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The Platform for Sharing, Initiating and Learning Citizen Science in Europe

Deliverable 4.3
Report on Policy Maker Engagement and Awareness-Raising Activities (2020 update)

Authors: Mollie Latham, Luigi Ceccaroni

Disclaimer

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Review	Fredrik Brounéus (VA) Nadia Dewhurst-Richman (UCL) Lucy Robinson (NHM) Jessica Wardlaw (NHM)
Project Officer	Colombe Warin
Abstract	The EU-Citizen.Science project will create a platform to raise awareness of citizen science, and facilitate engagement with citizen science projects. This document is an updated version of deliverable 4.2, which offered guidelines and recommendations for raising awareness of citizen science activities and projects among a variety of stakeholders. Through identification of existing projects and analysis of best practice, this report aims to establish a framework for increasing awareness in existing and new projects. A list of recommendations for awareness-raising among stakeholders is formulated based on existing literature. These recommendations are then allocated to the identified groups of stakeholders to suggest the most appropriate ways to raise awareness among different audiences.

Keywords	Awareness, Citizen Science, Recommendations

Contents

1 Version Log

Version	Date	Released by	Nature of Change
V0.1	20/11/19	Mollie Latham (Earthwatch)	Structure and content of deliverable
V.02	17/12/19	Mollie Latham & Luigi Ceccaroni (Earthwatch)	Internal review complete
V.03	24/01/2020	Cecilia Cabello Valdés, (FECYT), Rosa Capeáns Garrido (FECYT), Margaret Gold (ECSA), Teresa Schäfer (ZSI), Katherin Wagenknecht (MfN)	External review completed
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V.08	18/12/2020	Mollie Latham & Luigi Ceccaroni (Earthwatch)	Final document prepared for submission (2020)

2 Definitions and Acronyms

AI	Artificial intelligence
ARMI	Angler's Riverfly Monitoring Initiative
CA	Consortium Agreement
CC	Creative Commons

CSA	Coordination and Support Action
CSO	Civil Society Organisation
Data	Information, in particular facts or numbers, collected to be examined and considered as a basis for reasoning, discussion, or calculation. In a research context, examples of data include statistics, results of experiments, measurements, observations resulting from fieldwork, survey results, interview recordings and images. The focus is on research data that is available in digital form. (European Commission, 2016)
Dataset	A grouping of data
Digital Curation	Selection, preservation, maintenance and archiving of electronically stored data
DMP	Data Management Plan
DS	Data Set
EC	European Commission
ECSA	European Citizen Science Association
FAIR	Findable, Accessible, Interoperable and Reusable
GA	Grant Agreement
GDPR	General Data Protection Regulation
H2020	Horizon 2020
ICR	Immediate Civic response
IPR	Intellectual Property Rights
Metadata	A description of data
MoRRI	Monitoring the evolution and benefits of responsible research and innovation
NGO	Non-Governmental Organisation
Open Access	Access that is free to all and free of any restrictions
Open Data	Data that can be freely used, shared and built on by anyone for any purpose
OpenAIRE	Open Access Infrastructure for Research in Europe

PPSR	Public Participation in Scientific Research
Repository	A location in which data is stored or managed
RIA	Research and Innovation Action
RRI	Responsible Research and Innovation
SDGs	Sustainable Development Goals
SME	Small- and Medium-sized Enterprise

3 Executive summary

The EU-Citizen.Science project will create a platform to, among other things, raise awareness of citizen science, and facilitate engagement with citizen science projects. This document offers guidelines and recommendations for raising awareness of citizen science activities and projects among a variety of stakeholders. Through identification of existing projects and analysis of best practice, this report aims to establish a framework for increasing awareness in existing and new projects. A list of recommendations for awareness-raising among stakeholders is formulated based on existing literature. These recommendations are then allocated to the identified groups of stakeholders to suggest the most appropriate ways to raise awareness among different audiences.

4 Introduction

Interdisciplinary collaboration and novel approaches are essential components to providing mutual ways of working within citizen science across Europe. The EU-Citizen.Science project aims to develop a diverse and innovative platform that will make citizen science accessible to all. The platform will be populated with carefully curated resources and tools that will be accessible to wider audiences. The provision of resources, tools, guidelines and training modules will enable a wider understanding of citizen science and facilitate people in initiating citizen science activities. More specifically, the project aims to:

- coordinate citizen science actions and leverage existing resources in the currently fragmented landscape of citizen science in Europe;
- engage stakeholders at all levels (local, national and European);
- create a mutual learning space and a set of comprehensive codesigned training modules for the different target audiences.

The platform will be made accessible to different stakeholders, ranging from interested citizens to scientific institutions, up to politicians and public media, and aims to facilitate citizen science on a broader scale. The project plans to broaden the awareness of citizen science among the general public, augmenting participation of citizen science within education and improve communication among scientific publications and project participants.

WP4 focuses on awareness and engagement of identified stakeholders. The work package and its subsequent tasks and deliverables facilitate the project objectives, namely in empowering diverse stakeholders to adopt citizen science

practices and begin initiatives and strengthening links between citizen science and policymakers. WP4 will develop strategies and recommendations to facilitate engagement with and awareness of citizen science in Europe. Critically, the subsequent reports will provide best practice, including how to engage audiences with citizen science and create new initiatives, aided by the expertise of project partners across the consortium.

4.1 Purpose and Scope of this Report

This document, titled "Report on Policy Maker Engagement and Awareness-Raising Activities", is a deliverable of Task 4.1 'Achieving societal awareness and engagement in science through existing citizen science networks, projects and multiplier events' and Task 4.2 "General policy recommendations for citizen science", both of which contribute to the overall aims and objectives of Work Package 4 'Awareness and Engagement - Public and Policymakers'. With the ambition to mainstream citizen science in Europe and provide materials that are accessible to a wide range of audiences, Work Package 4 encompasses the engagement and awareness of a diverse catalogue of stakeholders. Guidance and assistance in achieving awareness and engagement with citizen science is a critical aspect of the centrality and interdisciplinary nature of the platform.

Deliverable 4.3 will offer a diverse approach to awareness-raising of citizen science projects and activities, fostering awakening in those learning about, and hopefully participating with, citizen science, as well as offering a comprehensive understanding of strategies for awareness-raising. Deliverable 4.3 explores the literature surrounding awareness of citizen science, assessing the discussion surrounding strategy and optimisation, in order to develop a comprehensive list of guidelines and recommendations for awareness-raising across the stakeholders. This list aims to explain the process of awareness-raising within the EU-Citizen.Science framework and will consider methods used by the project partners and third parties to raise awareness of the platform, ultimately offering examples of best practice.

4.1.1 Scope of the deliverable and of the updates with respect to D4.2

WP4 focuses on increasing the awareness and engagement of identified stakeholders with citizen science, demonstrating a conceptual model for developing strategies to consolidating existing initiatives and increasing awareness among stakeholders, namely policymakers, and provide guidance and consistency among citizen science initiatives. This deliverable has allowed collaboration and cooperation with other project partners, encompassing the breadth of knowledge and expertise within the consortium, something that will be further utilised within the update in month 34.

Deliverable 4.3 (this deliverable) presents recommendations on "awareness raising" in all types of stakeholders, with a specific focus on policymaker awareness and engagement to be incorporated within updates to this report. Deliverable 4.1, published separately, presents recommendations on "engagement" more generally for all types of stakeholders, including policymakers.

The updates included in this deliverable with respect to D4.2 consist of:

- An update regarding the work completed since submission.
- A focus on policymaker engagement and awareness-raising, utilising the results of the policymaker workshop held at the October project meeting.
- Increased detail on the example projects utilised within the recommendations, such as web link, logo and project name.

4.2 Definitions

4.2.1 Awareness

When considering deliverables 4.1, 4.2 and 4.3, it was necessary to clearly define the difference between awareness and engagement and establish the difference in definition to support the difference in approach. For the purpose of this project, engagement is defined as the active participation or involvement of an audience member with a citizen science

project, activity or event, on one or more occasions.
For the purpose of this project, awareness is defined as a knowledge of citizen science or a citizen science project, activity or event, and summarises a more superficial interaction that is limited to a knowledge of its existence, opposed to involvement with it. This definition is in line with the Cambridge dictionary definition "knowledge that something exists, or understanding of a situation or subject at the present time based on information or experience" (Cambridge, 2019). Similarly, Collins Dictionary states that to be aware of something is to know about it, and that a person who is aware "notices what is happening around them or happening in the place where they live" (Collins Dictionary, 2019).

4.2.2 Audiences

For the purpose of this report, the audiences (or stakeholders) considered are:

- academia
- educators
- the public
- non-governmental organisations (NGOs) and civil society organisations (CSOs)
- industry and small- and medium-sized enterprises (SMEs)
- the press and media
- policymakers and funders.

These stakeholders have been identified via *Deliverable 2.1: Stakeholders, Network and Community Mapping Report*, a deliverable part of *Work Package 2: Platform, Community and Network Building* (Figure 1). For the purpose of this study, the public will encompass volunteers (or participants), as traditionally, in citizen science, volunteers are part of the public. It is important to remain consistent in audience terminology among the consortium, as having consistency in terms utilised impacts the development of knowledge, as referenced in Eitzel et al. (2017).

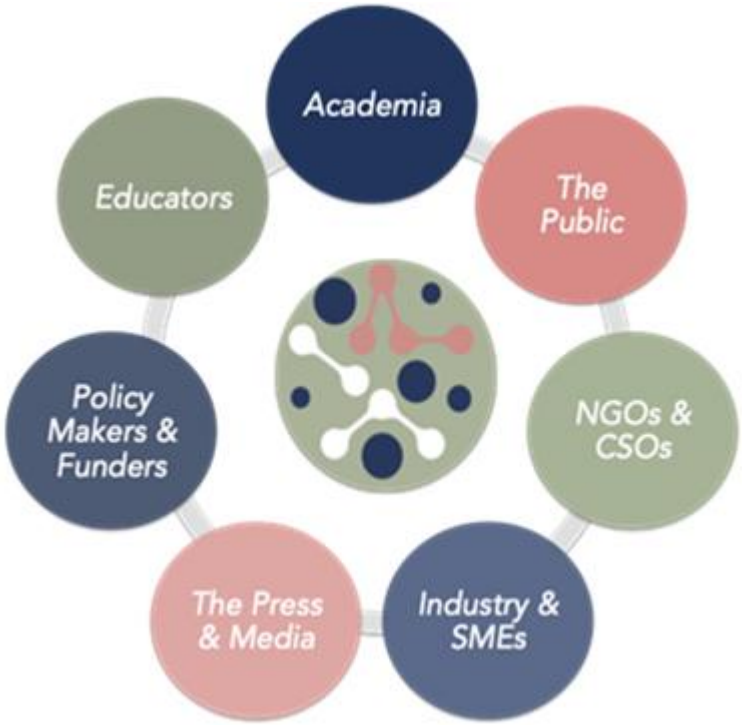

Figure 1- Stakeholder Map from Deliverable 2.1: Stakeholders, Network and Community Mapping Report, a deliverable part of Work Package 2: Platform, Community and Network Building

4.3 The EU-Citizen.Science platform

As a central platform for sharing knowledge, initiating action and supporting learning, the EU-Citizen.Science platform provides resources surrounding engagement for all stakeholders. The provision of resources, training and examples of best practice will provide content to meet the varying needs of society and policymakers. The platform will act as a guidance tool for those wishing to expand their understanding of citizen science, get involved with a project, or begin a new project. Also, the platform will highlight opportunities and guidance for funding citizen science and provide an understanding of how citizen science can inform local decisions and broaden understanding of communities. This deliverable will be hosted on the platform to guide and support citizen science practitioners and participants in raising awareness of projects and initiatives among key stakeholders.

4.4 Methodology

Deliverable 4.3 explores the literature around raising awareness of citizen science among a range of audiences to develop a comprehensive list of recommendations. These recommendations will explain the process of promoting citizen science among society, presenting a range of strategies which will be subsequently made available on the platform. Following discussion among work-package members, the key focus areas for the deliverable were established. The critical sections of the report included the recommendations and the focus on policymakers. An extensive literature review was carried out, including a range of best practise examples and recommendations.

A draft of these recommendations was offered to the project partners and some third-party members, at the project meeting in Vilnius (month 9); this was to gather feedback on the existing recommendations and to ask for suggestions on missing recommendations, which was used to develop the deliverable content. Consortium members were consulted to provide examples of citizen science projects to present real examples of how the recommendations were used in practice.
Following an internal review, reviewers from European Citizen Science Association (ECSA), Museum für Naturkunde (MfN), International Institute for Applied Systems Analysis (IIASA) and Ministry of Economy and Competitiveness (MINECO) were consulted for the review process, following which the deliverable was redistributed for comments from partners who were not involved in the initial review.
Following submission of this deliverable in month 14, an update was issued in month 24. Since submission, WP4 has worked towards the commitments outlined in section 8 ‘Next Steps’. WP4 and WP2 hosted calls with project partners and third parties to discuss the deliverables, with a focus on the recommendations. The aim of this call was to establish the usability of the recommendations and to assess the relevance of the guidance to different organisations across Europe. The feedback from these meetings was collated and has been implemented within the deliverables through the following actions:
Increased detail on the example projects utilised within the recommendations, such as web link, logo and project name.
More content focusing on policymaker engagement, namely challenges and solutions.
Content resulting from discussion with consortium members, drawing on their expertise and experience to develop the recommendations and include new content that would be beneficial to citizen science practitioners

Critically, work package 4 has developed the content focusing on policymakers. As described in section 8, work was conducted surrounding policymaker engagement. Two workshops were planned and delivered, with the aim to highlight the importance of engaging with policymakers and explore the challenges and opportunities this presents. Initially, a workshop was help by WP4 to address the following questions, which were reviewed internally by Earthwatch staff:
What are the benefits of engaging policymakers with citizen science?
What are the common challenges when engaging policymakers with citizen science?
How have you engaged policymakers with citizen science thus far?

Responses to these questions were gathered and reviewed, creating a list of answers to each question. A second

workshop was then conducted with members of the consortium. This was hosted during the October 2020 project meeting, which happened online, as travel restrictions were in place. The lists of answers produced in the first meeting were presented to the consortium to ask for their thoughts and opinions, and to contribute their expertise and experiences related to policymaker engagement to this list. In small groups, members of the consortium discussed the list and added to it where necessary. The result of both the Earthwatch workshop and the consortium workshop was a comprehensive framework for engagement with policymakers, including the challenges and solutions. The content from these workshops has been used within this deliverable (4.3) to explore the interaction between the public, scientific experts and policymakers, and will form the basis of focused work to further develop strategies and resources regarding policymaker engagement. This will include a further update to deliverables 4.1 and 4.2 in month 36, as well as the creation of policy briefs and stakeholder-specific guidance.

5. State of the Art

A critical aspect of engagement is termed the point of engagement, alluding to the point at which the participant learns about a project or activity, cementing awareness-raising as an integral aspect of participation with citizen science (O'Brien and Toms, 2008). For stakeholders to become involved with citizen science, they must first be aware of the existing opportunities. Lack of awareness acts as a barrier to active involvement with citizen science, with many unaware that opportunities aligning with their values and motivations exist (Burgess et al., 2017) (West and Pateman, 2016). Raising awareness of citizen science is critical for (1) increasing the interest in projects, (2) the recruitment of new volunteers, (3) establishing the importance of the work citizens are conducting, and (4) making this work well known among communities (Bonney et al., 2009). With an increasing value added to science, in addition to the desire of many audiences to actively involve themselves in the scientific activities and projects, it is important to highlight the opportunities made available by citizen science (Robinson et al., 2018).

It is essential to implement targeted efforts of awareness-raising, tailored to different audiences, to encourage greater interaction with citizen science (Haklay, 2015). Opportunities for awareness-raising are ample, particularly among underrepresented communities. It is important to employ a range of awareness-raising strategies to widen the audiences and diversify the participant base of citizen science (Robinson et al., 2018). Planning the awareness-raising of an event, activity or project is critical for successful recruitment of volunteers and interest from key stakeholders (Tweddle et al., 2012). The approach to awareness-raising will vary with the audience, and interactions can differ depending on existing awareness, interest, motivation, audience size and category of stakeholder (Tweddle et al., 2012).

Efforts to scale citizen science and expand research areas are limited by a lack of awareness. Emerging scientific research demands a knowledge base that is multi-faceted, encompassing a range of stakeholders and facilitating a broad understanding across multiple audiences (European Commission Digital Earth Lab, 2019). Currently, the potential for a wider reach and broader access to knowledge bases is largely untapped, owing to lack of awareness. The expansion of citizen science across Europe commands a new approach to communication and participation, one that is interactive, open and widespread (DITOS, 2016). Methods of raising awareness are increasingly diverse, accessing various audiences and informing them of current and future projects and activities. Awareness-raising strategies can be tailored to suit different audiences, with the additional advantage that commonly employed techniques raise awareness among channels beyond those that are initially targeted.

5.1 Audience

It is important to recognise and understand the differing interests and motivations of your target audiences and to use a diverse catalogue of strategies to raise awareness, as different audiences will be more receptive to different strategies of awareness raising (West and Pateman, 2016). There are a numerous and varied audience types, most of which fit in to one of three categories; 'warm' audiences who are already engaged in scientific projects or activities of similar topic or interest, 'cold' audiences who lack an initial connection with your project, and 'hard to reach' or under-served audiences who consistently are rarely seen amongst the participants in citizen science or people who engage with citizen science.

The amount of awareness-raising necessary will depend upon the aims of the project, the size and category of the audience you are hoping to reach, and the strategies employed. Targeting existing groups or audiences that you have already interacted with will require less effort than raising awareness among new stakeholders (Tweddle et al., 2012). Collaboration is an important resource for raising awareness of citizen science. Working with audiences to spread the word of an activity or project is a simple method of reaching a broad and diverse audience. Partnership with knowledge-based institutions such as universities, private and public research institutions, and corporate/organisation partnerships, can help to access new audiences and raise awareness. Similarly, this gives access to the networks that members of the organisation have access to, furthering awareness of the project. Established communication channels and interaction

with a range of organisations are important to the success of citizen science, while also offering access to a variety of skills and understanding, that could subsequently benefit the project (Haklay, 2015).

Working with groups that have similar interests raises awareness among audiences that are already engaged in the topic of choice. Particularly among public audiences, it is noted that commonly, people partake in activities, projects or groups owing to an existing interest or desire to express values of importance (Curtis, 2015). Local stewardship groups, clubs or small organisations encompass people with an inherent interest in specific subject areas, who are often connected to external networks that also have an interest and further raise awareness of an activity or project among a broader audience.

Awareness-raising activities conducted at the correct time can feed into an ongoing or emerging policy debate, and will likely attract the attention of policymakers. Aligning with ongoing policy debate increases the likelihood of selecting an issue that is of political or societal prominence at that time or of local concern, and therefore of interest to communities and local people. This is likely to increase the impact that citizen science can have within policy (European Commission Digital Earth Lab, 2019). Awareness-raising activities can be tailored to achieve this, addressing the necessity for timely reflections of the results, delivered in a robust and established way, leading to the engagement of policymakers with the project or activity.

5.2 Outreach

Outreach is one of the most traditional and efficient methods of awareness-raising. Outreach offers a personalised and targeted way of contact, establishing points of contact and building relationships in the early stages. Speaking to people at events, conferences, or gatherings is an effective method of raising awareness, and can include promotion from the research team, the volunteers or a dedicated research officer. Methods can be as simple as handing out leaflets and talking to people at a dedicated stand, or can expand to running a workshop or activity to spread the word of a project. Similarly, when technology and traditional methods of advertising are less accessible, direct interaction may be the most plausible method of raising awareness (Lange et al., 2019). Often, events provide a captive audience and can be an easy way to contact people who already have an interest in citizen science or the topic area. Communication is a critical aspect of a project or activity, so maximising face to face awareness-raising establishes relationships at an early stage, as well as providing a clear understanding of what involvement with the project looks like for specific audiences (West and Pateman, 2016). Some projects choose to employ designated team-members, or enrol specific volunteers, to act as community engagement officers, raising awareness of projects and providing information on participation. The UK Ladybird Survey employed a full-time officer for a period of the project, tasked with promoting the project to broad audiences; this proved successful in spreading the word of the activities and opportunities that were available to participate in (Roy et al., 2012). Considering a variety of methods for outreach is important; educational outreach and schools' visits can be effective in raising awareness. Project managers may wish to visit schools or educational settings, delivering workshops or sessions about citizen science, in order to raise awareness and run small scale trials (Cornell Lab of Ornithology, 2019). An example of this is the work Earthwatch conducts in schools, raising awareness of citizen science projects such as Naturehood. Designated facilitators offer a brief introduction to the projects and allow teachers and students to participate in some of the activities that they can get involved with if they sign up to the project. Students and teachers receive access to resources to take home, which can be shared with parents. Teachers can pass on the information of the projects to their networks, further raising awareness. Importantly, when interfacing directly with people, ensure the project has a clear, simple and accessible hook. Often, people feel overloaded by information, so using tools such as videos or photos will be effective in hooking people's attention and maintaining interest (Varner, 2014).

Traditional advertising such as posters, flyers, press, radio and television remain helpful in spreading awareness of a project or activity. Recruitment materials should be targeted to specific audiences, but general messages distributed via television, radio and print are effective ways to communicate with the general public (Hecker et al., 2018). Messages distributed through traditional media often reach large and varying audiences with diverse motivations, both directly and indirectly. Those seeing these messages will often distribute them among interested networks, expanding the reach

of the message. However, considerations should be made to the uniformity of the message (Lange et al., 2019).

5.3 Project Design

Project Design is integral to awareness-raising. Careful consideration is needed to ensure projects and activities ensure effective, relevant and targeted awareness-raising. Planning for diverse demographics and having a clear target audience, whose interests and needs you understand, are critical to consider early on in the project design. Often, different stakeholders have different perspectives, goals and motivations, so providing a universal approach to awareness-raising will not be as effective as utilising multiple methods and channels (Choi et al., 2005). Appealing to particular groups may add complexity to awareness-raising campaigns, but being responsive to audience interests will access broader audiences and engage more individuals (Pocock et al., 2014). Offering a varied approach when raising awareness of a project can cater to people with no experience, but also those with lots of experience, thus reaching a broader community. Lack of clarity about the offering and its purpose impedes interest from audiences, thus stressing the importance of establishing clear guidance on awareness-raising strategies and planning such strategies carefully, to ensure maximum gain (Vann-Sandera et al., 2016). When designing projects or activities, it is important to consider how results may be disseminated. Linking news articles and publications back to the research project is an effective way of raising awareness An exploration of the Galaxy Zoo project noted that awareness of the project, and subsequent participation, rose drastically following discussion of the results on online media outlets (Raddick et al., 2010). Not only does this raise awareness, but this also offers acknowledgement of the impact and effort of volunteers (Thornhill et al., 2016).

5.4 Technology

Technology, such as social media, is a way to access a new audience quickly and efficiently. Online platforms are increasingly utilised to raise awareness of activities and projects rapidly and succinctly (Roy et al., 2012). Platforms such as Twitter are an effective way to get a clear and effective message to a wide audience in a short space of time. Similarly, platforms such as Facebook have analytical tools that help you to publicise posts and maximise reach. The project managers behind the Garden BioBlitz cite Twitter as an integral component of awareness-raising, fostering awareness among communities of people with an existing interest (Roy et al., 2012). Platforms such as Twitter are effective in reaching audiences with existing interests in science or the topic of the project. There is the potential to reach new audiences on social media, but targeted efforts must be made to communicate with and reach out to audiences beyond your own networks, particularly when attempting to communicate with under-served audiences. This includes using hashtags that are popular among your audiences, following users in different fields or sectors and engaging in discussions about linked and new topics. It is also important to recognise demographic differences of users across different platforms and how you can target your social media use by researching the usage of your target demographic. Blogs and podcasts are also an effective way of awareness-raising. Some projects, such as Galaxy Zoo, launch projects via blogs or podcast features, offering a detailed and accessible summary of the project, and promoting direct methods of involvement with a clear message (Raddick et al., 2010). Newsletters and blogs keep people informed with the updates to the project and can be forwarded among networks. Having a website is an easy way to raise awareness, as people who may be researching new opportunities could be directed to your website. Additionally, having a clear portal for key information allows this to be shared among networks, thus raising awareness. Studies identify websites as a critical route for involvement with and information about a project, with nearly all surveyed citizen science initiatives using a website to explain and promote the project (Roy et al., 2012). It is important to note, that building a website is time and resource intensive, and isn't always accessible to all projects. Similarly, having a bad website that isn't well - maintained or useful, can be off-putting to potential participants. Whether utilising social media, websites, blogs or other channels, it is important to recognise the resource and time commitment necessary to maintain them. Technology continues to be useful if content is regularly updated with relevant and factual information.

6 Guidelines and Recommendations

Recommendations and their target audience are described below. It is important to note that the following list of recommendations is not exhaustive; understanding of awareness-raising strategies is continuously growing, and will, therefore, be expanded upon across the course of the project to encompass the broad range of experience from different projects, countries and audiences.

The recommendations are listed to align with the different stages of a project. The stages represent key milestones in the timeline of a citizen science project. These stages are -

Stage 1	Establish and explore the problem
Stage 2	Project design and development
Stage 3	Community engagement and data collection
Stage 4	Data analysis and dissemination
Stage 5	Evaluation and post-project work

Table 1 - The stages of a citizen science project, as detailed by Tweddle et al (2012), the ACTION project (*https://actionproject.eu*) and the PARTHENOS project (*https://training.parthenos-project.eu/*)

6.1 List of Guidelines and Recommendations

Recommendation 1: ensure awareness-raising is incorporated into project design

In order to achieve the project's aims, participants must be recruited. Unless they are aware that the opportunity exists to partake in citizen science, a project will be unable to achieve its research goals. Projects should be relevant, targeted and organised, identifying key methods of awareness-raising to spread the word and sustain interest. Work collaboratively to design strategies and consider techniques that will spread awareness among established and new networks (Tweddle et al., 2012). Plan for your demographic and have a clear target audience, whose interests and needs you understand. Awareness-raising should be integral to the project design, and should be planned accordingly to access a diverse audience (European Commission Digital Earth Lab, 2019). We recommend considering the seven audience categories we list in section 4.2.2 of this report, adapted to the needs of the project under consideration. Protocols designed to suit specific audiences, require planning, resources and time, and therefore should be considered early in the timeline of projects and activities (Pocock et al., 2014).

Example

Lee et al. (2017) considered the importance of awareness-raising strategies to successful recruitment of participants, a sentiment reflected in a study surrounding recruitment messages for Zooniverse projects. Four messages were devised advertising the same project, Gravity Spy, but appealing to different motivations, reflective of different audience types. These motivations were learning about science, social proof, contribution to science, and altruism. The project devised four emails, all with the same content but with different subject lines and first and final paragraphs, each altered to align more with different motivations. The study found that understanding different interests, schedules and priorities was important in tailoring materials and hooks used to raise awareness. The study also highlights the importance of incorporating awareness-raising strategies into

the project design. Creating and implementing unique materials and procedures will take time, money and effort, and so should be considered early on so as to be prepared and allocate resources and time accordingly. It is critical to consider this in order to mobilise the objectives of projects and appeal to specific audiences.

Recommendation 2: have a clear, simple and accessible hook when publicising

Whether producing informative materials or attending events and conferences, it is important to have a clear, simple and accessible hook. Citizen science projects are lengthy and require a lot of design and consideration. However, potential participants often note that being overloaded with information can be overwhelming, limiting the understanding that they have about the project and its aims (Varner, 2014). Using tools such as videos or photos are effective in hooking people's attention and maintaining interest, which increases their awareness of the project. Techniques such as using puzzles to describe the problem that the project is tackling, or asking people to discuss research questions are innovative and engaging ways to raise awareness. It must be considered that different strategies and hooks will have varying levels of effectiveness among different audiences, and often awareness-raising techniques should be tailored to accommodate different stakeholders (Tweddle et al., 2012).

Example

If conducting a project about perspectives and attitudes towards plastic pollution, you could ask individuals to give an example of the plastic item they use most commonly and how they could minimise their use. This could be aided by having common plastic objects out on display. Alternatively, you could show a picture or video detailing plastic pollution and ask individuals what their response is to what they have seen and what they think the key issues, causes and solutions are. As well as raising awareness of the issue and the project or activity, this has the added benefit of acting as a trial for the project, determining if methods employed to gather perspectives are effective and potential issues that could arise. Using interactive tasks, videos or photos can avoid overloading potential participants with information and can help in sustaining interest long enough to raise awareness.

Recommendation 3: develop a project website or establish an online presence

Utilising online tools for awareness-raising is invaluable for projects and activities. Websites act as hubs for information surrounding citizen science projects, and so their design and implementation should be carefully considered. Websites that have a clear user journey, accurate and informative content and easy navigation play a large role in sustained engagement, due to their role as a central hub for guidance and information (Newman et al., 2010). People who may be researching new opportunities surrounding citizen science or volunteering, or who are aiming to learn more could be directed to the website through a search engine or a link from another platform and links to websites can be easily shared among networks. Having a designated platform for the key information of a project or activity allows audiences to feel confident in learning more about citizen science and understand the key aims and objectives. It is important to consider the time and cost that building a website will require, as this could amount to significant amounts depending upon the requirements of the platform. Additionally, projects should consider that their website must be kept up to date with relevant and current information, which will incur further time and cost. Similarly, it is important that the website is of good quality, making important considerations such as ease of navigation, whether the content is representative of your audience, if the text is at an appropriate reading age and uses clear language, whether content is up-to-date, and whether the website is accessible to those with disabilities. Similarly, strategies such as search engine optimisation in which popular words that people might search are used in main headings and site name mean your website is more likely to be found in google searches and broadens the scope of audiences that may visit your webpage. Projects with limited budgets or time could explore using existing platforms, such as social media, to create an online presence, or utilising online citizen science repositories, such as the EU-Citizen.Science platform, to establish a location to host and discuss their project. This could also include listing the website in a directory such as SciStarter.

Example

Citclops is a project that developed systems to retrieve and use data on seawater colour, transparency and

fluorescence, using low-cost sensors combined with people acting as data carriers, contextual information (e.g. georeferencing) and a community-based Internet platform, considering actual experiences (e.g. Secchi Dip-In, Coastwatch Europe and Oil Reporter). The project website, fully operational five years after the end of the project in 2015, acts as a critical point of information for existing users and interested parties. The website has an easy-to-use interface, with clear direction to collected data and areas to submit data. The site hosts a set of instructions for collecting observations. These instructions and the accessibility of the site raise awareness among a larger pool of participants. Information about the project is also hosted on other websites (such as https://www.eyeonwater.org/), broadening the scope of the audience. Citclops is also an excellent example of website sustainability.

Project URL - http://www.citclops.eu/
Start date – 2012
Coordinated by - Fundacio Eurecat, Spain

Recommendation 4: target existing groups of people with shared interests

Gathering support among groups with similar interests is an effective method of raising awareness. Commonly, people are motivated to involve themselves with activities, projects or causes that allow them to express values that are inherently important to them (Curtis, 2015). Accessing groups that have an existing awareness opens up an audience that is already engaged in the topic of choice, and is, therefore, more likely to participate and spread the word. Communicate with local interest groups, clubs or youth assemblages. Often, those who have an interest in the topic are connected to networks that also have an interest and could pass on the word of your project. Considerations should be made that this approach, whilst effective at reaching interested audiences, may not attract under-served audiences who do not typically participate in citizen science or science-based activities. These audiences may benefit more from alternative strategies.

Example

The Riverfly Partnership works to conserve water quality in rivers by sampling Riverfly and their habitats (Riverfly Partnership, 2019). In 2007, the partnership launched the Angler's Riverfly Monitoring Initiative (ARMI). The partnership recognised the unique position of anglers in monitoring the health of water bodies that are frequented by people for recreational fishing. The initiative and its tutors mobilise interest by training them in the simple sampling technique and equipping them with the understanding to contribute to their research (The Conservation Volunteers, 2014). Utilising the position of this group and their current interest effectively, raised awareness of the partnership's work. It provided a unique opportunity for individuals to spread the word among niche social circles.

Project - http://www.riverflies.org/rp-riverfly-monitoring-initiative

Recommendation 5: utilise traditional advertising techniques

Publicity is a critical component of raising awareness. Traditional advertising such as posters, flyers, radio and television remain helpful in getting the word out about a project or activity. This range of strategies is not exclusive to specific audiences, and the strategies can be used individually or in combination to raise awareness efficiently and among a large audience (The Conservation Volunteers, 2014). It is difficult to target these types of messages to specific audiences, and so project managers should be aware that only general messages can be distributed. Additionally, this method of

awareness-raising can incur high costs and demand a substantial amount of time preparing and distributing messages. Typically, messages circulated through these channels have a spread beyond the initial scope, as many individuals will be reached indirectly through social networks (Lange et al., 2019). It is important to consider who you aim to target using this strategy, ensuring that the efforts assigned to this type of awareness-raising are balanced proportionally to the number of people it's likely to reach. Posters are effective for local awareness raising, for example advertising in the location that events will take place, or places frequented by your target audience. Radio and television reach mass audiences, but lack the immediacy of people being able to access your website or communication channels, and so may be less effective at converting awareness into participation. Distribution of flyers can be effective when targeting specific audiences, predominantly those with existing interest, but may not work well for those who have no initial interest or experience with the topic or citizen science. Considerations should also be made to the environmental impact of paper-based advertising techniques.

Example

The CAPTOR project aimed to monitor air quality data in areas of Spain, Italy and Austria. The project utilised low-cost devices to measure levels of tropospheric ozone, in an attempt to raise awareness of the issue and engage local communities with the monitoring and upkeep of data collection. The interactive component of this project, namely citizens playing an active role in the data collection, was the "hook" for the mass media. A report released in the local press, followed by a discussion of the project on local news, brought a huge amount of awareness to the project and the air quality problem in the concerned region (Captor-project.eu, 2016).

CAPTOR

Project URL - https://www.captor-project.eu/en/
Start Date – 2016
Co-ordinated by - Universitat Politecnica De Catalunya, Spain
Press release - https://www.captor-project.eu/wp-content/uploads/2016/03/pressrelease_ecologistas_10062016.pdf

Recommendation 6: utilise technology to access a broad audience quickly and efficiently

Increasingly, technology and social media are being utilised to raise awareness of citizen science. New technology is an easy method of accessing a new audience quickly and efficiently (Tweddle et al., 2012). Platforms such as Twitter or Facebook are an effective way to get a clear and effective message to a wide audience in a short space of time. Some platforms have analytical tools that help you to publicise posts and maximise reach. Many social media channels have topics and hashtags that people can follow – using these hashtags distributes your message to an audience with pre-existing interest. You could also look for accounts that can reshare or distribute your content for you, to tap into wider conversations or communities within the social media platform. Online media and technology were a critical component of mobilising the launch of the Galaxy Zoo project, with project managers utilising various online channels to convey messages to a broad reach of stakeholders (Riddick et al., 2010). Awareness-raising conveyed in this way often has reach beyond the intended audience and is often distributed following interpretation by others, and so cannot be controlled as well (Lange et al., 2019). An additional benefit to this strategy is the option to specify audiences for awareness-raising materials. For example, tools such as hoot Suite allow you to target your messages to audiences of different ages, gender, interests, professions and more.

Example

The social media platform Twitter has millions of users, representing a broad range of audiences. The platform allows succinct messages to be distributed to a wide audience in a short time-frame, and is, therefore, a low-cost option for raising awareness. Having a Twitter profile is a good way to stay connected with established networks, while also allowing messages and information to be widely shared and discovered by new audiences (Tweddle et al., 2012). The Garden BioBlitz recognises twitter as a critical component in forming a dedicated

community of participants and raising awareness not only of the project, but also of the contributions made by other participants, both of which raise awareness and encourage participation (Roy et al., 2012).

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Project URL - https://www.gardenbioblitz.org/
Coordinated by – iRecord, UK

Recommendation 7: provide a newsletter or blog

Newsletters and blogs keep people informed with updates to the project and can be forwarded among networks. Similarly, they can be used to advertise new activities or opportunities for involvement. Both strategies have the capacity to communicate within and beyond existing communities, establishing a central location for information and communication in the project or activity (Richter et al., 2018). Similarly, blogs allow project managers and volunteers to communicate effectively with audiences (Curtis, 2015). Important considerations to make when starting a blog include how regularly you will post, how you will publicise when new blog posts go up, how is the blog linked to from the main project website (if one exists) and will you use particular content or hooks to attract people to read posts, all of which have implications for the success of the blog. Newsletters can detail updates from an organisation, news from citizen science projects and events and opportunities. While newsletters are often targeted at existing members, the opportunity for awareness-raising remains prevalent. Many of the featured projects or events may be new to recipients. Additionally, recipients may choose to forward the newsletter among their networks, accessing a new audience. Newsletters are direct methods of communication that go straight to participants, whereas blogs require a person to proactively go and check it, and so require publicity and promotion of their own, for example via social media. It is important to consider GDPR and ensure correct permissions are gathered when sending newsletters.

Example

A key component of the launch of the Galaxy Zoo project was an announcement on one of the principle investigators blogs. The publicity raised awareness of the project among a broad audience and resulted in a mass uptake of participants. Following the launch of the project, the project managers launched a blog detailing the research conducted as a result of participants contributions; at the time of publication (2010), this blog received approximately 25,000 unique visitors every month (Raddick et al., 2010).

Project URL - https://www.zooniverse.org/projects/zookeeper/galaxy-zoo/
Start date – 2007
Coordinated by – Oxford University, UK
Blog Website - https://blog.galaxyzoo.org/

Recommendation 8: collaborate with knowledge-based institutions, research institutes, companies and/or organisations

Raising awareness is enhanced by forging relationships and dialogues across disciplines, fostering a multi-faceted and diverse network (Hecker et al., 2018). Collaboration with knowledge-based institutions (institutions whose service is the provision of knowledge, such as universities) can be beneficial to the success of projects and activities, as academic partners can add legitimacy to a project which could convince policymakers of its rigour and importance. Targeted efforts should be made to raise awareness among such institutions surrounding citizen science and establish a partnership and network to work with (Haklay, 2015). Institutions such as universities, private and public research institutions, and

corporate/organisational partnerships can help access specific audiences and networks among which to raise awareness.

Example

Capturing Our Coast (CoCoast) was a 3-year long Citizen science project. Across the course of the project, CoCoast trained nearly 3,000 citizen scientists to survey rocky shores, gathering data on marine species to create a wider understanding of UK coastal biodiversity. The partners involved were Newcastle University, University of Hull, University of Portsmouth, The Marine Biological Association, Marine Conservation Society, Bangor University, Scottish Association for Marine Science and Earthwatch. Collaboration with knowledge-based institutions accessed a wide network of academics, scientists and students, which proved beneficial in recruiting volunteers and raising awareness of the project. The geographical scope for awareness-raising was broad, as the partners were located across the United Kingdom.

CAPTURING OUR COAST

Project URL - https://www.capturingourcoast.co.uk/
Start date – 2016
Coordinated by – Newcastle University, UK

Recommendation 9: discuss your project at events, conferences or gathering

Raising awareness directly through conferring with audiences is a critical method of raising awareness and distributing information in a clear and personal way. There are often two benefits to in-person dissemination, the first being awareness raising among potential participants. Speaking to people at events, conferences or gatherings is a traditional but effective method and can be conducted by the research team, volunteers or a dedicated outreach officer. The second benefit of face-to-face awareness raising includes interacting with targeted stakeholders to spread the word of the work you have done. This is particularly useful when attempting to engage policymakers, as you can attend events such as EU Green Week and others where policymakers will already be in attendance. Conferences and events provide great opportunities for dialogue with defined audiences and provide a mutual learning opportunity between citizen science practitioners and stakeholders. Maximising face to face interaction offers a personal component to awareness-raising, which can help to establish working relationships and address expectations early on (Tweddle et al., 2012). Awareness-raising in this setting allows communication of a large volume of information and the opportunity to respond to questions, without relying on third parties to correctly disseminate the information to stakeholders (Lange et al., 2019). The UK Ladybird Survey employed a dedicated officer who was responsible for promoting the survey in a plethora of ways, including hosting talks and workshops at events and attending shows and conferences (Roy et al., 2012).

Example

Events and gatherings are a good way to access a range of audiences. Often, educators or pupils will arrange events at which external parties can have a stand or deliver a presentation. The Association for Science Education hosts a conference each year that attracts people from all over Europe, with a broad range of disciplines, to discover new opportunities for learning and participation. Many citizen science-based projects and organisations run sessions delivering the impact of their research and information about how interested parties can get involved. Similarly, a broad range of stakeholders could be attracted to events, such as the European Researchers Night. This takes place annually, with events hosted in approximately 300 cities across Europe. The event hosts workshops and activities, showcasing science and research to a broad audience.

Recommendation 10: educational outreach and school visits

Projects may wish to employ educational outreach, visiting schools or learning groups, delivering workshops or sessions about citizen science, in order to raise awareness and run small scale trials. Educational settings, both formal and informal, are a good resource for generating interest in citizen science projects. Experiencing citizen science activities stimulates interest in the field, establishing an increased awareness of citizen science generally and a motivation to participate (Vitone et al., 2016). Citizen science projects Naturehood and Freshwater Watch are regularly used in schools; in 2019, these projects reached 477 educators and 2923 young people combined. Pupils receive resources to take home to their parents with the website on them, while teachers can pass on the information to their networks. This vastly increased awareness among key audiences, both directly and indirectly. Projects could reach out to their networks to establish contacts at schools, or utilise networks such as teacher unions and CPD organisations to communicate with large groups of educators. It is important to establish your audience criteria when considering which schools to raise awareness with – is there a geographical scope of your project? Do you want to work with schools that have multiple layers of deprivation? Do you want to work with schools who have specific land-requirements, so they can easily conduct research?

Example

A group of researchers in the USA introduced a citizen science project, investigating the Horseshoe Crab, to a group of pupils aged 11-13. The project was designed and ran by a local biologist, specifically for the purpose of this study. The key aim of this was to determine the effects of citizen science on various social factors, including awareness, willingness to participate and science performance. The result of the study indicated that including citizen science activities within these settings has a positive effect on interest in the project and citizen science generally (Hiller and Kitsantas, 2014). While this study involved long-term participation in the same project, even one workshop or session could drastically increase the awareness of large audiences to citizen science.

Recommendation 11: align projects with ongoing or future policy debate

It is suggested that decisions guiding involvement with a project or activity are determined by the purpose and nature of the topic or issue (Hollo et al., 2015). Therefore, considering alignment with ongoing or future policy debates could be an effective method of raising awareness of projects or activities. Awareness-raising that is well-timed and carefully prepared to fit with ongoing or emerging policy debate can raise the profile of a project or activity and attract the attention of politicians. Similarly, aligning with ongoing policy debate means you are likely to select an issue that is of political/societal prominence at that time or of local concern, raising awareness among potential participants. Information gathered from projects or about new and existing projects and activities that is distributed at the right time can feed into policy debate and attract the attention of policymakers and other audiences who have an interest in the issue or debate. Citizen science offers effective ways of connecting policy and communities. So, interest in projects or activities from relevant audiences has the capacity to raise awareness among secondary audiences (e.g. raised awareness among communities on projects surrounding local issues could mobilise individuals to discuss this with local policymakers) (Hecker et al., 2018). It is important to consider that not all topics can feed into policy, and that this recommendation is opportunistic and will not be applicable to all citizen science projects and activities. Similarly, awareness raising among policymakers and decision-makers is difficult, and so it is important to find ample opportunities to communicate and meet with them and target communications to this audience specifically

Example

Populations of Koala bears vary across Australia; while some districts fear for the survival of the species, other areas, such as Kangaroo Island, see them as a pest, wreaking havoc on the landscape (Masters et al., 2004). This has caused widespread discussion about how best to manage populations of the species. In the early ’90s, culling populations led to a huge public outcry. Lack of comprehensive information on population distribution presents an inimitable challenge for policymakers, confusing efforts to formulate a suitable management plan and framework that applies nationally (Flower et al., 2016).

This highlights an area of potential for citizen science to influence policy. Long-term data monitoring has provided a significant contribution to management schemes, offering substantial and clear information on population and distribution (Flower et al., 2016). The Great Koala Count is a citizen science project, aimed at formulating a comprehensive idea of koala populations across Australia. The project is repeated annually, offering a long-term perspective of changes to population, particularly following natural disaster (Research Data Australia, 2019). This project, and its respective data, has been widely utilised in the management planning for the species, contributing to the development of a South Australian Government koala management and conservation policy (Hollow et al., 2015).

Project URL - https://researchdata.ands.org.au/national-parks-association-koala-count/671425
Coordinated by - National Parks Association of NSW, Australia
Start date - 2012

Recommendation 12: link studies, publications and reports back to the citizen science project

Linking studies back to the research project is effective in raising awareness – sometimes, research that is reported on is not linked back to the project or activity from which data was gathered. It is important to link blogs, reports and publications utilising results from citizen science back to the initial study and to raise awareness of the successes of citizen science.

Example

Plastic pollution studies often make national news, yet many are unaware that the results were gathered from a citizen science project. The 'Break Free from Plastic' project encompasses the work of multiple environmental organisations, working towards the goal of tackling plastic pollution. The project coordinates clean-ups and is most famous for its brand audit. Sampling more than 180,000 pieces of plastic across 42 countries, the project aims to highlight the corporations that were the top 'offenders' for plastic pollution. The results are widely publicised and awareness of the project increased exponentially as a result of mention in the media (Break Free from Plastic, 2019).

Project URL - https://www.breakfreefromplastic.org/
News - https://www.euronews.com/living/2019/11/16/who-are-the-world-s-top-ten-marine-plastic-polluters

6.2 Stakeholder mapping

Table 1 depicts which of the recommendations would be suitable for raising awareness among different stakeholders. Stakeholders are identified in figure 1, encompassing academia, educators, the public, NGOs and CSOs, industry and SMEs, the press and media and policymakers and funders. The table uses crosses to indicate whether the listed recommendation (numerical value only) is able to be utilised among the listed audience.

	Recommendation											
Stakeholder	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**

Academia	X	X	X	X	X	X	X	X	X			X
Educators	X	X	X	X	X	X	X	X	X	X		X
The Public	X	X	X	X	X	X	X		X	X	X	X
NGOs & CSOs	X	X	X	X		X	X	X	X			X
Industry & SMEs	X	X	X	X		X	X	X	X			X
The Press & Media	X	X	X		X				X	X	X	X
Policymakers & Funders	X	X	X						X		X	X

Table 1 - Relevant recommendations among the identified groups of stakeholders

6.3 Policymakers

Policymakers encompass an essential audience for citizen science as key stakeholders in the facilitation, communication and funding of projects and initiatives. There are positive social and economic impacts of involving policymakers with citizen science, but this is hindered by a lack of awareness of both citizen science in general, and of specific projects and initiatives. Citizen scientists have the knowledge needed to address the issues communities are facing locally and globally, while policymakers have the authority to address the issues. and so collaborating with them on the issues that citizen science addresses can be beneficial in addressing challenges for local and international levels. Turbé et al. (2019) identify that having policymakers more deeply involved in project delivery, beyond just being the funder, leads to increased policy impact.
The EU-Citizen.Science project is creating resources, training and learning materials that are useful to both citizen science practitioners and policymakers, to foster a collaborative approach for raising societal awareness about citizen science. In this way, the project will empower practitioners in working closely with policymakers and demonstrate the benefits of enhancing and utilising citizen science and among policy and policymakers.

6.3.1 Challenges when engaging policymakers with citizen science

There are several challenges when engaging policymakers with citizen science, ranging from concerns surrounding data quality to issues with communication. These challenges are significant barriers to engagement and a key focus of WP4's work will be on addressing these challenges with tangible and applicable solutions. We will collaborate with consortium members to fully explore challenges and develop a schematic method of identifying challenges and aligning them with corresponding solutions, a task that we have begun to address in this deliverable (4.3). This will include signposting resources and developing strategies to engage policymakers. The solutions detailed in table 2 are complemented by guidance from deliverable 4.1 – Guidelines and Recommendations Based on a Range of Best Practices for Achieving Societal and Policymaker Engagement. This table can also be found in D4.1 and is replicated here to demonstrate the important work the consortium has done surrounding policymaker engagement and to strengthen the evidence base and guidance regarding policymakers within this document.

Challenge	**Solution**
Knowing who to talk to and how to make initial contact. Policy networks are large and diverse, so it can be hard to	• Communicate among networks to 'horizon scan', seeing if particular organisations or

find and contact the right policymakers for each project.	people are aware of upcoming events or policy concerns. • Contribute to public enquiries. • Engage with local or national representatives e.g. local councillors and reach out to other policy makers through them. • Collaborate with NGO s and organisations that have already established links to policymakers.
Policymakers may not be interested in citizen science projects.	• D4.1 Recommendation 3: highlight the benefits of citizen science. • Show examples of how other policy makers have been engaged, such as projects in which data has been used for policy or projects that contributed to the policy procedure. • Try to connect material and content to local policies so they can see the clear link between citizen science and themselves. • Understand what communities want and where public pressure upon policymakers can be utilised. • Tap into the goals of policymakers and see if your project aligns with them. You could identify their goals by researching events they have attended or policies they have advocated for. You could also check if their local government website has profiles that identify these goals.
Maintaining active contacts when job roles change so often.	• Engage not only with the policy makers, but with other staff members who work closely with policymakers who may have connections and know-how. • Make a person in the research group responsible for the relationship with the policy maker, a specialised “diplomat”.
Getting policymakers engaged in discussions is a slow process. There is a need to assign time for communication between policymakers and scientists, otherwise either parties might not be aware of projects that are happening.	• D4.1 Recommendation 1: Carefully consider the design of the project. • Recommendation 10: Establish positive working relationships with stakeholders.
The timescale of citizen science projects may not align with policy-making timescale and it can be difficult to align policymaker timelines with project timelines.	• D4.1 Recommendation 1: Carefully consider the design of the project. • Understand how and when your project aligns with policy concerns. This can be done by discussing relevant timelines with policymakers or by involving them in the design phase to ensure alignment. • Make a person in the research group responsible

	for the relationship with the policy maker, a specialised “diplomat”.
Maintaining conversations and engagement beyond initial interest can be difficult.	• D4.1 Recommendation 3: Highlight the benefits of citizen science. • D4.1 Recommendation 10: Establish positive working relationships with stakeholders. • Understand what policy makers requirements are before the project is designed and include them in the design phase to understand how the project can be relevant to them. • Provide communications and hands- on opportunities e.g. tree planting day with photographers. • Invite policymakers to be project partners or sit on the project advisory board. • Assign someone to maintain the relationship with the policymaker and ensure consistent re-engagement with the same parties, groups and individuals. Consider that some policymakers may wish to achieve their own agendas when considering this approach.
Some policymakers may only be interested in pushing their own agendas within a project.	• Understanding what policy makers need before the project is designed. Include them in them in this phase to understand how the project can be relevant to them and allow them to influence protocols and objectives. Engage with policy makers already in the design phase of the project, to consider their concerns and preferences.
Being prepared for chance encounters with policymakers.	• Develop materials for distribution at events and conferences, such as policy briefs.
Many policymakers have doubts surrounding data quality.	• D4.1 Recommendation 13: Address concerns surrounding the quality of data resulting from citizen science projects. • Have a proven concept, data collection strategy or pilot study. • Develop and practice an "elevator pitch", to be able to effectively and captivatingly explain what the project is about in a very short time.
The need for project members to be up to date and knowledgeable on relevant policies, in order to effectively feed in.	• D4.1 Recommendation 4: Consider current policy concerns and align projects with current policy standards.
Lack of confidence surrounding communication, as some researchers may not know how to communicate in a language that policymakers understand or share and visualise information in a way that is relevant to policy processes.	• D4.1 Recommendation 2: Provide a systematic and tailored approach. • Ensure language is simple and concise, avoiding jargon and explaining terminology. • Be targeted in your information and communication of how policymakers can be

	involved. • Try to keep material as impartial as possible. • If possible, have experienced communicators involved in the core project team. • Make a communications plan in which policy makers are a key target group, outlining key messages, strategies and timelines for engagement.
Policy makers are more focused on actionable items, but citizen scientists cannot guarantee results.	• Show examples of how other policymakers have been engaged. • Ensure dissemination and outreach materials are concise and accessible, presenting key findings in a clear manner, free of jargon.
Time limitations of projects and policymakers.	• D4.1 Recommendation 1: Carefully consider the design of the project. • Account for time to engage stakeholders in the project design. • Provide a range of opportunities for involvement, giving plenty of choice on how policymakers can participate.
Policymakers don't recognise the effective impact that citizen science has had in communities at societal level.	• D4.1 Recommendation 3: Highlight the benefits of citizen science. • Show examples of how other policymakers have been engaged, including success stories and lessons learned of policymakers being involved. • Understand how your project aligns with policy concerns.

Table 2 - challenges encountered when engaging policymakers with citizen science, identified through workshops with WP4 staff and consortium members.

7 Events and Dissemination

On an annual basis in months M24 and M34, the report will be updated to include information (title, date, location, content) on significant events (conferences, seminars, workshops) which will be organised by EU-Citizen.Science partners (Table 2).

Over the course of the project, WP4 will consult with project partners and third parties to gather information on awareness-raising activities and strategies used at events. Policymakers will be engaged in activities at events co-organised by the project partners and through the global portal. This will be expected to result in increased awareness and understanding from citizens, policymakers, commercial companies and not for profit – philanthropic organisations. Existing citizen science networks and projects' events will be used as awareness-raising multipliers. In this section, we will report on the aforementioned multiplier events, to offer examples of events that can be utilised to increase awareness of citizen science.

Title	Date	Location	Content
SAPEA conference "The Future of Science Advice in Europe"	13/01/2019	Helsinki, Finland	SAPEA conference "The Future of Science Advice in Europe" - Promotion of the EU-Citizen.Science platform to European science academies and EC's policy advisors
EU-Citizen.Science and Citizen Science Cost Action workshop	10/04/2019	Brussels, Belgium	'Building a community network for educators, teachers, Citizen Science practitioners and researchers on synergies between Citizen Science and Education' was organised and run by the Members the Citizen Science COST Action CA15212 Working Group 2 'Education', in collaboration with ECSA and the Project. The main goal of the workshop was to effectively and sustainably connect the diverse stakeholders in the field of Citizen Science
Museum Night Leiden	18/05/2019	Leiden, Netherlands	At the Leiden Observatory, partners presented several CS projects and had a booth about CS in general and the CS Lab
Ecsite Conference	07/06/2019	Copenhagen	Presentation at the Project Showcase session of the Ecsite Conference
Austrian Citizen Science Conference	26/06/2019	Austria	Austrian Citizen Science Conference attendee, generating interest in and awareness of the platform
Beyond borders in Citizen Science	27/06/2019	Vienna, Austria	EU-Citizen.Science workshop on "Beyond borders in Citizen Science"
Science Camp	01/08/2019	Oxford, UK	Workshop for emerging scientists on community engagement and how to incorporate Citizen Science into their work.
Round Table Discussion in cooperation with COST Action	13/09/2019	Vilnius, Lithuania	Round Table Discussion in cooperation with COST Action: Open discussion: Perspectives of Citizen Science in Lithuania. Talk "Intro to CS for policymakers", followed by presentations from EUCS project partners, with a moderated discussion to conclude
Open Science Fair Conference	18/09/2019	Porto, Portugal	Speaker at a workshop at the Open Science Fair Conference on "towards-an-alliance-of-citizen-science-in-europe" (https://www.opensciencefair.eu/workshops-2019/towards-an-alliance-of-citizen-science-in-europe)
Forum Citizen Science	25/09/2019	Münster, Germany	Forum Citizen Science in Münster
Austrian Researchers' Night	27/09/2019	Austria	Austrian Researchers' Night as part of the European Researchers' Night
Drinkable Rivers project meetings	01/10/2019	Barca D'Alva, Portugal	Organisation of monthly citizen science activities to monitor the water quality of the Douro river (as part of the Drinkable Rivers project) in collaboration with schools, citizens and policymakers

European Week of Regions and Cities	09/10/2019	Brussels, Belgium	European Week of Regions and Cities
2nd Portuguese Citizen Science Meeting	24/10/2019	Lisbon, Portugal	Series of talks at the 2nd Portuguese Citizen Science Meeting
CIEEM - Planning for success	19/11/2019	Llandudno, UK	CIEEM - Planning for success: Maximising biodiversity through planning and strategic land use. Presented Citizen Science Sustainability Training Programmes to practitioners.
workshop in the frame of the local www.urwatair.gr CS project	14/02/2020	Thessaloniki, Greece	Workshop in the frame of the local www.urwatair.gr CS project, generating awareness of the platform
UKEOF Environmental Monitoring: Meeting Evidence Needs	27/02/2020	Manchester, UK	Presenting citizen science project 'Freshwater Watch' to policymakers
Natural capital in England	02/04/2020	Online	Natural Capital in England: protection and enhancement, effective utilisation and assessing value, and next steps for policy. Networking and ensuring involvement in policy landscape.
Austrian Citizen Science Conference	05/05/2020	Vienna, Austria	The Citizen Science Network Austria is organising the 6th Austrian Citizen Science Conference in 2020. The annual conference on Citizen Science promotes the active participation of citizens in scientific projects.
Tiny Forest Monitoring Day	05/09/2020	Oxford, UK	Local volunteers conducted citizen science on the Tiny Forest and looked at how much the trees had grown, the soil moisture levels, the temperature difference within the forest, levels of biodiversity etc.
River Restoration Centre Annual Conference	09/09/2020	Online	Poster presentation discussing citizen science and current project - attendance was Key to development into River Restoration
CS SDG 2020 Conference	15/10/2020	Online	Speaker at the CS SDG 2020 Conference. Oral communication focused on the project: "Drinkable Rivers - Citizen Science as a tool for the involvement of the local community in monitoring water quality of the Douro River"
Dutch Design Week	21/10/2020	Online	Presentation of the ECSA Principles, Characteristics, and EU-Citizen.Science platform at the Dutch Design Week, Embassy of Health
Citizen Science Lab Webinar	03/11/2020	Online	Presentation of the ECSA Principles, Characteristics, and EU-Citizen.Science platform at the first Citizen Science Lab Webinar

Table 2 - Significant events organised by EU-Citizen.Science partners

8 Conclusion

The EU-Citizen.Science project and its partners aim to provide a comprehensive and sustainable platform, providing relevant resources, training and guidelines that have been carefully curated to support a range of audiences. This deliverable contributes to this, detailing recommendations for achieving a wider awareness of citizen science among the variety of stakeholders highlighted within the project. Through identification and analysis of best practice and study of the available literature, this deliverable establishes a framework for improving the awareness of citizen science projects and activities. This deliverable contributes to Task 4.1 and 4.2, which aim to achieve societal awareness in citizen science through identified projects and initiatives and make general recommendations for policy. This deliverable will undergo further development and review in order to be adapted into an accessible and helpful resource that will be hosted on the platform, which will include a list of activities and events hosted by project partners and third parties. Parallel steps include the delivery of D4.1, which focuses on sustained engagement among stakeholders for citizen science, as well as contributing to WP5 through the development of a "Train the Trainer" methodology. Next steps include the delivery of D4.4, which focuses specifically on policymaker engagement and the implementation of recommendations regarding citizen science.

9 Next Steps

Deliverable 4.3 is an output of tasks 4.1 "Achieving societal awareness and engagement in science through existing citizen science networks, projects and multiplier events" (Months 1 – 34) and task 4.2 "General policy recommendations for citizen science" (Months 1 – 30). This report and its resulting recommendations provide concrete assistance in raising societal awareness of citizen science. This deliverable will contribute to the content provided on the EU-Citizen.Science website; the recommendations produced in D4.3 will assist stakeholders with raising awareness of citizen science activities and events across Europe, and will form the basis of an informative and user-friendly resource to be hosted on the platform. The foundation of these recommendations is formed from an extensive literature review, but WP4 will consult project partners and third parties throughout the updates and the process of translating the deliverable into a resource.

Deliverables 4.1 and 4.2 begin the development of a citizen science model for impacting science and research policy, contributing to a set of recommendations on how to make use of and support citizen science. These deliverables provide recommendations surrounding the engagement of policymakers in citizen science, the motivation of collaboration, the discussion between policymakers and citizen scientists, and capacity building, production of supporting materials and identification and production of key messages and recommendations. This model will need to be developed to include communication of information needs, the partnership between policymakers and citizen scientists, joint planning and fundraising and establishment of research ethics. WP4 will work closely with project partners to establish the facilitation of these points, as well as consulting supporting literature to develop the model to encompass these factors. This work will occur as part of Tasks 2 and 3 and will be conducted between months 13 and 34. Developments surrounding this model will also be reported upon within the updates to Deliverable 4.2, which will occur in months 24 and 34, and Deliverable 4.4. Once the recommendations resulting from the model are developed, WP4 will adapt the list to produce a resource that will be hosted on the platform.

Critically, in addition to the updates to events, Earthwatch will concentrate on awareness-raising and engagement among policymakers. This will include running an online workshop or survey in which we gather the thoughts and questions of project partners. This will involve discussing the current understanding of policymaker awareness, the benefits and

challenges and the areas for action. Following this, WP4 will deliver a workshop during the project meeting in Madrid to disseminate these results and expand upon them, to form content for the first update (D4.3). To improve the interaction between the public, scientific experts and policy decision-makers, a series of policy recommendations on the integration of responsible research and innovation into the citizen science context will be devised. These recommendations will be reported upon in the update to Deliverable 4.3, which will occur in months 34. The deliverables will contribute to the work conducted by MINECO to produce the report for deliverable 4.4. WP4 will work closely with MINECO to establish how these recommendations will contribute to the case study, and similarly utilise their expertise and the results of the study to develop this deliverable within its updates.

Discussion with project partners highlighted the necessity to offer specific guidance for individual stakeholders, incorporating participation at the various phases of initiatives, examples of best practice, the benefits to these stakeholders and statistics that promote the relevance and successes of citizen science. As a result of this feedback, WP4 aims to develop a toolkit, including a series of documents aimed at individual stakeholder groups, that will provide guidance to partners, third parties and external parties in raising awareness of citizen science initiatives among specific audiences.

The outputs of tasks 4.1 and 4.2 will be measured using the EU-Citizen.Science evaluation framework, a result of task 7.1 produced by work package 7. As an output of these tasks, deliverable 4.3 will be measured using this framework. Within the tasks remaining timeline (months 15 to 34), a thorough evaluation will be conducted, to ensure that the objectives of the project are achieved. Deliverable 4.2 aims to assist the EU-Citizen.Science project in broadening understanding of citizen science across Europe, providing recommendations and examples of implementing them to establish best practice. As a result of WP4, there is an expectation of increased awareness of citizen science amongst all stakeholders, but particularly policymakers. Critically, we must ensure this is achieved within the task timeline and following the development of resources reflecting the content of this deliverable by utilising the evaluation framework.

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