives, and during the projects' lifetime (and possibly beyond) (Roche et al., 2020).

To support this process, NEWSERA has established the #CitSciComm Labs, as collaborative spaces, where the NEWSERA pilots worked together with stakeholders's representatives and science communication experts in the co-design, implementation and validation of communication strategies specifically addressed to each of the 4H stakeholders, as target audiences.

So, where to start?

# 1.A NEWSERA methodology to co-design communication strategies

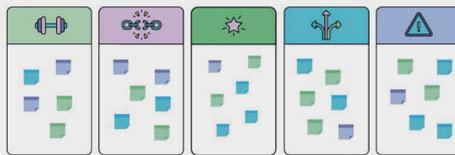
During the first round of #CitSciComm Labs, NEWSERA used a common methodology applied to each individual 4H-stakeholder group. This methodology has been fully explained elsewhere (Magalhães et al., 2022) and is included in the Blueprints for #CitSciComm with and for citizen scientists and society at large, career scientists, and industries and SMEs, from this collection.

## Defining projects' and stakeholders' perspectives as well as objectives



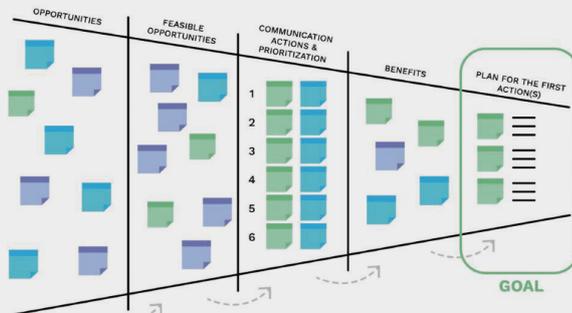
About your CS project: identify **S**trengths ("what you have"), **W**eaknesses ("what you don't have"), **W**ishes ("what you want to achieve"). Then brainstorm **O**pportunities that can help fulfill the Wishes and at the same time, detect possible **T**hreats.

## Making a diagnosis of the communication strategies of each project



During SWOT + Wishes analysis, take into account the perspective of your target stakeholder. Also, consider adopting different points of view, have in mind neutral, emotional, optimistic, creative, organisational & judgemental opinions.

## Co-designing communication actions



Chose the most feasible opportunities to involve your target stakeholder. Define possible communication actions, which benefit both the CS project and the stakeholder. Define a communication plan with prioritized and detailed actions and tasks.

## Defining indicators



Define S.M.A.R.T. indicators (specific, measurable, realistic and timely) to measure the impact of your actions. Consider achieving societal, economical, political, scientific, educational and environmental impacts.

Figure 1. NEWSERA Methodology in four steps

During the implementation of the NEWSERA Labs and mentoring sessions, the NEWSERA pilots' needs and interest in capacity building became more evident, as related to the policy impact of CS projects and how to engage with policymakers.

The potential of citizen-generated data to influence decision-making processes at any governance level was recognized by all. While some project experiences were reported to have influenced local policies (e.g. GERT) and European policy decisions (e.g. D-NOSES and Cities at Night), and other data were considered reliable sources of information by the Ministry of the Environment (e.g. InNat, MammaNet, OCS), there is still reluctance and resistance from public institutions with little interest in specific issues (e.g. failed attempts to contact MEPs initiated by Aliens in the Sea).

In order to further support the NEWSERA pilots, our team devised a specific participatory session (approximately 3h duration, with training included) for the construction of each CS project “policy map”. NEWSERA defined six areas to explore:

## Policy action Map

### 1. Build alliances with policymakers

It is crucial for the scientific community to collaborate closely with public administration at all levels, from local to international. Building partnership with policymakers can enhance the impact of any project and prevent mistrust and conflicts. Policymakers are often interested in finding new ways to interact with citizens, and the scientific community can facilitate this by building bridges between the two. NEWSERA recommends presenting your project in a way that addresses citizens’ problems rather than focusing on the details of scientific procedures when interacting with policymakers.

1	[PROJECT]		
	Build alliances with policymakers		
	Goals	Who to contact (Authority/Institution)	Mutual Interests
International			
European			
National			
Regional			
Local			

## 2. Find the right person

To ensure the success of your project, it is crucial to identify the appropriate policymaker at the local, regional, national, European, or international level who would be interested in it. Cultural diversity and legislative variations in different territories pose significant challenges at the EU and international levels. Therefore, it is essential to begin with a thorough policy analysis of how a specific territory is governed and by whom. This step is necessary to seamlessly incorporate the data and results generated by CS into the policymaking process.

2	[PROJECT]						
	Find the right person						
	Vision	Part of the government?	Other territories	Technical person or political role	Subjecty	Networking	Contact
International							
European							
National							
Regional							
Local							

### 3. Plan ahead

To effectively engage policymakers, it is crucial to plan ahead and stay informed about public agendas and timing. You can begin by consulting ephemerides and taking note of key policy events, such as the UN General Assembly, meetings, and European Parliament working groups, as well as local policy presentations on specific topics. Additionally, it is important to consider electoral agendas and how they may impact policymaker availability and priorities. Thankfully, political and policy agendas are publicly available, and many of these events occur during regular working hours. By staying attuned to these schedules and strategically timing your outreach, you can maximise your chances of successfully connecting with policymakers and advancing your goals.

3	[PROJECT]																														
	Plan ahead																														
Enero	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Febrero	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Marzo	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Abril	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Mayo	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Junio	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Julio	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Agosto	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Septiembre	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Octubre	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Noviembre	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Diciembre	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Sin fecha asignada																															

#### 4. Support evidence-informed policies

To make a real impact on public policy, it is important to support evidence-informed decision-making. Start by assessing whether your CS project can address an issue on the political agenda and contribute to generating evidence that policymakers can use. To maximise the relevance and impact of your research, consider co-creating the project with policymakers themselves. By involving them in the design and execution of the research, you can ensure that findings align with their needs and priorities. Once you have your research results, create specific materials tailored to policymakers. Offer solutions to public problems and issues based on your research, and provide clear messages and recommendations to governmental agencies and departments based on the data. By following these steps, you can ensure that your CS project makes a real difference in informing and shaping public policies.

4	[PROJECT]		
	Support evidence-informed policies		
	Data and results	Political agenda Topicality?	Strategy and materials
International			
European			
National			
Regional			
Local			

## 5. Prepare a direct and specific message

When communicating with policymakers, it is important to prepare a direct and specific message that takes into account their busy schedules and competing priorities. To ensure your message is heard, take the time to tailor it to their specific needs and interests. Before your meeting, make sure you have a clear idea of what you want to convey and how your project can address their needs. To simplify communication, consider developing usable products that showcase the value of your work in a tangible way. To maximise your chances of success, it is also a good idea to hold informal discussions with available technical and political decision-makers before presenting your project to them formally. This can help you build relationships and get a better sense of their needs and concerns, ultimately making your presentation more effective. By following these guidelines, you can increase the likelihood that your message will be heard and acted upon by busy policymakers.

### 5 [PROJECT] Prepare a direct and specific message

	Messages
International	
European	
National	
Regional	
Local	

**6. Team up with other organisations and build your relationship based on mutual benefits**

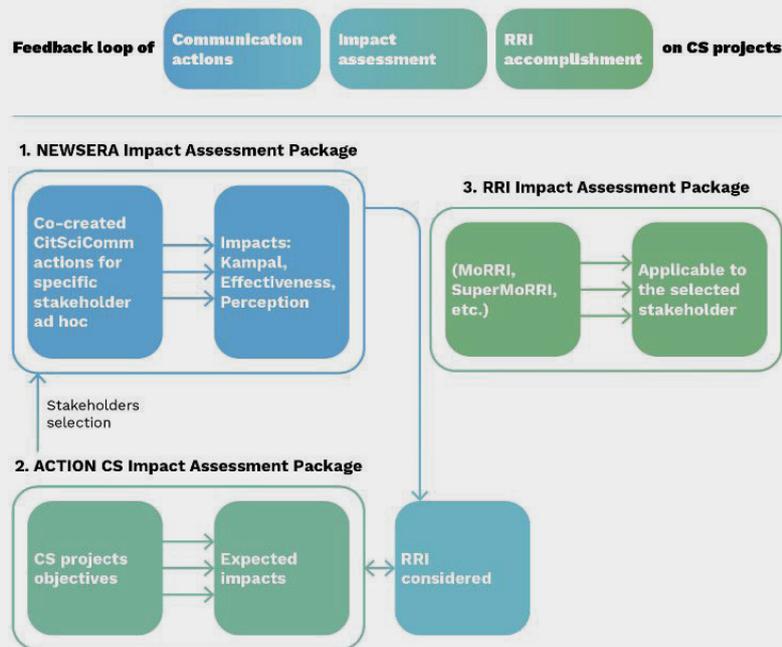
Collaboration with other organisations can be a powerful way to amplify the impact of your CS project. To build strong relationships with other groups, focus on identifying mutual benefits and coordinating actions across different levels of governance. By thinking globally and acting locally, you can help ensure that your efforts have maximum impact. Consider working together with complementary projects such as cultural neighbourhood organisations, or amateur associations, and pay attention to the social roots of the organisations you want to engage with. When reaching out to potential partners, present CS as an innovative method to generate evidence and inform public policies based on citizen-generated data. This can help you position your project as a valuable resource for organisations seeking to make evidence-based decisions. By collaborating with other groups, you can help build a more comprehensive and effective approach to addressing public challenges, and increase the visibility and impact of your CS project.

**6** [PROJECT]  
**Team up with other organizations and build your relationship based on mutual benefits**

	Actions	Other projects/organizations
International		
European		
National		
Regional		
Local		

## 1.B NEWSERA indicators and impact assessment methodology

NEWSERA established a new framework for the impact assessment of citizen science communication strategies (Giardullo et al., 2021) taking into account different dimensions, such as communication, RRI (from the MoRRI and Super-MoRRI projects) and citizen science project objectives (from the ACTION project).



**Figure 2.** NEWSERA Framework for impact assessment of communication strategies in CS projects

Following on this framework model, NEWSERA suggests a set of indicators (NEWSERA Indicators Table), which correspond to three key macro-areas (Communication, Participation of quadruple helix stakeholders and Impact), each with three related sub-areas, as follows.

NEWSERA Indicators		
Communication	Participation of 4H Stakeholders	Impact
Channels (C)	Alignment with target audience (TAA)	Economic (E)
Actions (A)	Level of Engagement (LE)	Scientific (Sc)
Products (P)	Openness (O)	Political (P)
		Social (So)

**Figure 3.** Macro-areas and corresponding sub-areas from the NEWSERA framework of indicators

Furthermore, the comparison that emerged between the analyses of the NEWSERA pilots made it possible to create a flexible roadmap to monitor the effectiveness of the communication strategy used by a CS project, considering quadruple helix stakeholders and science and data journalists, in relation to outputs, outcomes and impact.

So, for any given CS project interested in carrying impact assessment (short, medium or long-term), NEWSERA suggests to plan another working session (approximately 2h) with the following steps:

1. **Co-create indicators:** organise a co-creation working session by inviting representatives of the stakeholder of interest in order to build indicators taking into account their experience, from which new needs or unforeseen outcomes can be identified;
2. **Analyze what exists:** look at the existing work plan, including objectives, actions, tasks and chronogram; choose which key macro-areas to submit to analysis and what data are or will be available;
3. **Select the most suitable indicators:** query the indicators on the NEWSERA Indicators Table, that comply with the SMART rule and which can be feasible for one's project, considering the available economic and human resources; consider including other indicators that are not on the table if these can be more useful.

Communication actions	Tasks	Chronogram	NEWSERA Indicators			Specific Indicators	
ACTION 1	Task 1.1	YEAR Julio Agosto Septiembre Octubre	Communication	C	Is the project on TV, radio, etc.?	✓	Number of TV appearances
	Task 1.2			A	...	✓	...
	Task 1...			P	...		...
ACTION 2	Task 2.1		Participation of 4H stakeholders	TAA	Are citizen scientists participating in publications or is their engagement recognized?	✗	Number of publications with CS as co-authors
	Task 2.2			LE	...		Existence of co-atorship guidelines
	Task 2...			O	...		...
ACTION ...	Task 3.1		Impact	E	Does the project have any cooperation for exploitation?	✓	Number of products or services licensed
	Task 3.2			Sc	...		...
	Task 3...			P	...		...
				So	...		...

Figure 4. Co-design frame to build indicators together with the stakeholder of interest.

# Co-designing communication strategies targeting policymakers

In order to inspire on the co-design of communication strategies, hereby are some of the actions and tasks defined and implemented by the NEWSERA Pilots involved in the Policymakers CitSciComm Lab:

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## Geovacui

1. Identify initiatives and contact main policymakers and journalists to engage them in the project.
2. Identify and contact several citizens from different municipalities related to the project's topic. Then create a collaborative map of all related initiatives.
3. Creation of "breakfast with policymakers".
4. Carry out several meetings with political representatives, online and face-to-face. Give options to stakeholders to co-create the final recommendations document if they wish to do so.
5. Record personal stories to later show the material to policymakers. This activity was not foreseen at the initial communication plan, but happened naturally and was included.

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## Cities at Night

1. Map of potential stakeholders interested in participating.
2. Define priorities and narratives through policy briefs.
3. Identify and contact the agents of the European and national institutions possibly interested. Get meetings with them.
4. Contact lobby groups potentially interested in participating to advocate together.
5. Be active in social networks and media and create impact in the broad media such as television and radio.
6. Create an index of good practices of cities and regions.
7. Integrate the project in a light pollution topic of the Smart Cities Missions to apply to different funding proposals.
8. Interact with the federation of environmental municipalities.

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## D-NOSES

1. Locate areas with odour problems and map municipalities affected.
2. Plan preliminary interviews and align the project with the local political agenda.
3. Create visual materials and marketing to communicate the added value of the CS methodology for local issues.
4. Create training materials, workshops and activities such as sensory walks to engage.
5. Differentiate between policymakers and technical personnel.
6. Show the social, political and economic impact to policymakers.
7. Advocate in general terms to introduce the topic in public agendas.

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## PΩSTORYα

1. Organise workshops, debates and a summer course
2. Organise an open event for policymakers.
3. Transform the resulting materials from the event's outcome into graphic materials for dissemination

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## Citizen's Drought Observatory

1. Open direct channels with the Ministry on Ecological Transition in Spain.
2. Create a working line with the Ministry of Universities in Spain.
3. Design and establish a strategy to involve the agricultural sector.
4. Write articles in journals and participate in radio.
5. Create a specific plan for the final report for the Spanish Congress of Deputies.
6. Participate in different CS Conferences
7. Publish recommendations to address policymakers derived from the civic lottery and citizen's jury performed during project's implementation

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**Invasoras.pt**

1. Plan to have several meetings with members of the parliament, ministers and the general public.
2. Run webinars with city mayors, CS champions, technical staff, etc.
3. Implement a specific action plan.
4. As all the communication actions defined in the first NEWSERA Lab were achieved, the pilot defined new actions consisting in the dynamization of a campaign to raise awareness for the specific species.

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**Novos Decisores Ciências**

1. Plan communication mechanisms and the creation of social media networks.
2. Insert the project in the municipality's social actions network.
3. To include the project in social development plans.
4. Seek national and local funding opportunities.
5. Present the project to the general public and policymakers, showing a film produced by the inhabitants of the neighbourhood.

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**Air Heritage**

1. Draft a Policy Brief with which to communicate the findings to local institutions in order to participate in decision making while promoting the project to neighbouring municipalities.
2. Announce the schedule of monitoring and data collection activities under the project to the citizenry in order to promote their involvement
3. Promote light mobility routes to coincide with the resumption of the school year by engaging students and families to participate in order to subsequently collect their feedback through satisfaction questionnaires.

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**Gelavista**

1. Plan intensive communication to make it more participative and reach more policymakers.
2. Run online training and workshops on identification and procedures for municipal technicians.
3. Organise three scientific publications.
4. Create a mailing list for stakeholders related to NEWSERA and targeting policymakers.
5. Run workshops and other types of participation with related-projects.

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**Aliens in the Sea**

1. Organise a photo contest event with winning prizes to engage citizens and interact with other projects.
2. Activate relations with policymakers through the photo contest event, by guaranteeing publicity exposure on official channels and establishing an initial mutually beneficial collaboration with public institutions.

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**Gena**

1. Initiating collaboration with Arpa so that project data is available within its database
2. Mapping Stakeholders to initiate a retention and recruitment campaign

We hereby also include the selection of indicators used (N= number of projects that have selected the indicator to monitor) by the NEWSERA Pilots, but as aforementioned, the NEWSERA Indicators Table can be used ad hoc according to your own needs and stakeholder of interest.

**Table 1.** Overview of the indicators used by the NEWSERA Pilots, according to their work plan and target stakeholder.

<b>Macro-Area</b>	<b>Sub-Area</b>	<b>Co-created indicator</b>	<b>N</b>
Communication	Action	Does the project have a targeted outreach and communication strategy?	3
		Are citizen scientists involved in communicating, spreading, sharing results?	4
		Number of public meetings/events per year	8
		Does the project use informal and formal communication tools to get connection, upgrade and inform the citizens?	11
	Channels	Does the project have a presence on TV, radio, newspapers or magazines?	7
		Does the project have a presence on digital social networks?	4
		Does the project include innovative means of science communication and popular media (e.g. art)?	3
	Products	Increase in community reach on social media (twitter, fb, etc)	13
		Increase number of followers on social media	7

**Table 1.** Overview of the indicators used by the NEWSERA Pilots, according to their work plan and target stakeholder.

Macro-Area	Sub-Area	Co-created indicator	N	
Impact	ECO	Does the project have any cooperation for exploitation, e.g. with social entrepreneurs? .....	1	
		Does the project generate any economic impact, e.g. cost reduction, new job creation, new business model, etc.? .....	2	
	POL	Number of activities/reports related to policies .....	1	
		Does the project have any impact on political decisions? .....	6	
	SCI	Does any cross-fertilization of projects take place? .....	4	
		Does the project link to experts from other disciplines? .....	3	
		Does the project collaborate with other initiatives at national or international level to enhance mutual learning and adaptation? .....	5	
		Number of scientific contributions .....	4	
		SO	Number of schools (number of teachers, number of students) .....	5
			Have you had any educational materials and resources derived from the project (e.g. MOOCs) being applied? .....	1
	Does the project collaborate with local organizations (e.g. in environmental or social fields)? .....		5	

**Table 1.** Overview of the indicators used by the NEWSERA Pilots, according to their work plan and target stakeholder.

Macro-Area	Sub-Area	Co-created indicator	N
Stakeholder engagement	Level of participation	Are the participation options and the degree of involvement diversified? Which levels can people participate in?	1
		Are citizen scientists participating in publications or is their engagement recognized?	3
		Ratio of registered users and active users	3
		General level of engagement	10
	Openness	Are the project objectives and results clearly and transparently communicated?	1
		Does the project have a data management plan, IPR strategy and ethical guidelines?	1
		Is the data handling process transparent? (E.g. do citizens know what the data is used for, where the data is stored and shared?)	2
		Is the generated data shared publicly and under which conditions, e.g. anonymized, metadata, ownership, consent, etc.?	1
	Alignment with target audience	Diversity in project's public meetings composition in terms of Age range	5
		Diversity in project's public meetings composition in terms of Level of education	2
		Diversity in project's public meetings composition in terms of Gender	1
		Diversity in project's public meetings composition in terms of quadruple-helix representatives	4
		Does the project stimulate political and public sector participation (e.g. through participatory meetings, interviews, other means)?	9
		Does the project stimulate academic research participation (e.g. through data/methodology validation, participatory meetings, interviews, other means)?	1
		Does the project seek collaboration with science communication professionals?	3
		Has the project elaborated policy briefs or formats (infographics, etc.) directed to policy makers?	4

## 2. Messages, innovative tools and channels

Hereby we gather a compilation of the description and details of messages, innovative tools and channels NEWSERA pilots have used. Moreover, we included expected outcomes and impacts that communicative actions can have to sustain long term collaborations between CS projects and their specific target stakeholder.

### Messages



## Innovative Tools and channels

F2F/ Networking	Attend events and contact Transfer Knowledge Units	Attend Parliamentary commissions and invite young researchers to learn from networking	Connect with public servants and technicians at all governance levels	Take advantage of electoral processes to connect with political parties
Materials	Create materials that grasp the attention of policymakers	Take advantage of social media, contact influencers and CS champions	Learn how to communicate with policymakers	Co-create policy materials with policymakers when possible
Partnership	Engage with facilitators and create partnerships with other projects	Take advantage of partners and the capacity of networking together	Contact public institutions to involve them in the project	Share tips and contacts with the CS ecosystem

## Expected outcomes and impacts

CS projects and policymakers can mutually learn from each other

Promote science-to-policy skills in research CVs

Technicians in public institutions are the ones whom can give sustainability to CS projects

It is in the essence of CS to have policy and social impacts

Use the policy departments already collaborating in a CS project to further advocate

Participate as much as possible in networking events

Knowledge Transfer Units are one of the most effective official channels to connect with policymakers

Lobby to integrate the sustainability aspect of CS projects in Funding Agencies

Define the scope of the policy impact of the CS project

# 3. Barriers and Mitigation Strategies

When addressing each of the 4H-stakeholders, we have found common barriers faced by the NEWSERA Pilots. Hereby we propose several mitigation strategies that can be planned in order to avoid or overcome these.

## Barriers

CS is a field that deals with the complexity of modern societies and its wicked problems.

Many CS projects lack the specialisation and multidisciplinary teams needed for success.

Feeling of professional intrusiveness when it comes to science communication and political science.

Feeling of a narrow academic and male gendered dominance in CS projects.

Lack of communication in the Knowledge Transfer Offices from academia to the public sector.

Scientists are often not familiar with policy or journalistic language, making it difficult to convince policymakers of the importance of their work.

Lack of professional incentives for policy advisors in CS, along with bureaucratic barriers to accessing policymakers.

Lack of communication among scientists, journalists and public administrations.

Lack of funding schemes for CS projects with policy impact. Most funding calls do not contemplate the amount of time and resources any CS requires. Underfunding CS projects leads to lower down scientific policy impacts.

Public administration mistrust in the citizens-generated data that may lead to closing the communication channels between scientists and policymakers.

## Mitigation strategies

To effectively tackle this barrier, building an interdisciplinary team is key. One scientist alone cannot and should not attempt to address everything.

CS projects require a well specialised and multidisciplinary team from the outset.

To improve communication and increase policy impact, consider integrating science journalists and political scientists into CS projects.

Be inclusive from project proposals. Train the next generation and invest in gender balance plans, and seek external collaborations.

Orient the Knowledge Transfer Offices towards policy impact. Hire mediators and train scientists and policymakers on the importance of using these Offices as a central point of knowledge connection.

Learn soft skills to strengthen communication among scientists, journalists, and policymakers, or include specialists in the working group.

Create CS project alliances to effectively lobby, and incentivise teams to plan policy impacts.

Have your own agenda and build a network of CS policy champions whom you can contact on a daily basis.

Build alliances and networking for greater lobby so various CS projects can align their scientific project with social and policy agendas.

Include public administrations from the beginning of the CS project so you can plan effective policy impacts and build CS champions for networking at any policy level.

# 4.

## Lessons learnt: NEWSERA Pilot Case studies

In this section we illustrate NEWSERA pilots as case studies, including a brief description, aim, more concrete target audience within their stakeholder group, indicators and best practices. Each case study further develops on their successes and achievements towards their specific stakeholder within the CitSciComm Labs, and overall in the project itself.

During NEWSERA synergies between the different CS projects also occurred and themselves served as inspiration between each other, cultivating an active community of practice that expanded to other local, national and international networks (for example, ECS platform, National associations of CS, the SwafS-19 sister projects, the Spanish Observatory of CS, etc.) and that will surely hold after NEWSERA ends, either independently and/or connected via new initiatives. In each of the blueprints we share some “seed” examples that emerged during the project.

### Project

## D-Noses / OdourCollect (OC)



### What was this project about?

Odour pollution is the second cause of complaints worldwide (after noise), and yet, there is a lack of harmonised regulation. D-NOSES undertook ten pilot interventions using a bottom-up approach and ad hoc multi level engagement model. Parallely, OdourCollect (a free App) was created within the project to allow citizens to monitor in real time the presence of odour pollutants.

[dnoses.eu/about-d-noses](https://dnoses.eu/about-d-noses)

[odourcollect.eu](https://odourcollect.eu)

### Main Goal

To reverse the way in which odour pollution is commonly tackled and legislated, through a co-creative citizen science approach.

### Target audience

Policymakers at various governance levels.

### Good example for

Citizens-generated data projects, policy impact.

### Best practices:

At a national level, **D-NOSES partners together with consultants, NGOs and public administrations, developed the first Spanish norm** to include mapping odour annoyance by using advanced psychometry based on CS methodologies. For this process this working group is being advised by the Spanish standardisation body (UNE). At a European level, **D-NOSES and the European Bureau for Conservation and Development organised an online joint event “Revising Odour Pollution in Europe”** that **brought together policymakers, representatives from industries, communities and scientists** to present their experiences and propose

recommendations to tackle odour pollution. This event led to the EU Committee of the Regions to adopt in its Plenary Session on 27 January 2022 the Opinion “**EU Action Plan: Towards Zero Pollution for Air, Water and Soil**”, where odour pollution is finally present at paragraph 45. At the local level, another outcome of the D-NOSES project, which is still under development, is the **elaboration of a model ordinance**. This document **will guide governmental authorities when managing an odour pollution problem** based on traditional techniques and also on citizen science methodology.



**Their feedback on NEWSERA participation:**

*“Citizen science projects often struggle to establish credibility and gain trust from government authorities and the general public. However, through participating in CitSciCommLabs, we have learned communication strategies to highlight the scientific rigour of our methods and data analysis, and emphasise the benefits of citizen science for the scientific community and society”.*

# Aliens in the Sea (AIS)

## What was this project about?

It aims to collect data on alien plant and animal species found in the Mediterranean waters surrounding Sicily and its minor islands. Through data collection by citizens, divers and researchers, the project intends to track the spread of species in order to create a database on their distribution and possible threat levels.



[www.unipa.it/Progetto-di-Citizen-Science-Aliens-in-the-sea/](http://www.unipa.it/Progetto-di-Citizen-Science-Aliens-in-the-sea/)

## Main Goal

In addition to implementing a database on the distribution of alien species in the sea, it is the ambition of the project to raise public awareness of the problem of biological invasions through correct information in order to influence the decision-making process and have an impact on local institutions.

## Target audience

Fishermen, beachgoers, boaters and others involved in sea-related activities, public sector.

## Good example for

Communication aimed at citizens engagement synergies with local political institutions.

## Best practices

By participating in NEWSERA, Aliens in the Sea was able to reflect on its communication strategy and found it necessary to adopt a **new approach** through which to diversify its CS initiatives in order to **broaden its target audience**. Therefore, the project launched its first **photo competition** open to citizens, divers and naturalist photographers, rewarding the best shots with scientific texts. The contest has enabled AIS to initiate interesting **collaborations** with local **diving clubs, associations** and other **scientists**, while at the same time gaining a wide participation, proving that Cs is a practice of transversal interest that involves a heterogeneous public. However, the interest in finding a willing interlocutor in local institutions was not matched.



## Their feedback on NEWSERA participation:

*“Thanks to CitSciCommLabs, we have reflected on the potential of the project which, through new communication channels, has regained scientific vitality and participation by opening up to new target audiences. However, a strategy remains to be implemented that succeeds in involving the Marine Protected Areas and local administrations, which are not very willing to collaborate.”*

# Invasoras.pt

## What was this project about?

Invasoras.pt is a project dedicated to inform, detect and act on the problem posed by the emergence of invasive plants in Portugal. The project has various actions to inform society in order to enable it to help in the detection of these species and act accordingly



[invasoras.pt](https://invasoras.pt)

## Main Goal

The main goal of the project is to raise awareness, detect and act upon the problem of biological invasions, to make invasive plants known at a national level and to stimulate the active participation of society both in the mapping of these species and in control and dissemination activities.

## Target audience

Society at large, public sector (such as local administrations) and policymakers.

## Good example for

Citizens-generated data projects; policy and environmental impacts.

## Best practices:

The project **created complete profiles** of the invasive plant species in the Portuguese territory and **provided tools and information** that are intended to be useful for those dealing with this problem, whether they are managers of areas with invasion problems, members of the scientific community, local authorities or others interested in the subject. The project also **provided support materials for environmental education activities**, for teachers and informal action groups. At a national level, Invasoras.pt **gathers frequently groups of**

**collaborators** who are interested in implementing management actions of invasive plant species. The project **goes to the field** with several volunteers and, in some cases, with local authorities to identify and control invasive plant species. Also, they perform several **training actions directed to local authorities** interested in overcoming this problem.



## Their feedback on NEWSERA participation:

*“The implementation of strategies mostly directed to the public sector and policymakers was a big challenge, but very useful to boost the better management of a particular invasive plant species (Fallopia japonica) and devise a directed Action Plan to control it.”*

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# The way to go: recommendations to efficiently engage with policymakers for wider impact

- **Timing is crucial:** It is essential to connect with policy agendas and identify the right moment to collaborate with policymakers. To maximise impact, CS projects should take advantage of windows of opportunity throughout the policymaking process, from problem framing to policy analysis.
- **Understand which level and type of policymaker is relevant to your project:** this requires an understanding of the topic studied and the differences between governmental and parliamentary bodies.
- **Boost the potential of CS policy impact:** it is important to communicate good practices in CS and promote it as a utilitarian scientific field. CS is uniquely positioned to address social challenges that matter to people, which can legitimise public policies.
- **Monitoring public policies can be an important phase in a CS project:** it also allows citizens to participate in policy decisions, and increases the general value of public participation.
- **Grasp the attention of policymakers:** elaborate visually attractive materials to present CS results to policymakers. Consider the human and emotional factor as crucial in the engagement. Use the WOW factor to catch their eye.
- **Create alliances with public institutions:** start by asking public institutions which kind of data they are in dire need and build your alliance with them. Create alliances also with the media journalists, specially the local media to produce innovative communication materials to better engage and work on data and indicators formats.
- **Raise institutional awareness for creating Transfer Knowledge Units:** and mediators that can build bridges between scientists and policymakers. It is also paramount to mentor young professionals for network transferring.
- **Advocate to make the CS field a recognized monitoring tool:** create long-lasting institutional support to the CS field. A way to do that is to foster transnational CS projects (e.g. Iberian level) to grasp the attention of policymakers to better monitor and harmonise transnational social challenges.
- **Consider the multi-level governance model to effectively garner support at all institutional levels:** European, national, regional and local levels. Engage with local institutions from the beginning of your project (e.g. CS project results in local elections programmes). By applying a bottom-up approach from the beginning it is easier to have further policy impact at other institutional and governmental levels.
- **Advocate for the creation of cascade fundings:** for new and ongoing CS projects, and make public institutions participate in the standardisation of CS methodologies.
- **Talk about the economic impact of the CS project:** policymakers are eager to hear how your CS project can impact and scale up the local community in economic terms. Use the power of storytelling to explain how CS projects can avoid economic conflict of interests by answering social and public needs. Use former successful examples to explain that CS projects can economically impact the municipality (e.g. mosquito alert, birds watching).
- **Boost the social dimension of CS:** any CS project has a strong social component at different levels: From increasing public participation, raising awareness, to building bridges between citizens and public institutions. Take advantage of the very own CS methodology in engaging citizens in the policy process, and use the CS social impact to show policymakers the benefits of working in your project.
- **Lobby:** with each and every policymaker eager to hear you, from political parties to governmental bodies. Advocating for the recognition of CS is an ongoing process.

# General resources

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## NEWSERA Policy Briefs

NEWSERA Policy Brief 1  
<https://doi.org/10.5281/zenodo.4837244>

NEWSERA Policy Brief 2  
<https://doi.org/10.5281/zenodo.7752561>

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## Guides and online training

Guide of science communication for citizen science projects and citizen science journalism  
<https://doi.org/10.5281/zenodo.7752525>

### How do you transform citizen science data into a news story?

YouTube link:  
[https://youtu.be/Y\\_lAo321\\_V4](https://youtu.be/Y_lAo321_V4)  
*Invited talks from science and data journalists - only available in Spanish*

### Data4CitSciNews conference

YouTube link: <https://www.youtube.com/live/EwDdfJ7yFoY>  
*Invited talks from scientists, journalists and designers to debate on the state of the art in data journalism, fake news and the concept of citizen science journalism*

### Online workshop on common challenges for citizen science:

communication. Organised by Scivil – Citizen Science Vlaanderen YouTube link: <https://youtu.be/9a700xeWTeQ>

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## Relevant Publications from the NEWSERA Consortium in Open Access

Magalhães, J., Guasch, B., Arias, R., Giardullo, P., Elorza, A., Navalhas, I., Marín-González, E., Mazzonetto, M. and Luís, C. (2022). 'A methodological approach to co-design citizen science communication strategies directed to quadruple-helix stakeholders'. JCOM 21 (04), A05.  
<https://doi.org/10.22323/2.21040205>

*Here you will find our methodology to co-design a CS project communication strategy together with the stakeholder of interest. You can adapt to your own specific case.*

Luís, C., Navalhas, I., Marín-González, E., Magalhães, J., Arias, R., Giardullo, P., Leguina, L. Keeping participants engaged in citizen science projects: the role of science communication strategies. PoS (CitSci2002) 017.

<https://pos.sissa.it/418/017/pdf>

*Here you will find a methodology to discuss with CS project managers, participants, and other stakeholders, the challenges faced in maintaining long-term engagement, specifically focusing on citizens as the main stakeholder target group.*

Giardullo, P., Neresini, F., Magalhães, J., Luís, C., Marín-González, E. and Arias, R. (2023). Citizen science and participatory science communication: an empirically informed discussion connecting research and theory. JCOM 22(2), A01.

<https://doi.org/10.22323/2.22020201>

*Our exploration consisted in a survey involving 157 CS projects around the EU. We found that CS projects tend to communicate through social media mainly reproducing a knowledge transfer mode. This may hinder effective encounters with both participants and potential target audiences.*

Giardullo, P., Arias, R., Leguina, L., Magalhães, J. (2021) Responsible and inclusive citizen science: comparing initiatives and assessing impacts. Tecnoscienza 24, 12, 2

<http://www.tecnoscienza.net/index.php/tsj/article/view/480/294>.

*This paper resumes the variety of notions of participation, citizenship, and democratization of science in CS as they emerged during a panel carried out during the XIII STS Italia Conference "Dis/entangling Technoscience" held in June 2021.*

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## Relevant public deliverables from the NEWSERA Consortium

Giardullo P, Citarella MA, Neresini F, Magalhães J, Arias R, Guasch B, Pelacho M, Luís C (2021) NEWSERA - Report on indicators for impact assessment of science communication in Citizen Science Projects (Deliverable 2.2) (1.1). Zenodo.

<https://doi.org/10.5281/zenodo.5139999>

Leguina, Magalhães J, Tola E, Guasch B, Elorza A, Lacunza I, Arias R. (2023). Citizen Science as a communication tool in the Post-Factual Era. (Deliverable 3.7) (v1.2). Deliverable report of project H2020 NEWSERA (grant agreement No 873125). Zenodo.

<https://doi.org/10.5281/zenodo.7689045>

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## Relevant Publications from our Pilots

Liñán S, *et al.* (2022) A new theoretical engagement framework for citizen science projects: using a multi-temporal approach to address long-term public engagement challenges. *Environ. Res. Lett.* 17 105006

<https://doi.org/10.1088/1748-9326/ac939d>

Garrison H, Agostinho M, *et al.* (2021) Reflections on meaningful and impactful stakeholder engagement in fundamental research. *EMBO Reports* (2021)22:e54000

<https://doi.org/10.15252/embr.202154000>

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## Others

Frontiers Research Topic “Bridging Citizen Science and Science Communication”, with Yaela Golumbic, Alice Motion, Joseph Roche and Joana Magalhães as co-editors

<https://www.frontiersin.org/research-topics/48185/bridging-citizen-science-and-science-communication>

Carayannis EG and Campbell DFJ (2009) ‘Mode 3’ and ‘Quadruple Helix’: toward a 21st century fractal innovation ecosystem. *Inter J Tech Manag*, 46:3-4, 201-234.

<https://doi.org/10.1504/IJTM.2009.023374>

A 10-step guide to writing citizen science project descriptions that spark interest and attracts volunteers - CS Track Project

<https://cstrack.eu/format/news/how-to-write-an-engaging-citizen-science-project-description/>

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## SwafS-19 sister Projects

“Science communication: Empowering citizens in the public discussion of science”-CORDIS RESULTS PACK

<https://cordis.europa.eu/article/id/442429-science-communication-empowering-citizens-in-the-public-discussion-of-science>

Roche J, Arias R, Bell L, Boscolo M, Fornetti A, Knutas A, Kupper F, Magalhães J, Mannino I, Mendoza I, Moreno-Castro C, Murphy K, Pridmore J, Smyth F, Tola E, Tulin M, Weitkamp E and Wolff A (2021) Taking Stock and Re-Examining the Role of Science Communication. *Front. Environ. Sci.* 9:734081.

<https://www.frontiersin.org/articles/10.3389/fenvs.2021.734081/full>

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EU Prize for Citizen Science and Accelerator Open Call - <https://impetus4cs.eu/>

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