



# CLIMAS

CLIMAtE change citizens engagement  
toolbox for dealing with Societal resilience

**Deliverable 3.3** - Tool on Citizen Science application for Climate Assemblies. Initial version.

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## List of Acronyms

<b>Acronym</b>	<b>Definition</b>
CS	Citizen Science
CS Toolkit	Citizen Science Toolkit
CA	Climate Assembly
LL	Living Lab
ECSA	European Citizen Science Association

## CLIMAS Project Overview

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Climate change is one of the most critical issues to tackle today as it is foreseen to have detrimental social, environmental, and economic impacts in the near future. The last climate change events, such as flooding in Germany and Belgium in both Continental and Atlantic regions, heat waves and lack of water in both Mediterranean and Boreal regions, show that the policymakers, experts, and stakeholders' actions are not enough, and a 360° citizen engagement is urgently needed. Therefore, we need to learn from fruitful experiences in citizens' engagement in climate change action and build up citizens' supporting infrastructure for climate adaptation measures to help the 150 European regions and local communities resist. Climate assemblies and living labs are considered sustainable and reasonable tools to stimulate deliberative democracy in climate policymaking.

The ambition of the CLIMAS project is to support a transformation to climate resilience by offering an innovative problem-oriented climate adaptation Toolbox, co-designed together with stakeholders by applying a values-based approach, design thinking methods and citizen science mechanisms. All of that will be carried out with a gender and diversity-inclusive approach. It is expected that the use of the Toolbox will anticipate possible tensions, points of controversy and dilemmas vis-a-vis the adaptation to resilience. Therefore, the Toolbox aims at enabling empowerment and engagement strategies that produce a society "resilient by design". In addition, CLIMAS will include the empirical component for testing this Toolbox and formulating scientific-based guidelines for policymakers on how to shift Climate Assemblies from technically based deliberations that belong to climate change experts to multi-stakeholder deliberations based on solving the dilemmas from a bottom-up, societal, inclusive and value-based perspective. CLIMAS outcomes will positively influence policy development and awareness-raising processes and offer sustainable strategies to enhance the acceptance of citizens' led decisions by policymakers.

## Executive summary

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The CLIMAS Deliverable 3.3 *“Tool on Citizen Science application for Climate Assemblies. Initial version”* outlines the development of a preliminary version of the *Citizen Science Toolkit for Climate Assemblies*. This process involves collaborative methodologies, materials, and sessions to create initial content, detailing the envisioned structure and main contents of the final CS Toolkit. The primary focus has been integrating citizen science into climate assemblies to democratise knowledge and provide grassroots perspectives.

The *Citizen Science Toolkit for Climate Assemblies* (henceforth CS Toolkit) is a comprehensive resource for organisations, communities, and participants in climate citizens' assemblies. Its main objectives are introducing citizen science into climate assemblies and using living labs for co-designing, testing, and deploying tools. The CS Toolkit aims to enhance and deploy citizen science actions during assemblies and prepare end-users with basic knowledge and guidelines for developing those actions. Overall, it aims to integrate citizen-generated knowledge into climate assemblies for a more inclusive and robust deliberative democracy process.

In this deliverable, we present the first iteration of the co-creation of the CS Toolkit. We present the co-creation methodology and the sessions, as well as a comprehensive explanation of how citizen science can enhance the effectiveness of climate assemblies, identifying synergies and potential areas for collaboration. The potential roles and benefits of citizen science throughout various phases of climate assemblies, from initial planning to final implementation and impact evaluation. This information was collected from citizens, citizen science researchers, and deliberative democracy practitioners. We created a structured format for Citizen Science Cards that detail suitable projects, including essential information on activities, objectives, and expected outcomes. Additionally, we compiled a diverse collection of relevant citizen science projects related to climate issues, offering practical examples and best practices for integration into the CS Toolkit. In the deliverable, we also explain the next steps towards the final version of the CS Toolkit that will be integrated as a tool in the CLIMAS Toolbox.

The deliverable is structured as follows:

- **Section 2:** Methodology of the co-creation process, detailing principles, values, materials, and sessions.
- **Section 3:** Description of co-creation sessions and value propositions.
- **Section 4:** Table of content for the first CS Toolkit version, descriptions of each section, and details of the "Citizen Science Projects" section.
- **Section 5:** Conclusions, main outcomes, lessons learned, and next steps.

The final CS Toolkit, *“Tool on Citizen Science application for Climate Assemblies. Final version”* (D3.10), to be delivered in M34, will incorporate feedback and provide a robust framework for integrating citizen science into climate assemblies.



# 1. Introduction

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The *Citizen Science Toolkit for Climate Assemblies* (CS Toolkit) serves as a comprehensive resource for organisations, communities, and climate assemblies participants interested in introducing the power of citizen science in different parts of the deliberative process. The CS Toolkit aims to be self-contained and works stand-alone as well as integrated as a Tool in the CLIMAS Toolbox (*D3.14 – Report on the Climate Assembly Portal launching. Final version*)

The main objective of our tool is to bring citizen science (CS) into climate assemblies (CAs) and use living labs (LLs) as a space for co-designing, testing and deploying tools within the communities. Putting together a whole participatory approach lifecycle that includes building scientific knowledge through citizen science projects, developing innovative tools in living labs, and generating recommendations for policymakers in climate assemblies.

Climate assemblies have a very particular structure with different phases (e.g., learning, consultation, deliberation, elaboration of recommendations, decision-making, etc.) and actors (e.g., governance body, group of experts, citizens, etc.) (McBride, 2022). Citizen science relies on citizens to contribute to the entire research process. (Haklay, 2013). Thus, citizen scientists can be empowered people who can acquire deep knowledge and expertise around a specific topic, from framing concerns to monitoring recommendations. Therefore, they can contribute to breaking with top-down structures in the assembly context.

Accordingly, the **main goal of the CS Toolkit is to allow the different actors of the climate assemblies to enhance and deploy existing citizen science projects during the assemblies in different geographic contexts and territories.** To do so, it is essential to provide concrete value propositions, co-created with end-users, around the power of citizen science in citizen climate assemblies. For this, we identified from different sources (e.g., citizen science and participatory platforms, co-creation sessions with stakeholders and citizens, etc.) citizen science projects that can be used in climate assemblies. Moreover, the CS Toolkit has at the core the goal of preparing end-users with the basic knowledge and guidelines for developing those citizen science actions towards a better, bottom-up, more robust, inclusive and reliable deliberative democracy process. Therefore, the CS Toolkit should allow the inclusion of citizen-generated knowledge into climate assemblies.

In this deliverable, we will present the co-creation process that we have followed during this first period of the project, the content structure that we envision for the final version of the CS Toolkit, which will be delivered in M34, and a first draft of some of the core sections of the CS Toolkit. The deliverable is structured in the following way:

- In **Section 2**, we introduce the methodology we have followed during the co-creation process. We detail the principles and values of the process, the main materials, the sessions designed, and the data collection to detect topics and citizen science projects. A preliminary

version of this methodology has been published as a paper in the Open Living Labs Days (Vicens, Alvarez, Bertomeu, & Laniado, 2023).

- In **Section 3**, we introduce the three co-creation sessions that we have carried out during this period in Ebre Bioterritori Living Lab and at the European Citizen Science Association Conference (ECSA24) and the value propositions of this process.
- In **Section 4** we present the table of contents of the first version of the CS Toolkit and the materialisation of different sections. We also provide a description of each part of the CS Toolkit and especially detail it in the "Citizen Science Projects" section, the core element of the CS Toolkit.
- In **Section 5** we present the conclusions, main outcomes, lessons learned, and next steps for the CS Toolkit's co-creation.

In the Annexes, we present the materials of the co-creation sessions (Annex 1: Co-creation sessions), the agenda and other content of co-creation (Annex 2: Ebro Bioterritori Living Lab, Annex 3: ECSA Conference), the analysis of participatory platforms (Annex 4: Analysis of relevant topics from climate assemblies processes) and the raw content of this first version of the CS Toolkit (Annex 5: Contents of the initial version of the Citizen Science Toolkit). The living CS Toolkit can be found in Eurecat's participatory platform ([decidim.eurecat](https://decidim.eurecat.org))<sup>1</sup>. The final version of the CS Toolkit will be included in the CLIMAS Toolbox in the climate-assembly portal (D3.14).

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<sup>1</sup> [decidim.eurecat](https://decidim.eurecat.org)

## 2. Methodology

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In this section, we will delve into the methodological approach to developing the CS Toolkit and the tools we have been using with this process. It is important to note that part of this methodological approach has been published in the proceedings of OpenLivingLabs Days. (Vicens, Alvarez, Bertomeu, & Laniado, 2023) and presented at the European Citizen Science Conference 2024 (Vicens, Laniado, Di Commo, & Alonso-Raposo, 2024).

### 2.1 Principles and values of the co-creation

The main difference between living labs and other participatory methodologies is their focus on social innovation. This approach promotes the participating person's activism through a systemic and community-based lens. According to (Westley, et al., 2015) social innovation encompasses any initiative – product, process, program, project, or platform – that challenges and contributes to changing the established routines of our social system. Thus, social innovation labs exhibit various configurations depending on their experimental approach. For example, (Scholl, et al., 2017) explores various categories of social innovation labs within an urban context. These categories include labs for change, city labs, design labs, government labs, impact labs, policy labs, reality labs, etc. Living Labs are another modality within the umbrella of social innovation labs. As ENOLL (European Network of Living Lab) points out, living labs prioritise a user-centred approach to innovation, actively involving users in the co-creation, co-design, and evaluation of innovative solutions and development processes.

Depending on the core purpose of the process, several approaches to co-creation exist. In this sense, we understand co-creation as a transformative process that gathers some principles and values around radical collaboration. (Tamm & Luyet, 2019) and the ones used in the participatory design of citizen science projects and open science in general (Senabre, et al., 2021). We thus present the principles and values which have guided our co-creation process, while establishing a safe space for all participants. These principles have been adapted based to the value-based approach proposed in the CLIMAS project.

- **Horizontal process** – All contributions from participating individuals are equally valuable.
- **Equality** – Ensuring that all individuals are treated equally, regardless of their differences.
- **Diversity** – Integrating different social groups, genders, orientations, and thinking methods into the process.
- **Inclusivity** – Including underrepresented individuals in society in the process and the design of the tools.
- **Equity** – Distribution of efforts and resources among participating individuals in an equitable manner.
- **Based on values** – Put values at the centre of the co-creation of the tool.

- **Transdisciplinarity** – The topics addressed in the co-creation process combine multiple disciplines to achieve a common goal.
- **Flexibility** – We must be open to adaptation, be patient and flexible with changes and unforeseen circumstances.
- **Open knowledge** – The process results are made available under a CC license.
- **Co-ownership** – The citizens involved in this process are co-owners of the ideas and results.

Accordingly, the sessions were adapted to people with different languages and levels of digital literacy following the *CLIMAS Guidelines for Inclusive Facilitation and Inclusive Climate Assemblies*. To do so, we created specific language materials depending on the territories and local context (see, for example, materials in Catalan<sup>2</sup> and Greek<sup>3</sup>) and counted on Eurecat's team's participation in supporting people with technological-related struggles.

## 2.2 Co-creation sessions

The CS Toolkit is mainly co-created with communities in living labs, but it is also in contact with climate assemblies and other communities of practitioners, for instance, in citizen science.

We planned to carry out different sessions to co-create the CS Toolkit and, ultimately, create guidelines for introducing citizen science actions in climate assemblies and, particularly, defining the attributes that make citizen science projects suitable for a climate assembly and selecting the most relevant projects based on the selected criteria. Projects may be relevant for various reasons that should be assessed, including the topic's relevance, the significance of research findings, the project's leadership team accessibility, the opportunity to actively participate in the project, the alignment with community concerns, and so on.

Accordingly, we designed two types of co-creation sessions (Vicens, Bertomeu, Alvarez, & Laniado, 2024):

- **Session Type 1: The power of citizen science**

The main goals of this type of session are to provide participants with a basic understanding of citizen science and to engage them in hands-on citizen science projects. This session aims to establish a foundational knowledge of citizen science while enhancing familiarity through practical experience. It is designed for individuals who may or may not already be familiar with citizen science.

- **Session Type 2: Incorporating citizen science into climate assemblies**

The main goal of this type of session is to introduce participants to the concept of climate assemblies, their functioning, and the deliberative processes involved. Additionally, participants

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<sup>2</sup> Materials in Catalan can be found in the Ebre Bioterritori Living Labs [sessions](#)

<sup>3</sup> Materials in Greek can be found in the Chios Living Lab [session](#)

will explore how citizen science can be integrated into these assemblies. This kind of session delves into the role of citizen science in deliberative democracy, specifically within the context of climate assemblies. It examines the actors involved and the types of citizen science activities that can be realistically implemented in these settings. This session is intended for individuals who are already familiar with citizen science.

Furthermore, as part of the co-creation process and the constantly interactive process described in the general methodology of CLIMAS, we are testing the CS Toolkit in living labs and/or climate assemblies. We are implementing the learnings from these tests into the CS Toolkit on a recurrent basis until the final version is produced. The testing of the CS Toolkit in climate assemblies and living labs will be reported in D4.2.

## 2.3 Co-creation community

One of the most important aspects to highlight is the communities involved in this co-creation process (Senabre, et al., 2021), (Skarlatidou, et al., 2019). We identify and engage with different stakeholders and plan their participation in developing the CS Toolkit. For this initial version of the CS Toolkit, we focused on three key communities: civil society, citizen science researchers and practitioners, and experts in deliberative democracy. Citizen science researchers and experts on deliberative democracy are stakeholders with a deep knowledge on citizen science and climate assemblies respectively, on the other civil society are potential end-users of the CS Toolkit. In the next iterations we will collect the feedback of representatives of climate assemblies.

Civil society was primarily represented in the living labs sessions. Citizen science practitioners participated in workshops during the European Citizen Science Association Conference (ECSA 2024). Experts in deliberative democracy contributed through internal meetings between the Citizens' Assembly for Climate of Catalonia<sup>4</sup> and partners with relevant backgrounds. Eurecat's researchers, the authors of this deliverable, participate in the assembly as observers to evaluate the fit of citizen science in the process.

In Section 3.2.1, we provide detailed information on how we recruited civil society participants for the living lab sessions.

## 2.4 Materials and activities

We develop different materials and activities to be carried out in the workshops. Some of the materials are focused on conveying basic knowledge to the participants about the content of the session, and others are more focused on the facilitation of the dynamic. The main materials are:

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<sup>4</sup> <https://participa.gencat.cat/processes/assembleaclima/steps?locale=en>

**Knowledge pills on citizen science and citizens climate assemblies.** We created different materials to provide the basic knowledge to the participants in the co-creation sessions, for both citizen science and citizen climate assemblies (Annex 1: Co-creation sessions). On the latter, we used as a core resource the initial version of the "*Methodological guidelines and manual for setting-up and facilitating climate assemblies*" reported in D3.3 and the materials designed in WP6 and adapted for the session.

The information and materials provided to the participants about Citizen Science included an oral presentation that encompassed several definitions of citizen science and various types of projects, complete with examples. The information and materials regarding climate citizens' assemblies were specifically designed to help non-experts understand the overall functioning of climate assemblies. These resources were distributed to participants in a physical format. Using a set of cards, this approach deviated from traditional screen-based presentations. The cards, given to each participant, were focused on answering the following key questions: What are CAs? Why does society need CAs? How do CAs work? What phases do CAs have? And who are the main actors involved in CAs? In Annex 1: Co-creation sessions (Figure 11 and Figure 12) the Climate Assemblies Cards are presented.

All these materials are open access (under license CC-BY) and will be gathered in the CS Toolkit for further use.

**Multi-dimensionality of citizen science projects.** The variables we consider for analysing citizen science projects cover various aspects. Some of them focus on accessibility and inclusivity, while others concentrate on specific contributions of different phases in the climate assembly following the methodological guidelines developed in CLIMAS D3.2 – *Methodological guidelines and manual for setting-up and facilitating Climate Assemblies. Initial version*. For instance, "Identification of Issues" pertains to the organization phase, while "Political Impact" is centred on the recommendations phase. Additionally, there are variables focusing on operational aspects such as "Difficulty", "Viability", and "Transparency" (Figure 8). Below is a list of these variables along with the main questions presented to participants.

- **Accessibility:** How easy is to access the project? Is it intuitive? What difficulties and barriers have you encountered in accessing it?
- **Inclusivity:** Do you believe it is inclusive for anyone regardless of age, gender, educational level and income, digital skills, language, ethnicity, or other social situations?
- **Identification of issues:** Does the project help highlight social and/or environmental concerns in a specific area? Which ones?
- **Knowledge:** Do you think it can help learn about the topic? Do you think it can spur action for the cause? Can the project potentially generate experiential or scientific knowledge on the addressed topic? What kind?

- Political impact: Do you believe the project can be useful for generating policy recommendations regarding climate change, environmental preservation, or improving social aspects?
- Difficulty: What level of difficulty would you say the tasks in the project have for the participants? Where do you think difficulties might arise?
- Viability: How easy is it to participate in all phases of the project? How long do the actions last? What material resources do you need? Is it flexible in terms of time?
- Transparency: Are the methods, materials, data, results, and publications open to everyone? In what format are they available? Does the project offer material resources?

**Actors and phases of climate assemblies.** In order to co-study how citizen science can be leveraged and what activities can be carried out during the assembly we generated two canvases. One focused on the actors and other focused on the phases of climate assemblies based on the guidelines generated in in D3.2. The actors' canvas (Annex 1: Co-creation sessions, Figure 9) includes representatives of different stakeholders, experts (in climate and policies), civil servants, experts in deliberative processes and climate change, as well as the assembly person. Furthermore, we include two main groups in the citizen climate assembly:

- Content group: Composed of technical experts from universities and (sometimes) civil society organizations. It provides advice on knowledge curation to the assembly: on the selection of evidence and speakers.
- Steering group: Composed of representatives from different social interests (for example, relevant political parties, economic and environmental organizations), experts in deliberative processes, and often selected members of an assembly. It provides input on the overall design of the assembly and its impact.

The second canvas (Annex 1: Co-creation sessions, Figure 10) is focused on the different phases of the citizen climate assembly. The main phases of citizen assemblies are the training phase, consultation, deliberation, and formulation of recommendations. Before and after the assembly itself, aside from the purely logistical part, there are some actions that are vitally important for its development, such as formulation and follow-up. We understand the formulation of the assembly in terms of defining the topics to be addressed, the content provided to the assembly members, and the experts who participate in the process, among other things. Similarly, after the assembly has ended, there is follow-up for accountability. This canvas, therefore, addresses the main phases of the climate assembly where we could potentially introduce citizen science:

- Framing: Identification and elaboration of the main challenges to be addressed through deliberation during the climate assembly. Once the issue is well identified, different groups are formed (e.g., content group, steering group) that create the thematic agenda, select the experts, and design the deliberative process in general.

- **Learning:** The participants receive relevant information, and different experts share knowledge and opinions with them from various perspectives so they can form a criterion and position themselves regarding the challenges presented.
- **Deliberation and Recommendation:** The participants deliberate together and, with the help of facilitators, develop recommendations with the greatest possible consensus, which they will convey to the political decision-makers.
- **Follow-up:** After the commissioner analyses the Assembly's recommendations, they report back to the Assembly members and the general public on implementing measures. The oversight group and the steering group monitor the accountability process.

## 2.5 Participatory platform



### Active processes

[See all processes →](#)



Figure 1 - Active processes in decidim.eurecat on the co-creation of the CS Toolkit

The participatory process has been facilitated using the internal participatory platform of Eurecat (decidim.eurecat<sup>5</sup>) based on the open-source platform Decidim<sup>6</sup>. This platform manage data in compliance with the law as it is stated in the Terms and Conditions<sup>7</sup> of the platform (more details will be provided in the next version of the Data Management Plan). Until now, we have created two processes: "*Co-creation of Citizen Science Toolkit for Climate Assemblies*<sup>8</sup>" and "*Citizen Science Toolkit*<sup>9</sup>". The first process is focused on describing and sharing the materials of all the phases of the co-creation process, including sessions, minutes, materials, and the parts of the CS Toolkit that are under development or testing. In the second process, we share the finalised content of the CS Toolkit. This content is connected via Graph API to the Toolbox developed in the project that integrates all the tools, and it will be reported in (D3.14).

## 2.6 Identification of Relevant Citizen Science Projects

One of the fundamental aspects of the CS Toolkit is a selection of citizen science projects relevant to citizen climate assemblies, specifically those researching topics related to climate change action. The goal is to compile a collection of projects representing a diversity of topics and geographies to ensure they are relevant for living labs and, consequently, for climate assemblies within the project.

As a preliminary step to identify relevant topics for climate assemblies, we analysed available data from participatory processes for the Catalan context: the participatory processes of the Citizen Climate Assemblies of Barcelona<sup>10</sup> and of Catalonia<sup>11</sup>, fostered respectively by the municipality of Barcelona and the government of Catalonia. Both processes are hosted on their Decidim participatory platform, and all content related to citizen proposals and comments is available as open data. We analysed content from both participatory processes through topic modelling and extracted a map of the identified topics. In both cases, among the most important topics, we found *energy, transport and mobility*; and in the case of the Citizen Climate Assembly of Barcelona, in particular, one topic on *public transport*, one on *cyclists and pedestrians*, and one on *emissions*. In the Citizen Climate Assembly of Catalonia, other topics related to food, trees and plants, water and buildings emerged. A more detailed description of the methodology and results of this analysis is presented in the Annex 4: Analysis of relevant topics from climate assemblies processes.

We employ multiple strategies to identify suitable projects. Beyond scrutinizing Europe-wide initiatives, our primary approach involves collaborating with local communities around the living labs and climate assemblies to gather active projects aligned with local needs. For instance, in the Catalan context, we proposed BiciZen<sup>12</sup>, a project focused on micromobility in Barcelona. Similarly,

<sup>5</sup> <https://decidim.eurecatprojects.com/?locale=en>

<sup>6</sup> <https://github.com/decidim/decidim>

<sup>7</sup> <https://decidim.eurecatprojects.com/pages/terms-of-service>

<sup>8</sup> <https://decidim.eurecatprojects.com/processes/climas/?locale=en>

<sup>9</sup> <https://decidim.eurecatprojects.com/processes/cstoolkit/?locale=en>

<sup>10</sup> <https://www.decidim.barcelona/processes/AssembleaClima>

<sup>11</sup> <https://participa.gencat.cat/processes/assembleaclima>

<sup>12</sup> <https://www.bicizen.org/>

in Chios, we worked with Marine LitterWatch<sup>13</sup>, a project addressing marine plastic and other litter. This local approach, involving discussions with regional citizen science offices and communities, helps us engage with projects more deeply integrated into the community.

Additionally, we have an open call for citizen science projects, which is particularly useful at events we participate in to discover unique projects<sup>14,15</sup>. Finally, we periodically gather information about citizen science projects from platforms and databases such as EU Citizen Science<sup>16</sup>, SciStarter<sup>17</sup>, and Zooniverse<sup>18</sup>. These platforms feature active projects relevant for understanding climate change impacts, making them potential candidates for inclusion in climate assemblies.

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<sup>13</sup> <https://marinelitterwatch.discomap.eea.europa.eu/>

<sup>14</sup> [Open call for citizen science projects](#)

<sup>15</sup> <https://www.climas-project.eu/call-for-citizen-science-projects-for-citizen-climate-assemblies/>

<sup>16</sup> <https://eu-citizen.science/>

<sup>17</sup> <https://scistarter.org/>

<sup>18</sup> <https://www.zooniverse.org/>

## 3. Co-creation of Citizen Science Toolkit

In this chapter, we detail the journey of collaborative creation of the CS Toolkit. A development across different environments where we delve into the details of the process, the design of the specific sessions, activities and the outcomes derived from these settings. It is worth to highlight that the co-creation process has been following a target-based pathway, combining the diversity of expertise and experience around citizen science to ensure 360° and a bottom-up approach.

### 3.1 Co-creation sessions in Ebre Bioterritori Living Lab and European Citizen Science conference.

To achieve these goals, we conducted three sessions dedicated to designing the CS Toolkit in collaboration with various stakeholders. Two sessions involved the local community, comprising members of civil society from the Lower Ebre region, at the Ebre Bioterritori Living Lab. Additionally, at the European Citizen Science Association conference in 2024, we held a co-creation session that included inputs from international citizen science researchers and practitioners. The valuable contributions from both communities have enriched the approaches and perspectives regarding the practical usage of citizen science in climate assemblies.

Following the co-creation phase, subsequent sessions where we will test the CS Toolkit's functionality and usability will be performed on the context of WP4 (D4.2). Participants will engage in practical exercises to assess its effectiveness in real-world scenarios, providing insights for refinement that will impact in the final version of the CS Toolkit.

### 3.2 Living Lab Sessions



Figure 2 - Co-creation session in Ebre Bioterritori Living Lab

Since living labs are real-life environments, they are ideal spaces for the co-creation processes of the CS Toolkit before deploying it in climate assemblies. Therefore, we conducted two sessions in the Ebre Bioterritori Living Lab, located in Amposta, in the Lower Ebro Region of southern Catalonia. This Living Lab is part of the Eurecat Technology Centre<sup>19</sup> and the Climate Resilience Centre<sup>20</sup>.

To achieve this, we established a comprehensive co-creation community and held two collaborative sessions. Following the co-creation process design, the first session focused on citizen science, while the second session examined the role of this interdisciplinary field in citizen assemblies.

### 3.2.1 Co-creation community

The foundation of the co-creation process lies in community involvement. The co-creation community comprised more than 20 members, including organisers, facilitators, observers, and citizens. The recruitment process, described in the following paragraphs, involved issuing a call to citizens and specifically reaching out to communities in the Ebre region engaged in associative, environmental, and political activities.

After brainstorming and defining a stakeholder map, a contact database was created to gather information about potential participants. We then developed a recruitment strategy sensitive to engaged collectives and vulnerable groups. This involved listing local networks, organisations, and initiatives concerned with cultural, environmental, and social issues. The target sample included libraries, public institutions such as municipalities, research centres, cultural collectives, “*centres oberts*” (socio-educational intervention centres), cooperatives, environmental NGOs, and interested individuals from the local context.

The recruitment strategy included several actions such as (1) Creating a contact database, compiling information on potential participants; (2) reaching out to entities; (3) launching an open call for citizen registrations through an online questionnaire (see Figure 13), the questionnaire ensured data collection on inclusivity, mainly in terms of linguistic diversity and dietary requirements; (4) dissemination in websites, social media, newsletters; (5) communication outreach, sharing materials with positively engaged and collaborative initiatives, etc. Some of these materials can be found in Catalan, in Figure 14. Following these actions, we successfully recruited 18 citizens, each participating in at least one session.

### 3.2.2 Session I - Citizen Science

Following the co-creation process design, we performed two sessions. The first session was dedicated to providing and igniting basic knowledge about citizen science to ensure a consistent understanding among all participants. Moreover, the session was centred around a hands-on activity aimed at experimenting in-situ with citizen science projects. In addition, science projects of

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<sup>19</sup> <https://eurecat.org/>

<sup>20</sup> <https://centreenresilienciaclimatica.org/en/>

interest were selected to allow the community to be familiarized with. Those citizen science projects were provided resources for people's further exploration before the next session.

### **3.2.2.1 Citizen science projects to practice in-situ**

Most of the participants knew citizen science or have experienced or participated in citizen science activities. Even so, we introduced two citizen science projects to the participants.

**Natusfera**<sup>21</sup> is the Spanish version of iNaturalist, an online social network of people who share information about biodiversity to help each other learn about nature. Its main goal is to connect people with nature. Although not a science project per se, iNaturalist is a platform for science and conservation projects, providing valuable open data for research projects, land managers, other organizations, and the general public. It is the primary application for the collaborative collection of biodiversity data in places such as Mexico, South Africa and Australia. Most of iNaturalist's software is open source.

**BiciZen**<sup>22</sup> is a collaborative platform that aims to make urban regions more suitable for bicycle use. The platform allows users to share data and information about cycling. For example, cyclists can share information about bike parking, thefts, safety, conflicts with other road users or obstructions in bike lanes. It also allows one to make suggestions to improve the cycling infrastructure and report on positive cycling experiences. The platform can also be used by activists, urban planners and researchers who want to document and study bicycle-related phenomena. The data collected on the BiciZen platform provides a permanent and long-term record of aspects and phenomena related to cycling. Furthermore, this data is open and free for anyone to use.

### **3.2.2.2 Multi-dimensional analysis of citizen science projects**

The first participatory dynamics was focused on evaluating different dimensions of the citizen science projects to generate recommendations towards an inclusive and transversal perspective to face climate and global change through citizen science. We prepared a canvas (Figure 8) with some variables and general questions.

During the first session, we omitted the operational variables (i.e., difficulty and openness) of citizen science projects. Instead, we focused on accessibility, inclusivity, and the variables concerning the potential of citizen science for climate assemblies. The summary of the contributions is as follows:

Participants noted that the digital gap is a crucial factor to consider regarding accessibility. While digital platforms offer accessibility features for individuals with certain impairments, such as built-

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<sup>21</sup> <https://spain.inaturalist.org/>

<sup>22</sup> <https://www.bicizen.org/>

in systems on mobile phones, participants stressed the importance of adopting systems that cater to older individuals to bridge the digital gap (Martellos, Seggi, & Conti, 2022).

Another aspect to consider regarding accessibility is the language used in citizen science projects and applications. When implementing citizen science projects within local contexts, it is essential to utilize the native languages of the community, typically Catalan and Spanish in this case. This becomes particularly significant when engaging with local communities and is a factor to consider when selecting citizen science projects for a specific climate assembly.

Additionally, when utilizing digital devices for citizen science actions, internet access is a key consideration. Participants highlighted the importance of having applications that can be used offline, as internet connectivity may not always be available. For example, accessing offline maps is a beneficial feature for mapping-focused citizen science projects.

Regarding **inclusivity**, participants highlighted two specific aspects: language and gender. Regarding language, participants expressed discomfort using applications in languages other than their mother tongue, which also affects accessibility to the project. As for gender inclusivity, it's important to consider non-binary gender options, often overlooked in projects.

It is worth highlighting aspects more closely related to the potential impact of citizen science power on climate assemblies. Participants noted that the projects they engaged are able to provide experience-based and theoretical **knowledge** on specific topics, such as mobility and biodiversity. While the applications were effective in understanding concepts about species or identifying mobility issues, participants expressed a desire for additional content, such as workshops or other activities, to provide more contextual information. Participants also mentioned that these projects can raise awareness about using bikes, as seen in BiciZen, or democratise knowledge in a participatory manner, as seen in Natusfera.

Participants particularly emphasised the potential of these projects to **identify problems**. Whether it's invasive species in the case of Natusfera or mobility issues in the case of BiciZen, both projects can aid authorities and citizens in detecting and monitoring issues. The collection of vast amounts of data, when properly processed, can be used to inform public policies. However, participants acknowledged that this process is not straightforward. They also mentioned that these tools can serve as a means to raise awareness and potentially exert public pressure to **generate policies**.

### **3.2.2.3 Immersion on Citizen Science**

The last block of the session focused on recommending a series of citizen science projects for participants to engage with during the two weeks between sessions. The aim was to explore various projects or, for those accustomed to participating in citizen science initiatives, to conduct a critical analysis considering the dimensions discussed throughout the session. We suggested over 10 citizen science projects covering topics such as water, agroecology, biodiversity, and air quality and also included other projects mentioned by the participants. The selection of projects was based on four

variables: geographical context, diversity of topics, typology of projects, and relation to climate action.

### **3.2.3 Session II – Climate Assemblies**

The second session of the co-creation process was dedicated to citizen climate assemblies. However, the session was divided in two parts, the first part was focused on reviewing the dimensions of citizen science projects and getting knowledge of the experience of participants using those projects during the last two weeks. The core part of the sessions was focused on introducing to the participants the concept of citizen climate assembly and, in addition to that, on collectively thinking how citizen science can fit in a citizen climate assembly context.

#### **3.2.3.1 Knowledge pill on climate assemblies**

In the knowledge pill dynamics, the participants got the materials described in Section 2.4. All this information was reinforced with the presence and the evidence provided by a technician of the Catalan Government (EXO-Gen, partner in CLIMAS project) who has been carrying out the Catalan Climate assembly. In addition, providing examples and evidence, a Q&A dynamic was established to enable the knowledge uptake of the participants around the basics of the climate assemblies.

#### **3.2.3.2 Co-creation dynamics: The role of citizen science in climate assemblies**

According to the goals and the scope of the co-creation process, this dynamics was focused on the following main questions:

- What value can citizen science bring to the climate assembly?
- How can the different actors use citizen science in the different phases of the climate assembly?

As explained in Section 2.4, a canvas was developed for this co-creation session. The canvas was focused on how citizen science can be deployed into climate assemblies' contexts. Thus, it was containing the four main phases of the climate assemblies (framing, learning, deliberation and recommendations, and follow up).

The exercise was focused on understanding hence how, who and when citizen science can be implemented in assemblies. In addition, the contributions where focused on the putative value provided by citizen science and which kind of activities could be carried out in those contexts.

The value propositions arisen during the co-creation were appropriately located in each phase of the citizens' assembly. In case people did not know, we provided some guidance while facilitating this connection.

### 3.2.4 Highlights of the session

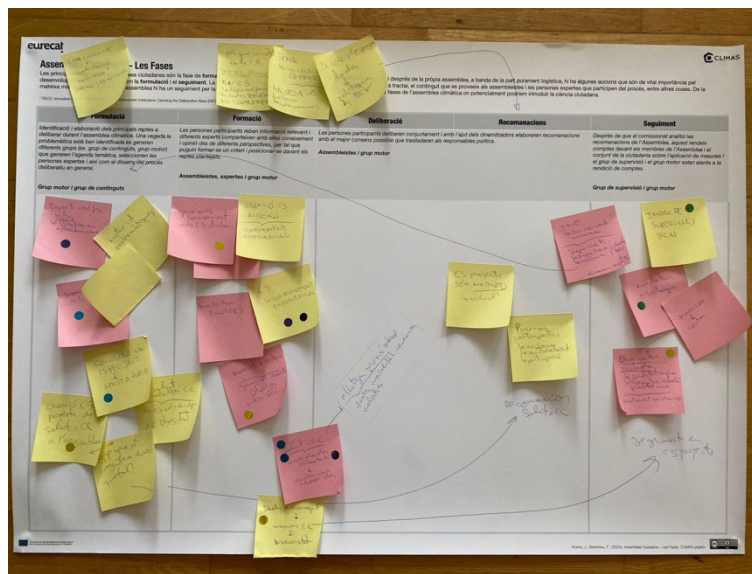


Figure 3 - Canvas with the contributions of citizens in the climate citizens' assembly session in Ebre Bioterritori Living Lab

Some of the participants were familiar with certain citizen science projects and related actions, such as MosquitoAlert and Natusfera, etc. The contributions in the co-creation thus were performed from citizen scientists' perspectives. It highly enriched the value proposition for delving into the relationship between citizen science and climate assemblies.

Citizen science proposals were from basic to highly ambitious. On one hand, the usage of existing and actual projects with activities can be a source of options to be carried out into the assemblies; such as seminars and participative activities. On the other hand, in the discussion arose the potential benefits of the co-creation of a citizen science project specifically adapted to certain topics, where people involved in the assembly can be key players from the research question until the monitoring and policy recommendations through evidence-based mechanisms. Citizen science can be a perfect mechanism for problem and concern identification around climate and global change, such as water scarcity, plastic pollution, bird migration, species identifications, insect blooms, etc. Those contributions were summarized in the poster presented at the ECSA conference in 2024 (Vicens, Bertomeu, Alvarez, & Laniado, 2024).

Accordingly, here is a collection of insights corresponding to the different phases of the assembly:

- Framing and organization phase: Local citizen science reflects social concerns in each territory. Thus, identifying citizen science projects and activities can be useful for selecting topics (e.g., mobility, energy, greenery, etc.) for climate assemblies in each context. Analysing citizen science projects, communities, organizations and citizen observatories in a region can yield evidence of environmental issues and provide insights into public concerns.
- Learning phase: Invite citizen scientists and those deploying citizen science actions in the local context to participate in climate assemblies the same way the professional scientists or technicians are invited. This approach can facilitate data collection, knowledge sharing, and

the ignition of collective intelligence. Citizen scientists can contribute as experts, sharing their experiential knowledge. Their involvement can inspire, empower, and engage assembly participants, enriching their knowledge and experience.

- Deliberation and recommendations: Data collected from citizens can be presented during the assembly to reinforce the deliberation phase.
- Follow-up: Citizen science can provide evidence for monitoring the effects of policies. It can play a crucial role, possibly involving the initiation of new projects to track the effectiveness of recommendations or utilizing existing projects for monitoring purposes. Additionally, establishing a citizen observatory based on citizen-generated data with assembly members could be a viable method to monitor the impact of the measures applied.

### 3.3 Co-creation in ECSA conference

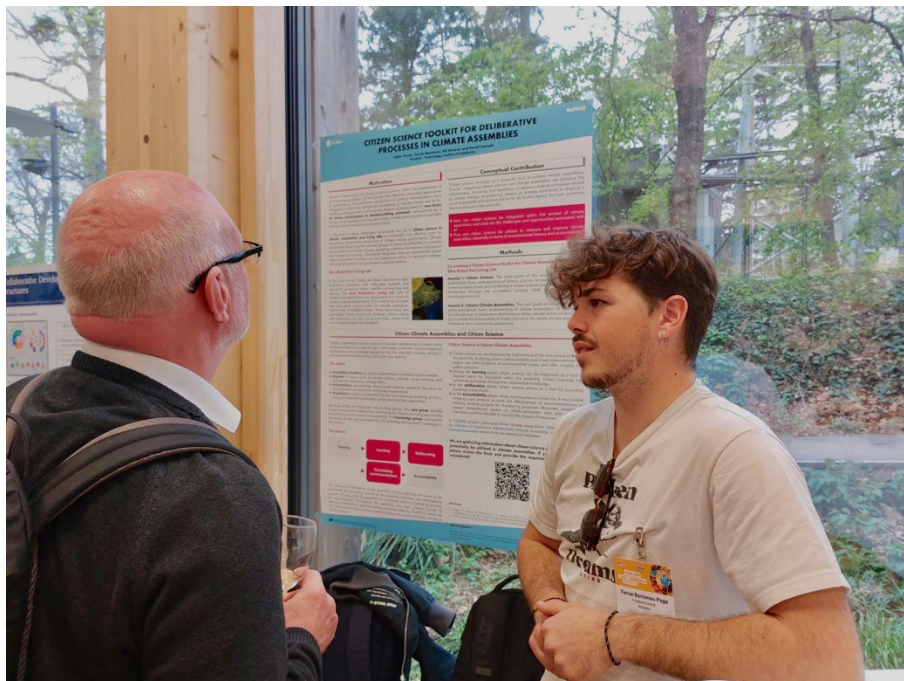


Figure 4 - Poster session in ECSA Conference 2024

Following the co-creation process design, the European Citizen Science Association (ECSA) Conference 2024 was a perfect space for co-creating the CS Toolkit for climate assemblies (see Annex 3: ECSA Conference). Since the first session type of the co-creation process design was dedicated to providing basic knowledge on citizen science, at the ECSA Conference 2024, we skipped this because all participants were deeply familiar with the topic. Hence, it was a great opportunity to ask citizen scientists, researchers, and practitioners about the possible incorporation of this interdisciplinary field into climate assemblies. Therefore, the session carried out at the conference was focused on Climate Citizens' Assemblies.

According to the co-creation process design, the goals of the session were:

- To introduce participants to the concept of climate assemblies;

- To explore how citizen science can be integrated into these assemblies.

The session delved into the role of citizen science in deliberative democracy spaces, while going in-depth towards the potential citizen science activities which could be applied into the different phases of the climate assemblies.

The materials and methods used were the same used for the second session of Ebre Bioterritori Living Lab, described in Section 2.4. The co-creation community positively denoted the huge compatibility of citizen science with climate assemblies. It is worth highlighting participants recognized citizen science as a source of bottom-up, public and reliable citizen-generated data as well as citizen-b evidence. In addition, people affirmed that the usage of citizen science within the assemblies can inspire, empower, engage and foster participation in the assembly while enriching knowledge and experience up-taking through practice and in a horizontal manner.

### 3.3.1 Highlights of the session

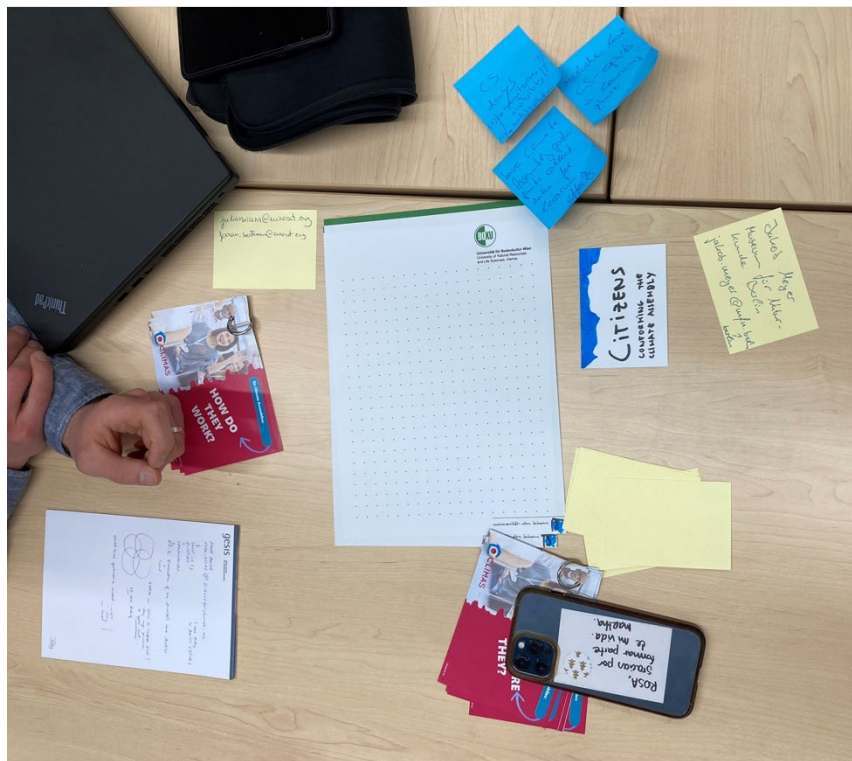


Figure 5 - Co-creation session in ECSA Conference 2024

The people involved in the co-creation process were distributed in different tables, to perform a role-playing imagining that they are taking part in the assembly process, where potential contributions of citizen science could be developed by each actor type.

**Citizens' table** denoted the valuable contribution that citizen science can provide evidence while generating and providing data to the assembly by fellow citizens. It could be analyzed and digested after the collection with both, assembly persons and fellow citizens. It can also be useful for showing

best-case examples in relation to climate and other topics related, while promoting a sense of responsiveness.

In the **framing phase**, it is worth to highlight that participants denoted that climate assemblies could be nourished by citizen science projects carried out before the assembly. Furthermore, the dilemma could be proposed by the assembly participants through citizen science.

Notwithstanding, to enhance the assembly as a powerful tool, it would be important to co-design with citizens a process of citizen science engagement which would increase trust, legitimacy and empowerment of the assembly. Thus, citizen science researchers and practitioners should recap and provide evidence from the ongoing local projects. In addition, this can enhance individual and thus collective mindset for behavioural change throughout the whole process. This can be done by running small pilots, such as giving sensors to people generating data to be co-analysed with researchers for its usage in the **learning phase**.

Regarding the **organizers'** table, people also highlighted the usage of citizen science topics for deciding the assembly topic in the **framing phase**. In the **knowledge phase**, however, they noticed that citizen science projects could help go in-depth towards the selected topic. Moreover, it could be worthy to incorporate actors around the citizen science project, such as municipal offices, citizen observatories, etc., to include them in the climate assembly.

Finally, regarding the **experts** concerned with the climate assembly, citizen scientists, practitioners, and researchers could be engaged through their experience during the different phases of the climate assembly. The experience could help clarify opinions towards deliberation.

To do the latter, participants noticed that a perfect option would be to organize and experiment with citizen science within the assembly process. It could be a key factor for elaborating recommendations, making changes visible through bottom-up evidence, raising awareness and visibility, and promoting the visualization of data co-generated with citizens and researchers. It could be ignited through a "Citizen Science Day", when assemblypersons could engage with more citizens towards carrying out a whole scientific process, from data collection towards conclusions and **elaboration of recommendations**.

### 3.4 Main results of the co-creation sessions

Three sessions have formed the co-creation process. In all of those, people with different profiles, backgrounds, and experiences delved into the synergies between citizen science and climate assemblies.

On one site, participants from civic society required more effort to understand the whole process. However, those contributions were valuable, although not that deep. On the contrary, the ECSA

conference 2024 provided a deeper understanding of the potential use of citizen science in those deliberative democracy contexts, more concretely through the different assembly phases.

In the **framing or organization phase**, several value propositions were consistent. On one side, citizen science activities can be a signal for problem identification within the community where the assembly can be carried out. By identifying organizations, researchers, or communities engaged in relevant actions, people be included in the regular programme while providing value around the selected topic. On the other hand, citizen science can help in addressing citizen concerns through the identification of existing projects which can be useful to pinpoint areas most impacted by a certain issue. Thus, effectively addressing community concerns.

In the **learning phase** however, inviting citizen scientist testimonials and deployment of citizen science actions from the project into deliberative democracy processes can be a reliable source of bottom-up knowledge. It can inspire, empower, engage and foster participation in the assembly, while enriching knowledge and experience up-taking. In addition, citizen science can facilitate knowledge sharing through presentations of previous research, citizen science workshops, testimonials, or collective actions, such as samplings or data collection, during the assembly process. For instance, engaging a core group of (citizen) scientists to share knowledge and experiences with assembly participants. Or, engaging a core group of citizen climate assemblies to perform actions to share bottom-up and experiential knowledge with the rest of the assembly participants. Moreover, citizen science can offer visual representations of data collected to enhance understanding and accessibility of citizen science findings and perform an activity around the visuals. Finally, integrating citizen science projects into public spaces during climate assemblies can be also an action to be carried out during the learning phase. It could encourage public institutions like libraries, schools or civic centres to introduce citizen science projects related to climate and global change topics to be discussed and incorporate their insights into the assembly.

Additionally, in the **recommendation** phase, another utility from citizen science could be utilizing outcomes of the projects for policymaking and expert guidance. Incorporating recommendations from projects, which are based on evidence collected by citizen scientists, into policy decisions and expert assessments can enhance reliability and social acceptance.

In the **follow-up** phase, however, citizen science could contribute through the provision of updates on policy implementation based on evidence from the monitoring. Inform assembly participants about policy implementation progress and monitoring changes in certain variables can help to assess the effectiveness of implemented measures, particularly in coastal areas. For instance, citizen observatories (Kobernus, et al., 2015) could help to monitor the effectiveness and impact of public measures, through citizen observatories previously stablished or created ad-hoc in the last phase of the assembly.

## 4. The Citizen Science Toolkit

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In this chapter we describe the contents that will be part of the CS Toolkit based on the outcomes of the co-creation sessions performed with citizens in living labs and with citizen science practitioners at the ECSA conference 2024. The initial version of the CS Toolkit can be found in Eurecat's participatory platform (decidim.eurecat) in their online format as a living document that is under development and further testing (D4.2). The final version will be also edited in a document format. Here forth, you can find the main contents of this initial version of the CS Toolkit as well as a description of the content that we envision to include in the final version of the CS Toolkit.

### 4.1 Table of content of the Citizen Science Toolkit

Here we present the table of contents of the CS Toolkit. This content is a compilation of both the outcomes of the co-creation sessions. Particularly the value propositions that the different communities involved in the co-creation process have provided while delving into the application of citizen science in citizens climate assemblies. Moreover, there is contextual information that will give a 360° view for the deployment of the CS Toolkit.

#### 4.1.1 Introduction

The introduction of the CS Toolkit provides essential information on its purpose and scope, specifically addressing "Who is it for?", "What does it include?", and "How to use it?". Additionally, this section defines key concepts such as citizen science and climate assemblies and explains why a climate citizens' assembly is an ideal platform to introduce citizen science. This content is available in this initial version (Annex 5: Contents of the initial version of the Citizen Science Toolkit).

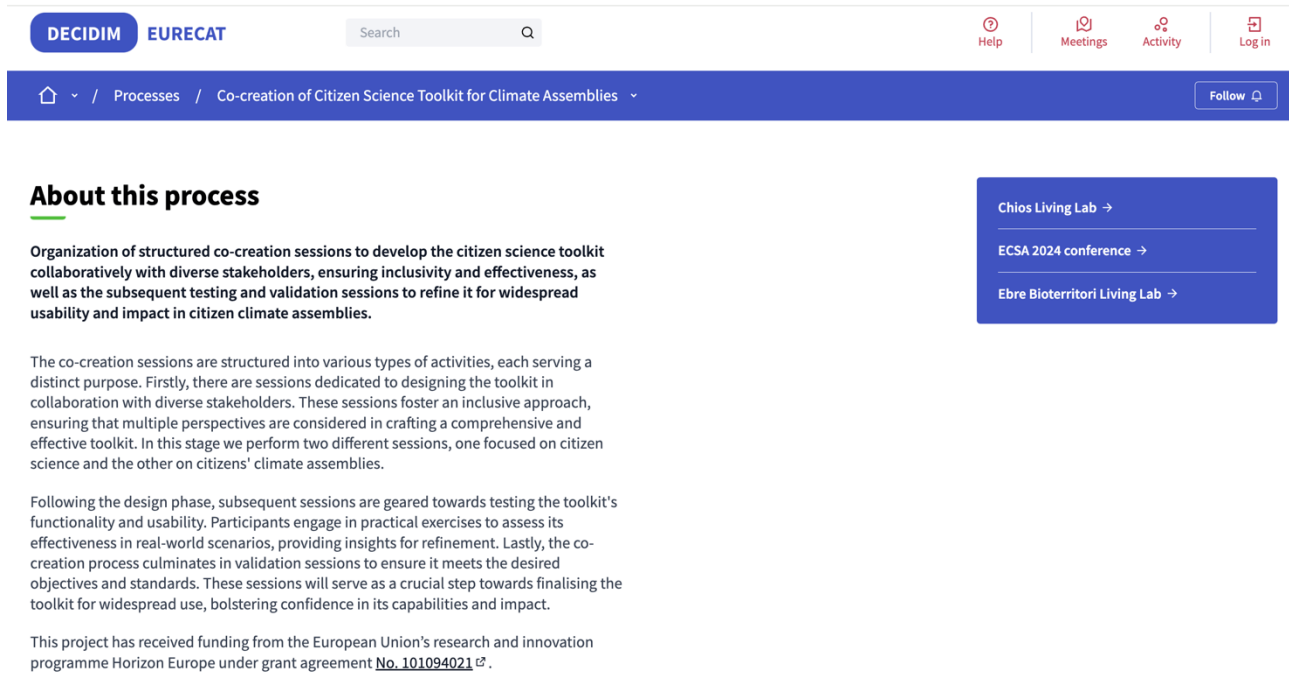
#### 4.1.2 Climate Citizens' Assemblies

In this section, we explain the basics of a climate assembly to the users of the CS Toolkit. We utilise information generated during the co-creation sessions and used in subsequent sessions. With this information, we aim to provide an overview of the key elements of a climate assembly, including the definition and objectives of climate assemblies, as well as the key actors and structure of the assembly. These materials are based on the work performed in D3.3 and adapted to our context. This content is available in this initial version (Annex 5: Contents of the initial version of the Citizen Science Toolkit).

#### 4.1.3 Citizen Science and Climate Action

This section will delve in the relationship between citizen science and climate action – adaptation and mitigation. This content will be available in the final version.

#### 4.1.4 Co-creation process



**About this process**

**Organization of structured co-creation sessions to develop the citizen science toolkit collaboratively with diverse stakeholders, ensuring inclusivity and effectiveness, as well as the subsequent testing and validation sessions to refine it for widespread usability and impact in citizen climate assemblies.**

The co-creation sessions are structured into various types of activities, each serving a distinct purpose. Firstly, there are sessions dedicated to designing the toolkit in collaboration with diverse stakeholders. These sessions foster an inclusive approach, ensuring that multiple perspectives are considered in crafting a comprehensive and effective toolkit. In this stage we perform two different sessions, one focused on citizen science and the other on citizens' climate assemblies.

Following the design phase, subsequent sessions are geared towards testing the toolkit's functionality and usability. Participants engage in practical exercises to assess its effectiveness in real-world scenarios, providing insights for refinement. Lastly, the co-creation process culminates in validation sessions to ensure it meets the desired objectives and standards. These sessions will serve as a crucial step towards finalising the toolkit for widespread use, bolstering confidence in its capabilities and impact.

This project has received funding from the European Union's research and innovation programme Horizon Europe under grant agreement [No. 101094021](#).

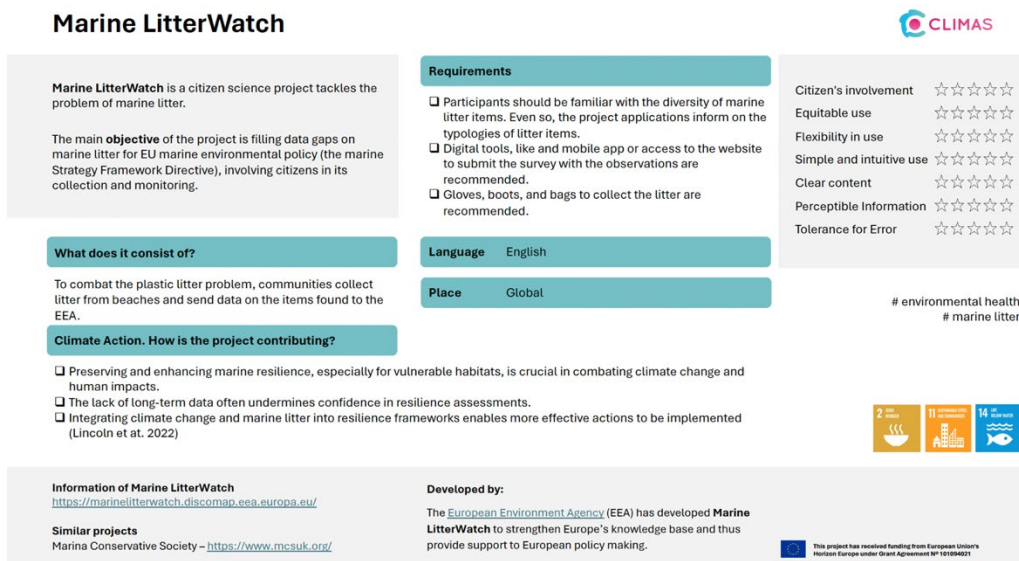
[Chios Living Lab](#) →  
[ECSA 2024 conference](#) →  
[Ebre Bioterritori Living Lab](#) →

Figure 6 - Co-creation process of the CS Toolkit in decidim.eurecat

In this section, we explain how the CS Toolkit has been developed and the importance of co-creating the CS Toolkit and testing it in different places. In this initial version, we only focus on the explanation of the co-creation sessions – the testing part and the outcomes and improvements that will result from the testing will only be integrated into the final version of the CS Toolkit. This content is partially available in this initial version and will be further developed once the process is finished. This content can be found in the decidim.eurecat platform<sup>23</sup>.

<sup>23</sup> <https://decidim.eurecatprojects.com/processes/climas>

### 4.1.5 Citizen Science Projects



**Marine LitterWatch**

**Marine LitterWatch** is a citizen science project that tackles the problem of marine litter.

The main **objective** of the project is filling data gaps on marine litter for EU marine environmental policy (the marine Strategy Framework Directive), involving citizens in its collection and monitoring.

**What does it consist of?**

To combat the plastic litter problem, communities collect litter from beaches and send data on the items found to the EEA.

**Climate Action. How is the project contributing?**

- Preserving and enhancing marine resilience, especially for vulnerable habitats, is crucial in combating climate change and human impacts.
- The lack of long-term data often undermines confidence in resilience assessments.
- Integrating climate change and marine litter into resilience frameworks enables more effective actions to be implemented (Lincoln et al. 2022)

**Requirements**

- Participants should be familiar with the diversity of marine litter items. Even so, the project applications inform on the typologies of litter items.
- Digital tools, like and mobile app or access to the website to submit the survey with the observations are recommended.
- Gloves, boots, and bags to collect the litter are recommended.

**Language** English

**Place** Global

**Information of Marine LitterWatch**  
<https://marinelitterwatch.discomap.eea.europa.eu/>

**Similar projects**  
Marina Conservative Society – <https://www.mcsuk.org/>

**Developed by:**  
The **European Environment Agency (EEA)** has developed **Marine LitterWatch** to strengthen Europe’s knowledge base and thus provide support to European policy making.

**Performance Metrics:**

- Citizen’s involvement ☆☆☆☆☆
- Equitable use ☆☆☆☆☆
- Flexibility in use ☆☆☆☆☆
- Simple and intuitive use ☆☆☆☆☆
- Clear content ☆☆☆☆☆
- Perceptible Information ☆☆☆☆☆
- Tolerance for Error ☆☆☆☆☆

# environmental health  
# marine litter

This project has received funding from European Union’s Horizon Europe under Grant Agreement N° 101094021

Figure 7 - Sample of Marine LitterWatch card

This is the core section of the CS Toolkit, where users can find specific citizen science projects to be deployed in the assembly. This section consists of cards with all the relevant information about each citizen science project and the potential activities to perform in a climate assembly. In this first version of the CS Toolkit, we have created the structure of the card and the content, which is currently being tested. For this version of the CS Toolkit, we have three cards that cover different topics with citizen science projects: BiciZen, OdourCollect<sup>24</sup>, and Marine LitterWatch, two of them collected through the open call for citizen science projects. In the final version, we envision having around 15 projects covering diverse climate-related themes and issues. The current content is available in this initial version (Annex 5: Contents of the initial version of the Citizen Science Toolkit)

### 4.1.6 Guidelines for Introducing Citizen Science in Climate Assemblies

This section will contain a set of recommendations and guidelines for including citizen science actions in climate assemblies in an effective way based on CLIMAS<sup>1</sup> experience. This content will be available in the final version.

### 4.1.7 Case Studies

This section will contain a description of the activities carried out in climate assemblies, of the citizen science projects selected, and of the lessons learned during this process. This content will be available in the final version.

## Appendix

<sup>24</sup> <https://scienceforchange.eu/en/project/odourcollect/>

Finally, the CS Toolkit has an appendix with general information about terms, readings and other resources, authorship, license and the general information about the CLIMAS project. This content is partially available in this initial version.

These contents will finally integrate the CS Toolkit and may undergo modifications because the CS Toolkit is in testing process according to the nature of the CLIMAS project.

## 4.2 Selection of Citizen Science Projects for Use in Climate Assemblies

The CS Toolkit will encompass a curated selection of citizen science projects tailored for implementation within climate assemblies. These outlined projects constitute a core aspect of the CS Toolkit, representing the central contribution that will undergo testing throughout the CLIMAS project. In this initial version, we present three projects showcased during the co-creation sessions to exemplify the cards, also used in the testing phase. This decision is informed by considerations of the participant's familiarity, the local context and operational testing planning. Nevertheless, as it was mentioned before, the final iteration of the CS Toolkit is envisioned to feature a portfolio of approximately 15 projects, curated to encompass diverse climate-related themes and issues.

The content included in these cards, which is currently under testing, is divided into two groups. One group contains information about the citizen science project itself, and the second part focuses more on the integration of the citizen science project within the climate assembly. In the first part, the user can find information such as the name of the project, a description of the project, the developers of the project, how the project is related to climate action, and how this project is related to the SDGs, among other things. We complete this information with a section devoted to citizen involvement, equitable and flexible use, clarity of content, etc.

Furthermore, we provide an overview of potential citizen science activities that can be carried out during the assembly. In the CS Toolkit, users can find various proposals for activities for different parts of the assembly. These cover all types of engagement and different levels of resources from the organisation. This is a collection of the main activities that have emerged from the different co-creation sessions.

A sample of the Marine LitterWatch card that is being tested is available on the decidim.eurecat platform<sup>25</sup> and in the Annex 5: Contents of the initial version of the Citizen Science Toolkit – Figure 23.

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<sup>25</sup> <https://decidim.eurecatprojects.com/processes/climas/f/9/meetings/5>

## 5. Conclusions

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### 5.1 Key outcomes

This deliverable details the process of co-creating a preliminary version of the CS Toolkit for Climate Assemblies. It outlines the methodology, materials, and sessions used to develop the initial content. We also report the envisioned structure and main contents for the final version of the CS Toolkit. Over the past months, our primary focus has been on integrating citizen science into climate assemblies. Through collaborative efforts, we have identified the limitations of climate assemblies and explored how citizen science projects can democratize knowledge and provide a more grassroots perspective. The key outcomes at this stage include:

- **Interaction between citizen science and climate assemblies:** We have developed a comprehensive explanation of how citizen science can enhance the effectiveness of climate assemblies. This includes identifying synergies and potential areas for collaboration.
- **Potential of citizen science in different phases of climate assemblies:** We have analysed and documented the potential roles and benefits of citizen science throughout various phases of climate assemblies, from initial planning to final implementation of recommendations and evaluation of the impacts. We have collected information from citizens, citizen science researchers and practitioners as well as deliberative democracy practitioners.
- **Citizen science card structure:** We have created a structured format for citizen science cards that detail citizen science projects suitable for climate assemblies. These cards include essential information on the main activities, objectives, and expected outcomes of each project, providing a practical resource for assembly participants (from organizers to citizens).
- **Compilation of relevant citizen science projects:** We have gathered detailed information on citizen science projects related to climate issues that, potentially, can be integrated into the CS Toolkit. This collection offers a diverse range of examples and best practices, showcasing how citizen science can address various climate-related challenges.

By focusing on these outcomes, we aim to provide a comprehensive CS Toolkit that empowers climate assemblies to leverage citizen science for more inclusive and impactful decision-making processes.

## 5.2 Lessons learned

In this research process, we have learned multiple things. However, we would like to highlight three key aspects about climate assemblies, citizen science, the interaction between the two, and participants' motivation.

Climate assemblies are complex deliberative democracy processes that involve numerous stakeholders and tasks. These range from operational tasks (such as event logistics) to organizing knowledge (determining who provides the information to citizens) and facilitating deliberation. This complexity can sometimes make organizers reluctant to include open, bottom-up, and innovative tools, especially when these assemblies are organized by governments. Notwithstanding, organizers, and particularly governments, often have citizen science offices within their organizational structure that could be easily integrated into the process. However, a lack of communication between departments can make this collaboration challenging. This CS Toolkit also aims to highlight the connections between existing structures that need to dialogue with each other.

Citizen science offers multiple options for inclusion in climate assemblies. Fortunately, citizen science is present in various spaces, including governments, schools, and civic organizations. The potential for citizen science to be used or included in climate assemblies is high, provided that the organizers are open to utilizing knowledge built by citizens. However, we have found that while many citizen science projects have a significant impact during their development (when funded), their sustainability is often not addressed, leading to their deactivation once funding ends.

We have noticed that the suitability of citizen science for climate assemblies depends on the topics being tackled. Citizen science projects are often centred around very specific topics, such as biodiversity and air quality, while topics more focused on climate adaptation, such as food security or drought, are more difficult to find. Therefore, while citizen science can fit into a climate assembly according to the topics covered, it may not always be possible.

Finally, one fundamental and intangible aspect we would like to highlight is the motivation of participants in co-creation sessions, especially citizens from civil society and citizen science practitioners, regarding the potential of citizen science for policymaking and their interest in understanding the fundamentals of climate assemblies. This motivation sometimes contrasts with the motivation of climate assembly organizers to include innovative tools in these deliberative processes, creating a barrier that we need to overcome.

## 5.3 Next steps

The CS Toolkit is currently under development and further testing. According to the CLIMAS project methodology, the final version of the CS Toolkit will be delivered in M34, incorporating all feedback received during testing in both living labs and climate assemblies. The testing report is provided in

D4.2 (M30), where we will present the results of the CS Toolkit testing. The final version will incorporate the necessary changes.

The next steps in the CS Toolkit's development focus on two main areas. First, we will implement improvements based on feedback received during the testing of specific parts of the CS Toolkit, such as the citizen science cards. This involves understanding how the CS Toolkit can be efficiently deployed in real-life environments with different end-users, including organizers and citizens. Second, we will further develop the remaining parts of the CS Toolkit, concentrating on results and best practices derived from our experiences with citizen science activities in assemblies. This toolkit will be incorporated as a Tool in the CLIMAS Toolbox (*D3.14 - Report on the Climate Assembly Portal launching. Final version*)

We aim to foster a collaborative environment where stakeholders can share knowledge, experiences, and resources to strengthen the overall capacity to implement citizen science in climate assemblies effectively. Ultimately, we will deliver a robust methodological framework that guides the integration of citizen science into climate assemblies, ensuring a systematic and inclusive approach.

## 6. References

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# Annex 1: Co-creation sessions

## Materials co-creation sessions

### Canvas for co-creation sessions<sup>26</sup>

eureka!

Projecte de ciència ciutadana:

(Indica el nom del projecte)

Valoració de les dimensions de projectes de ciència ciutadana per la generació de recomanacions des d'una perspectiva inclusiva i transversal per fer front al canvi climàtic.

	Accessibilitat	Inclusivitat	Identificació de problemàtiques	Coneixement	Impacte polític	Dificultat	Viabilitat	Transparència
	Com de fàcil és accedir al projecte? És intuïtiu? Quines dificultats i barreres t'has trobat per accedir?	Creus que és inclusiu per a qualsevol persona independentment d'edat, gènere, nivell educatiu i ingressos, competències digitals, llengua, ètnia o d'altres situacions socials?	El projecte ajuda a posar en evidència preocupacions o problemes socials i/o ambientals d'un determinat territori? Quins?	Creus que pot ajudar a aprendre sobre la temàtica? Penses que pot inclinar a l'acció per la causa? El projecte potencialment pot generar coneixement experiencial o científic sobre la temàtica que aborda? De quin tipus?	Creus que el projecte pot ser útil per generar recomanacions de polítiques públiques entorn el canvi climàtic, la preservació del entorn natural o de la millora d'aspectes socials?	Quin nivell de dificultat diries que tenen les tasques que el projecte a les persones que participen? On creus que pot haver dificultats?	Com de fàcil és participar en totes les fases del projecte? Quan de temps duren les accions? Quins recursos materials necessites? És flexible en el temps?	Són els mètodes, materials, dades, resultats, i publicacions oberts a tothom? En quin format es disposen? El projecte ofereix recursos materials?
<p><b>Alt</b></p> <p>Nivell de cada dimensió</p> <p><b>Baix</b></p>	<p>Col·locar el punt amb les lletres corresponents del projecte per cada un de les dimensions que constitueixen el nivell de cada una de les dimensions. El punt de cada una de les dimensions ha d'estar situat en alguna de les caselles, per exemple, que el projecte no ofereix accésibilitat i no té recursos materials disponibles.</p>							

Figure 8- Canvas illustrating the dimensions to be analysed regarding citizen science projects, along with the levels of each dimension for every project

<sup>26</sup> Materials in Catalan can be found in the Ebre Bioterritori Living Labs [sessions](#)





### Assemblea Ciutadana – Les Fases

Les principals fases de les assemblees ciutadanes són la fase de **formació**, **consulta**, **deliberació** i **formulació de recomanacions**<sup>1</sup>. Abans i després de la pròpia assemblea, a banda de la part purament logística, hi ha algunes accions que són de vital importància pel desenvolupament de la mateixa, com la **formulació** i el **seguiment**. La formulació de l'assemblea ho entenem en termes de definir els temes a tractar, el contingut que es proveeix als assembleistes i les persones expertes que participen del procés, entre altres coses. De la mateixa manera en haver acabat l'assemblea hi ha un seguiment per la rendició de comptes. Aquest canvas, per tant, respon a les principals fases de l'assemblea climàtica on potencialment podríem introduir la ciència ciutadana.

<sup>1</sup>OECD, Innovative Citizen Participation and New Democratic Institutions, Catching the Deliberative Wave (OECD Publishing, 2020).

Formulació	Formació	Deliberació	Recomanacions	Seguiment
<p><i>Identificació i elaboració dels principals reptes a deliberar durant l'assemblea climàtica. Una vegada la problemàtica està ben identificada es generen diferents grups (ex. grup de continguts, grup motor) que generen l'agenda temàtica, seleccionen les persones expertes i així com el disseny del procés deliberatiu en general.</i></p> <p><i>Grup motor i grup de continguts</i></p>	<p><i>Les persones participants reben informació rellevant i diferents experts comparteixen amb elles coneixement i opinió des de diferents perspectives, per tal que puguin formar-se un criteri i posicionar-se davant els reptes plantejats.</i></p> <p><i>Assembleistes, expertes i grup motor</i></p>	<p><i>Les persones participants deliberen conjuntament i amb l'ajut dels dinamitzadors elaboraren recomanacions amb el major consens possible que traslladaran als responsables polítics.</i></p> <p><i>Assembleistes i grup motor</i></p>	<p><i>Després de que el comissionat analitzi les recomanacions de l'Assemblea, aquest rendeix comptes davant els membres de l'Assemblea i el conjunt de la ciutadania sobre l'aplicació de mesures i el grup de supervisió i el grup motor estan atents a la rendició de comptes.</i></p> <p><i>Grup de supervisió i grup motor</i></p>	

Figure 10- Canvas illustrating the phases of the climate assemblies

### Climate Assembly Cards

Climate Assembly Cards created for the co-creation sessions. These cards have been translated from English to the languages of the sessions (Catalan and Greek). The content of the card is also part of the CS Toolkit.



Figure 11- Sample of Climate Assembly cards for co-creation sessions (what and why CAs)

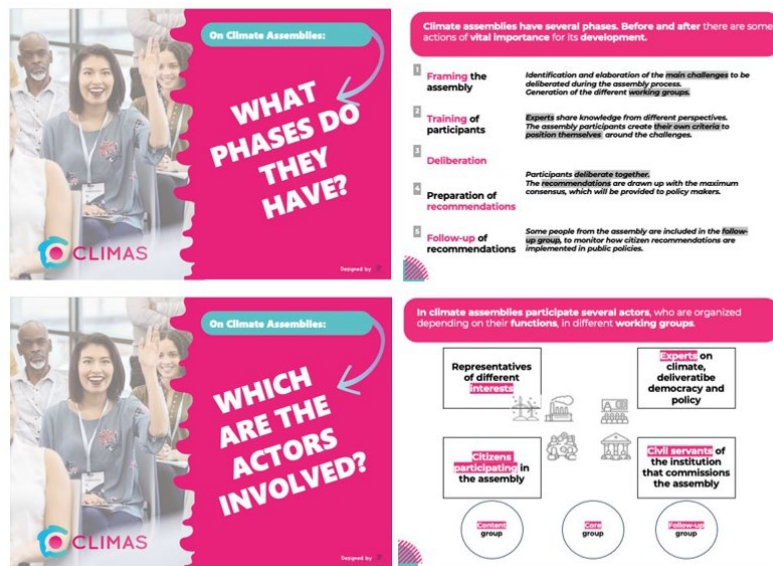


Figure 12- Sample of Climate Assembly Cards for co-creation sessions (phases and actors)

## Annex 2: Ebro Bioterritori Living Lab

### Co-creation community

For the creation of the co-creation community in Ebre Bioterritori Living Lab we have created different materials for recruitment and communication purpose.



**CLIMAS**

### Inscripció a les jornades del projecte **CLIMAS**

**CLIMAS** és un projecte europeu que es centra en el desenvolupament d'un conjunt d'eines innovadores per fer front als reptes del canvi climàtic, mitjançant la participació de la ciutadania com a element per a la resiliència social.

**Venim a participar en un procés de co-creació**, on estàs a punt d'inscriure't!!! Al llarg de les sessions construirem una caixa d'eines alternatives, a partir de projectes de ciència ciutadana, que estimulin la democràcia deliberativa a les Assemblees Climàtiques amb la finalitat d'incidir en polítiques climàtiques.

**Serà molt divertit, dinàmic i fàcil ;)**

**Què farem?**

**Sessió 1: Ciència ciutadana (15/02/2024)** – Presentarem el context de la sessió, el projecte CLIMAS, el Living labs i el procés de co-creació, així com entendrem el que és la ciència ciutadana i practicarem amb alguns exemples.

**Sessió 2: Assemblees climàtiques (29/02/2024)** – Ens endinsarem al concepte d'Assemblea Climàtica per a saber com encaixen els projectes de Ciència Ciutadana, amb els que haurem practicat al llarg de les diferents fases de l'Assemblea. El resultat serà el paquet d'eines de ciència ciutadana.

Per qualsevol pregunta, contacta amb Ferran Bertomeu ([ferran.bertomeu@eurecat.org](mailto:ferran.bertomeu@eurecat.org))

Aquest projecte ha rebut finançament europeu sota el programa de recerca i innovació Horizon Europe amb la subvenció nº 101094021.

Figure 13 - Form for inscription to the co-creation sessions in the Ebre Bioterritori Living Lab



## Participa a les jornades del projecte **CLIMAS!**

Vols passar-t'ho bé aprenent sobre **Ciència Ciutadana i Assemblees Climàtiques?**

Vols participar a la lluita per la **Resiliència Climàtica i la Justícia Social?**

**Quan?**

15 de febrer a les 18:00h  
29 de febrer a les 18:00h

**On?**

Al Living Lab Ebre Bioterritori  
Carrer Lligallo de Lorente, 3,  
43870 Amposta

**Contacta?**

[ferran.bertomeu@eurecat.org](mailto:ferran.bertomeu@eurecat.org)  
690 967 508



Inscriu-t'hi!



**CLIMAS**  
CLIMAS change citizens engagement toolbox for dealing with Societal resilience

**eurecat**  
Centre Tecnològic de Catalunya



Figure 14 - Materials for the recruitment of participants in the co-creation process in Ebre Bioterritori Living Lab

## Agenda

### Agenda

<p><b>Welcome</b> [18:00 - 18:10]</p> <p>Welcome Ebre Bioterritory Living Lab</p>	<p><b>Dimensions of citizen science projects</b> [18:50 - 19:20]</p> <p>Collaborative activity consists of evaluating the different dimensions of interest to define citizen science projects within the toolkit. We will work in two groups, one focused on a sustainable mobility project (BiciZen) and the other on a biodiversity project (Natusfera). We will give a brief explanation of the dimensions, and during the activity, we will focus on analyzing the accessibility and inclusivity dimensions of the projects.</p>
<p><b>Introduction to the CLIMAS project</b> [18:10 - 18:15]</p>	<p><b>Presentation of recommended citizen science projects and questionnaire</b> [19:20 - 19:30]</p>
<p><b>Introduction to the co-creation process</b> [18:15 - 18:20]</p> <p>Objectives of co-creation, the co-creation community, and the values of the co-creation process</p>	<p><b>Dynamic to select the different citizen science projects</b> [19:30 - 19:40]</p>
<p><b>Icebreaking – Drought Dilemma</b> [18:20 - 18:35]</p> <p>A social dilemma based on the "Collective-risk Dilemma" is presented and adapted to the current context of drought. Each person's contributions will play an important role at the end of the session.</p>	<p><b>Wrap-up</b> [19:40 - 19:50]</p> <p>What have we done today? What will we do in the next session? What will we do between the two sessions?</p>
<p><b>What is citizen science?</b> [18:35 - 18:50]</p>	

Figure 15- Agenda co-creation session on citizen science in Ebre Bioterritori Living Lab

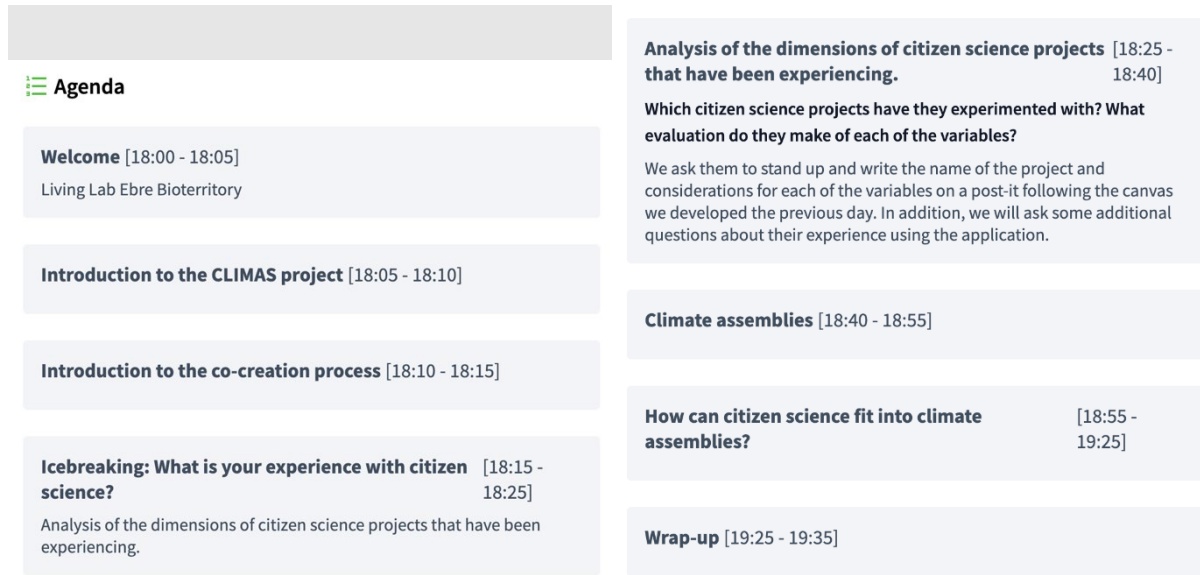


Figure 16- Agenda co-creation session on climate assemblies in Ebre Bioterritori Living Lab

## Annex 3: ECSA Conference

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### Abstract

Citizen science can be experienced as a tool for generating policy recommendations, there are plenty of examples in topics such as air quality, mental health or climate change. The emergence of climate assemblies as a form of deliberative democracy for climate change action creates a perfect framework for experimenting with citizen science, to explore its potential to bring the voice of citizens in the development of climate policies. This is the context in which the CLIMAS project takes place, with the ambition to support a transformation to climate resilience by offering a problem-oriented climate adoption Toolbox, co-designed in living labs and validated in climate assemblies.

In this workshop, participants are invited to jointly explore the role of citizen science in climate assemblies. We will begin with an introduction to the structure of a climate assembly, complemented by examples from CLIMAS. Furthermore, we will provide a comprehensive introduction to how living labs can serve as effective facilitators for the co-creation and testing process. Following the same participatory approach used in the co-creation sessions conducted within CLIMAS Living Labs, we will hold a session to discuss the potential of integrating citizen science into climate assemblies.

Finally, we will have a high-level debate on this topic with an invited speaker to wrap up the session. This session will combine learnings and practical insights into how citizen science can be effectively used in living labs and climate assemblies. It aims to generate fresh perspectives from citizen science practitioners regarding the integration of citizen science into climate assemblies to foster the creation of actionable climate recommendations.

The agenda for the workshop is organised as follows: we will provide the CLIMAS framework, followed by an introduction to climate assemblies and living labs and the methodology for testing citizen science in both climate assemblies and living labs. Collaboratively, we will discuss synergies among citizen science, climate assemblies, and living labs. Finally, we will have a high-level discussion with an invited speaker, concluding with a wrap-up and key takeaways. The outcomes of the workshop are expected to be incorporated into the CS Toolkit developed in the CLIMAS project and, subsequently, into future climate assemblies.

## Annex 4: Analysis of relevant topics from climate assemblies participatory processes

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In this section we present the analysis performed on data from the Citizen Climate Assemblies of Catalonia<sup>27</sup> and Barcelona<sup>28</sup>; we collected data from their respective participative processes on the Decidim participation platform, in the form of proposals (proposed by citizens or organizations) and interactions around the proposals, including comments, endorsements, and number of followers of each proposal. The dataset includes 59 proposals for Catalonia, and 37 for Barcelona.

We applied topic modelling to identify the main topics from each of the two participation processes and analysed the amount of interactions received by the proposals on each topic identified, to get an idea of the topics that received the most attention, not only in terms of numbers of proposals, but also according to different kinds of interactions.

We tested different models including two Bayesian models, namely Latent Semantic Analysis (LSA) and Latent Dirichlet Allocation (LDA), and the BERTopic<sup>29</sup> topic modelling technique. We evaluated the results of the three models in terms of the coherence of the topics identified through the Normalised Pointwise Mutual Information (NPMI), obtaining much better results for BERTopic (0.740) than for LSA (0.190) and LDA (0.217). Therefore, we adopted BERTopic for extracting the topics and obtaining the results shown below for the two assemblies (at the regional and municipal levels).

The topics that emerged for the Citizen Climate Assemblies of Catalonia are shown in Figure 17, with the number of proposals per each topic; apart from the first topic, which includes words related to the Assembly and participation process itself, we find the following topics, in decreasing order of the number of proposals: water and buildings, CO2 and climate change, transport, food and farmers, energy and renewables, trees and plants, and *resources and consumption*.

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<sup>27</sup> <https://participa.gencat.cat/processes/assembleaclima>

<sup>28</sup> <https://www.decidim.barcelona/processes/AssembleaClima>

<sup>29</sup> <https://github.com/MaartenGr/BERTopic/>



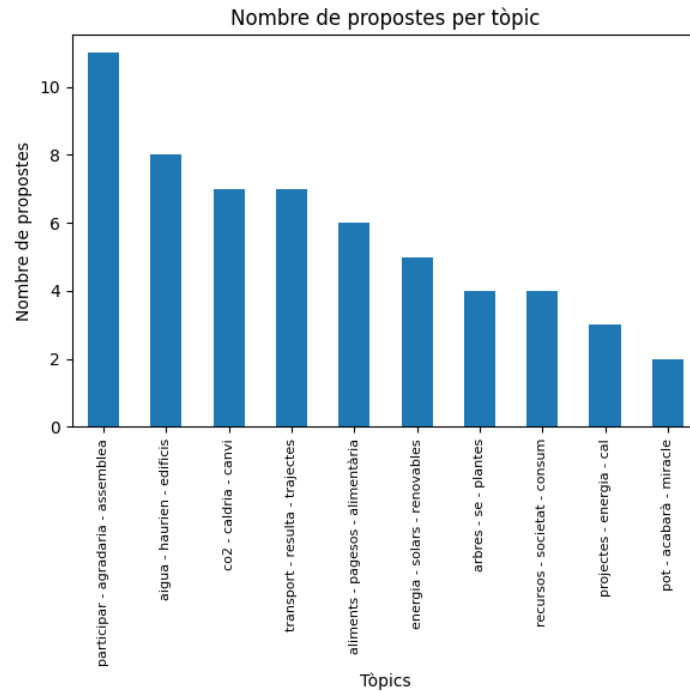


Figure 17 - Number of proposals per topic (Citizen Climate Assembly of Catalonia)

Looking at the number of comments received by the proposals on each topic, i.e. aggregating proposals by topic, we find that *transport* is the topic that generates more debate (Figure 18), while looking at all kinds of interactions, including endorsements and “following”, we find that *water and buildings*, followed by *food* and *transport* (Figure 19).

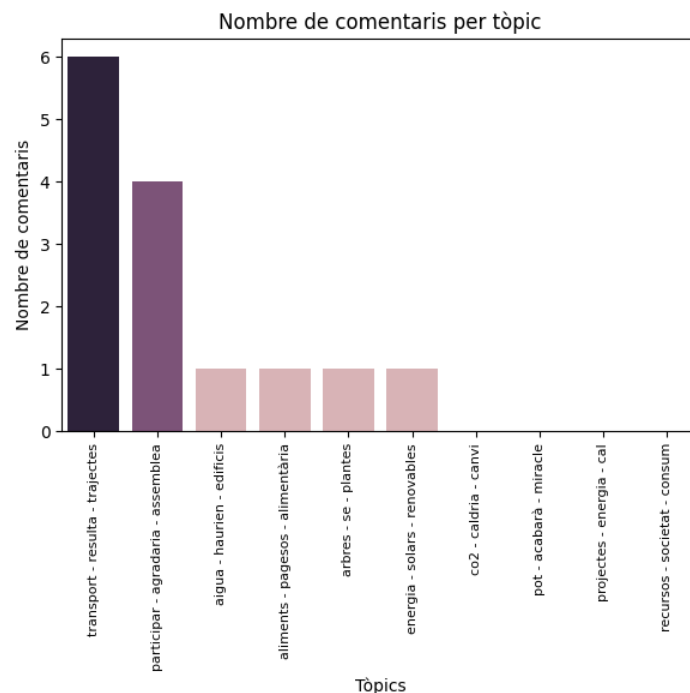


Figure 18 - Number of comments per topic (Citizen Climate Assembly of Catalonia)

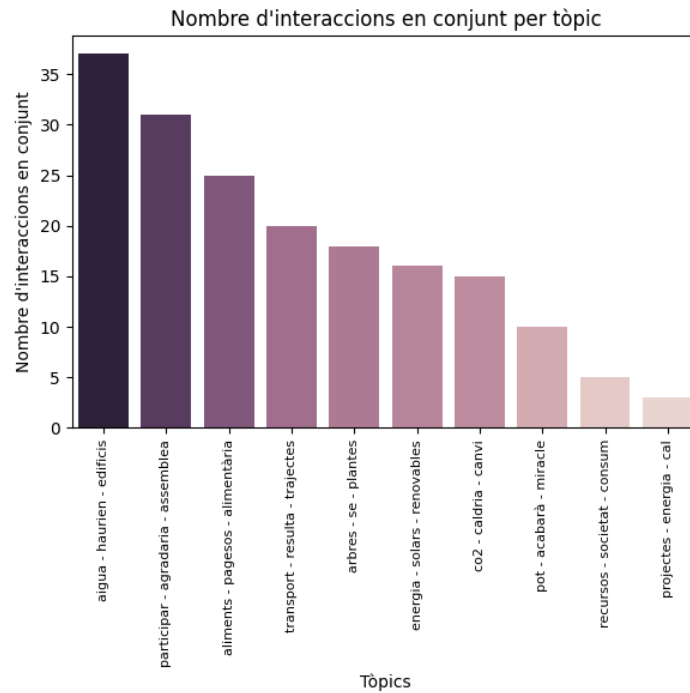


Figure 19 - Number of overall interactions per topic (Citizen Climate Assembly of Catalonia)

For the Citizen Climate Assembly of Barcelona, proposals were already manually assigned to three main categories: *consumption and waste*, *energy*, *mobility and infrastructures*. In Figure 20 we show the number of proposals by category, showing proposals that were accepted, rejected, or still under evaluation in different colours. The three categories have similar numbers of proposals; however, the *energy* category has a much higher number of accepted proposals.

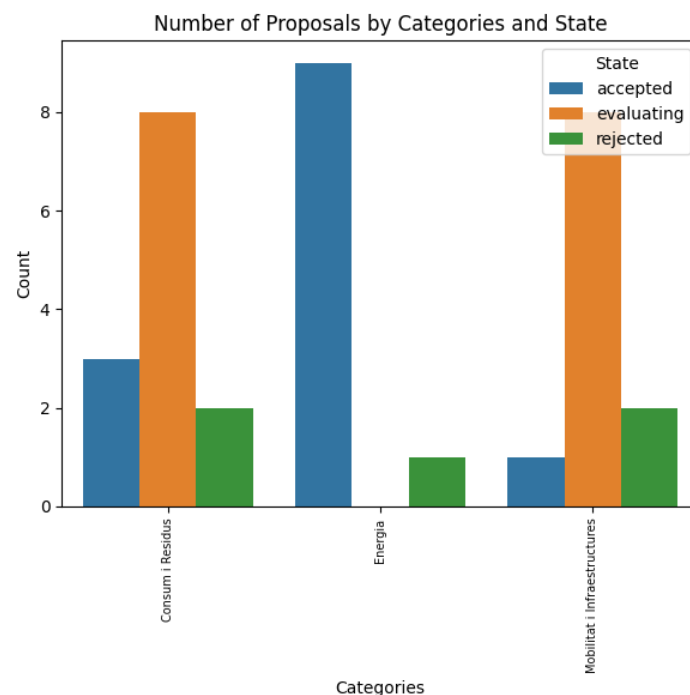


Figure 20 - Number of proposals per category and status (Citizen Climate Assembly of Barcelona)

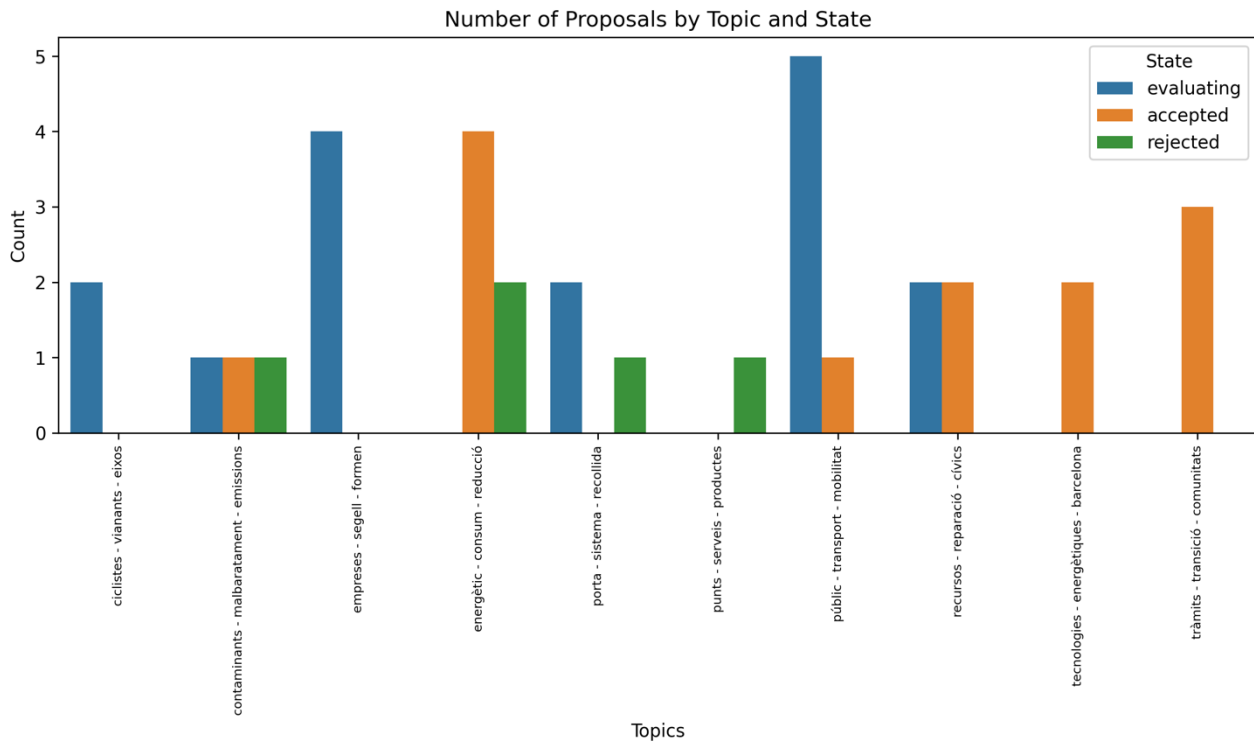


Figure 21 - Number of proposals per topic and status (Citizen Climate Assembly of Barcelona)

In Figure 21 we show the results obtained with topic modelling, again with the proposals divided by status. From left to right, we see the following topics:

- *Cyclists, pedestrians*
- *Pollution, emissions*
- *Enterprises*
- *Energy, consumption, reduction*
- *Collection system, door*
- *Services, products*
- *Public transport, mobility*
- *Resources, repair, civic*
- *Energetic, technologies*
- *Transition, communities*

The highest number of accepted proposals is on the topic related to energy, consumption, *and reduction*.

# Annex 5: Contents of the initial version of the Citizen Science Toolkit

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## Introduction

### Purpose and scope of the Citizen Science Toolkit

The *Citizen Science Toolkit for Climate Assemblies* serves as a comprehensive resource for organisations, communities, and participants in climate assemblies who are interested in introducing the power of citizen science in different parts of the deliberative process. By combining the principles of citizen science and the methodologies of climate assemblies, this CS Toolkit aims to facilitate collaborative efforts towards climate action, research, and policy development. Mainly, this CS Toolkit aims to present a collection of citizen science projects that can be used in different phases of a climate assembly and for different actors of the assembly.

### Who is the Citizen Science Toolkit for?

This CS Toolkit can be used by different stakeholders that are part of the climate assemblies:

- **Organizers** can use the CS Toolkit as a comprehensive guide to integrate citizen science into the core of climate assemblies. They will find a variety of activity ideas to facilitate during the assembly, as well as a list of researchers, communities, and organisations that can provide expert guidance and recommendations stemming from citizen science initiatives.
- **Civic organisations** can leverage the CS Toolkit to identify citizen science projects that provide concrete evidence of local issues. This evidence can shape the framing of the climate assembly and support follow-up actions. The CS Toolkit also offers strategies for organising initiatives to monitor the impact of implemented measures.
- **Citizens** participating in climate assemblies can use the CS Toolkit to engage meaningfully with citizen science projects. During the assembly, organisers can provide the CS Toolkit to citizens, who will find strategies to self-organize and create activities. Additionally, the public, including those not part of the assembly, can perform citizen science activities to monitor the impact of implemented measures.

## Climate Assemblies

### What are climate assemblies?

Climate assemblies are citizen assemblies that address the challenge of climate change through deliberative democracy. Deliberative democracy is an inclusive form of governance that facilitates decision-making based on collective debate and dialogue, aiming for consensus among participants.



Citizens' assemblies are the most well-known example of deliberative democracy. They involve a diverse group of individuals from civil society, making decisions that impact policies. These assemblies bring together people who reflect and represent society. The assembly deliberates, allowing participants to express their opinions based on the experiences and knowledge they have acquired throughout the process. The goal is to generate recommendations for political decision-making.

### **Why does society need climate assemblies?**

Climate assemblies emerged in response to two crises: the breakdown of traditional political representation in Western democracy and the climate crisis, which often tends to be a polarised debate. Climate assemblies aim to:

- Contribute to the development of climate action policies,
- Implement mitigation and adaptation strategies for climate change,
- Develop recommendations to improve policies, and
- Review and adapt existing policies.

The fundamental objective of these assemblies is to develop, improve, or adapt policies related to climate action, incorporating the voices of all societal groups. Short election cycles often prevent us from addressing long-term climate change issues. A climate assembly can provide a solid social mandate by:

- Proposing long-term solutions,
- Designing strategies, and
- Ensuring social equity by including the representation of different societal groups.

### **What phases do climate assemblies have?**

1. Framing the assembly: Identifying and elaborating on the main challenges to be deliberated during the assembly process and forming various working groups.
2. Learning: Experts share knowledge from different perspectives. Participants develop their criteria to position themselves around the challenges.
3. Deliberation and Preparation of Recommendations: Participants deliberate together, and recommendations are drawn up with maximum consensus, which will then be provided to policymakers.
4. Follow-up of Recommendations: Some assembly members join the follow-up group to monitor how citizen recommendations are implemented in public policies.

### **What are the actors involved in climate assemblies?**

Several actors participate in climate assemblies, organised into different working groups based on their functions:

- Representatives of different interests (stakeholders)
- Experts on climate, deliberative democracy, and policy
- Civil servants of the institution commissioning the assembly
- Citizens participating in the assembly



Additionally, there are content groups, steering (or core) groups, and follow-up groups.

### **How do climate assemblies work?**

Public institutions usually commission climate assemblies. Governments typically formulate the assembly and guide learning, deliberation, and recommendation processes.

To function effectively, the assembly must have a straightforward question (often framed as a dilemma) to guide citizens' positions and answers. Assemblies are usually held over several weekends.

At the outset, the commissioning institutions explain how they will respond to the citizens' recommendations, usually including a public response detailing how the assembly's results will be addressed.

Climate assemblies can serve as solid governance structures independent of the commissioning institution or specific economic interests. They are usually meticulously planned to ensure participants have ample time to formulate recommendations to the posed challenges. The assembly may be divided into smaller working groups to address various aspects of climate policy.

## **Citizen Science Projects**

### **Marine Litter Watch**

- Project name: Marine LitterWatch
- Project description: Marine LitterWatch is a citizen science project developed by the European Environmental Agency (EEA) to tackle marine litter.
- Objective: The project's main objective is to fill data gaps on marine litter for EU marine environmental policy (the Marine Strategy Framework Directive) by involving citizens in its collection and monitoring.
- Topics: environmental health, marine litter
- What does it consist of? To combat the plastic litter problem, communities collect litter from beaches and send data on the items found to the EEA.
- Requirements [Knowledge, Tools and Materials]:
  - Participants should be familiar with the diversity of marine litter items. Even so, the project applications inform on the typologies of litter items and use the website or mobile applications to submit the survey with the observations.
  - Digital tools, like a mobile app or access to the website, are recommended to upload the data collected.
  - Gloves, boots, and bags to collect the litter are recommended
- Language: EN
- Place: Global
- Web: <https://marinelitterwatch.discomap.eea.europa.eu/>

**Inclusivity and accessibility of the tools and materials:**

- Citizen's involvement: Is there a clear description of the expectations from citizens and the benefits of their involvement in the project?
- Equitable use: Are the tools and materials equitable (helpful to people in all their diversity)?
- Flexibility in use: Can the project be accommodated for a wide range of individual preferences and capabilities?
- Simple and Intuitive Use: Is the project understandable, regardless of the user's experience, knowledge, language skills, or current concentration level?
- Clear content: Does the project promote clear content and intuitive graphics?
- Perceptible Information: Does the project communicate necessary information effectively to the user?
- Tolerance for Error: Does the project admit accidental or unintended actions?
- Low Physical Effort: Can the project be used efficiently, comfortably, and with minimal fatigue?
- Size and Space for Approach and Use: Can the project be carried out in an appropriate size and space, reach, manipulation, and use regardless of the user's body size, posture, or mobility?
- Social, spatial, and economic inclusiveness: Will the project activities provide equal opportunities for all social groups to access digital mobility services?
- Security and protection of data: Does the project protect digital information from unauthorised access?

**How can the project and its related activities contribute to climate action?**

Preserving and enhancing marine resilience, especially for vulnerable habitats, is crucial in combating climate change and human impacts. However, the lack of long-term data often undermines confidence in resilience assessments. Integrating climate change and marine litter into resilience frameworks enables more effective actions to be implemented (Lincoln et al. 2022)

**What activities can be conducted within the climate assembly?**

- [Framing or Organization phase] Detecting ongoing citizen science activities within the community by identifying organisations, researchers, or communities engaged in relevant actions, such as MLW (Marine et al.), to include them in the regular programme.
- [Framing or Organization phase] Address citizen concerns by identifying existing citizen science projects, like MLW, to pinpoint areas most impacted by litter, thus effectively addressing community concerns.
- [Learning Phase] Inviting citizen scientist testimonials and deploying citizen science actions from the project into deliberative democracy processes can inspire, empower, engage, and foster participation in the assembly while enriching knowledge and experience in a bottom-up manner.

- [Learning Phase] Facilitating knowledge sharing through presentations of previous research, citizen science workshops, testimonials, or collective actions, such as litter sampling or data collection during the assembly.
  - Engaging a core group of (citizen) scientists from MLW to share knowledge and experiences with assembly participants.
  - Engaging a core group from the climate assembly for performing an MLW action to share bottom-up and experiential knowledge with the rest of the assembly participants.
- [Learning Phase] Offering visual representations of data collected through MLW to enhance understanding and accessibility of citizen science findings and performing an activity around the visuals.
- [Learning Phase] Integrating citizen science projects into public spaces during climate assemblies. Encourage public institutions like libraries, schools or civic centres to introduce citizen science projects like MLW related to the climate topics discussed in the assembly and incorporate their insights into the assembly.
- [Recommendations Phase] Utilizing outcomes of citizen science projects for policymaking and expert guidance. Incorporate recommendations from projects like MLW, based on evidence collected by citizen scientists, into policy decisions and expert assessments.
- [Follow-up phase] Establishing citizen observatories to monitor the effectiveness of public measures. Citizens can now monitor the impact of public measures, such as litter control efforts on coastlines, through citizen observatories previously established or created ad hoc in the last phase of the assembly.
- [Follow-up phase] Providing updates on policy implementation based on evidence and monitoring changes in litter levels. Inform assembly participants about policy implementation progress and monitor litter level changes to assess the measures' effectiveness, particularly in coastal areas.

## Who can use it?

[Organizers] [Experts] [Civil society] [Citizens]

**Developed by:** The European Environment Agency has developed Marine LitterWatch to strengthen Europe's knowledge base and thus support European policy making.

## Links of interest

<https://www.eea.europa.eu/publications/european-marine-litter-assessment/from-source-to-sea-the>

<https://www.eea.europa.eu/publications/european-marine-litter-assessment/outlook-and-recommendations>

<https://www.eionet.europa.eu/etcs/etc-icm/products/etc-icm-reports/etc-icm-report-5-2022>



## Similar projects

Marina Conservative Society – <https://www.mcsuk.org/>

## References

Lincoln, S., Andrews, B., Birchenough, S. N., Chowdhury, P., Engelhard, G. H., Harrod, O., ... & Townhill, B. L. (2022). Marine litter and climate change: inextricably connected threats to the world's oceans. *Science of The Total Environment*, 837, 155709. <https://www.sciencedirect.com/science/article/pii/S0048969722028054>

## Marine LitterWatch Card

This is the lo-fi prototype on the project card for Marine LitterWatch for testing in Chios.

### Marine LitterWatch

Το **Marine LitterWatch** είναι ένα πρόγραμμα Επιστήμης των Πολιτών (ΕτΠ) για την αντιμετώπιση του προβλήματος των θαλάσσιων απορριμμάτων.

Ο κύριος στόχος του έργου είναι η συμπλήρωση δεδομένων σχετικά με τα θαλάσσια απορρίμματα στα πλαίσια εφαρμογής της θαλάσσιας περιβαλλοντικής πολιτικής της Ευρωπαϊκής Ένωσης (Κοινωνική Οδηγία για τη Θάλασσα Στρατηγική - Marine Strategy Framework Directive) με τη συμμετοχή των πολιτών τόσο στο στάδιο της συλλογής απορριμμάτων όσο και στην παρακολούθηση του προβλήματος.

**Τι γίνεται κατά την δράση;**

Οι πολίτες συλλέγουν απορρίμματα από τις παραλίες και στέλνουν στον ΕΟΠ δεδομένα για τα είδη απορριμμάτων που βρέθηκαν.

**Δράσεις για το κλίμα. Πως συνεισφέρει το έργο;**


- Η διατήρηση και η ενίσχυση της ανθεκτικότητας των θαλάσσιων οικοσυστημάτων, ειδικά για ευάλωτα ενδιαιτήματα όπως η Μεσόγειος, είναι ζωτικής σημασίας για την καταπολέμηση της κλιματικής αλλαγής.
- Η έλλειψη δεδομένων συχνά υπονομεύει την αξιολόγηση της ανθεκτικότητας των οικοσυστημάτων.
- Η ενσωμάτωση της κλιματικής αλλαγής και των θαλάσσιων απορριμμάτων επιτρέπει την εφαρμογή πιο αποτελεσματικών δράσεων για την ενίσχυση της ανθεκτικότητας των θαλάσσιων οικοσυστημάτων (Lincoln et al. 2022).

**Απαιτήσεις**

- Εξοικείωση συμμετεχόντων με τα είδη των θαλάσσιων απορριμμάτων. Περαιτέρω πληροφορία για τους τύπους των απορριμμάτων βρίσκεται στην ιστοσελίδα του Marine LitterWatch.
- Εξοικείωση των συμμετεχόντων με τη χρήση ψηφιακών εργαλείων, όπως είναι η σχετική εφαρμογή για κινητά ή η πρόσβαση στον ιστότοπο του Marine LitterWatch προκειμένου να υποβάλουν τα είδη απορριμμάτων που συνέλεξαν.
- Συνιστώνται γάντια, μπότες και σακούλες για τη συλλογή των απορριμμάτων όπως και έντυπη λίστα με τα κυριότερα είδη θαλάσσιων απορριμμάτων.

**Γλώσσα**    Αγγλικά


**Τόπος**        Παγκόσμια κλίμακα




Συμμετοχή των πολιτών	☆☆☆☆☆
Δίκαιη χρήση	☆☆☆☆☆
Ευελξία στη χρήση,	☆☆☆☆☆
Απλή και διαισθητική χρήση	☆☆☆☆☆
Ξεκάθαρο περιεχόμενο	☆☆☆☆☆
Κατανοητές πληροφορίες	☆☆☆☆☆
Ανοχή για Σφάλμα	☆☆☆☆☆

# Δημόσια υγεία  
# Θαλάσσια απορρίμματα


2



11



14



**Πληροφορίες για το Marine LitterWatch**  
<https://marinelitterwatch.discomap.eea.europa.eu/>

**Παρόμοια ερευνητικά έργα**  
Marina Conservative Society – <https://www.mcsuk.org/>

**Αναπτύχθηκε από:**  
Ο Ευρωπαϊκός Οργανισμός Περιβάλλοντος (ΕΟΠ) ανέπτυξε το έργο Marine LitterWatch για να ενισχύσει το γνωσιακό υπόβαθρο της ΕΕ και να παρέχει υποστήριξη στη χάραξη πολιτικών για τα απορρίμματα.


 This project has received funding from European Union's Horizon Europe under Grant Agreement N° 101094021

Figure 22 - Marine LitterWatch citizen science card project description

### Δραστηριότητες που μπορεί να υλοποιηθούν κατά τη διάρκεια της κλιματικής συνέλευσης

#### Οργάνωση

- Εύρεση ενεργών δράσεων που σχετίζονται με την ΕτΠ (Επιστήμη των Πολιτών) στην περιοχή που πραγματοποιείται η Κλιματική Συνέλευση μέσω του εντοπισμού οργανισμών, ερευνητών ή φορέων που εμπλέκονται σε σχετικές δράσεις, όπως το έργο MLW (Marine Litter Watch), ώστε να συμπεριληφθούν στο πρόγραμμα της συνέλευσης.
- Αντιμετώπιση των ανησυχιών των πολιτών μέσω εύρεσης επιστημονικών έργων, όπως το MLW, προκειμένου να εντοπιστούν οι περιοχές που επηρεάζονται περισσότερο από τα ακουπιδία, ώστε να αντιμετωπιστούν αποτελεσματικά οι ανησυχίες της κοινότητας.

#### Μάθηση

- **Μαρτυρίες πολιτών καθώς και δράσεις του έργου** μπορούν να τεθούν σε διαβούλευση με σκοπό την εμπνευση, την ενδυνάμωση και προώθηση της συμμετοχής των πολιτών στη συνέλευση και τον εμπλουτισμό γνώσεων και εμπειριών από κάτω προς τα πάνω (bottom-up).

[1] From source to sea — The untold story of marine litter  
[2] Outlook and recommendations  
[3] ETC/ICM Report 5/2022: Marine Litter in Europe - An integrated assessment from source to sea  
Lincoln, S., Andrews, B., Birchenough, S. N., Chowdhury, P., Engelhard, G. H., Harrod, O., ... & Townhill, B. L. (2022). Marine litter and climate change: inextricably connected threats to the world's oceans. Science of The Total Environment, 837, 155709.

- Η ανταλλαγή γνώσεων κατά τη συνέλευση διευκολύνεται μέσω παρουσιάσεων προηγούμενων μελετών, ημερίδων σε θέματα επιστήμης των πολιτών, μαρτυριών ή συλλογικών ενεργειών, όπως είναι η συλλογή απορριμμάτων και η καταγραφή ή δεδομένων.
- Παρουσίαση των ιδίων των απορριμμάτων που συλλέγονται στα πλαίσια των δράσεων του MLW προκειμένου να γίνει πιο κατανοητό το είδος των υλικών και το μέγεθος του προβλήματος. Μπορείτε επίσης να πραγματοποιηθεί μια δραστηριότητα με αυτά τα υλικά (πχ κατασκευή έργων τέχνης).
- Προώθηση της συμμετοχής δημόσιων φορέων (π.χ. βιβλιοθήκες, σχολεία, κ.ά.) σε έργα ΕτΠ και πραγματοποίηση δράσεων σε δημόσιους χώρους στα πλαίσια των κλιματικών συνελεύσεων. Ενθάρρυνση δημόσιων ιδρυμάτων όπως βιβλιοθήκες, σχολεία κ.ά. να πραγματοποιούν έργα ΕτΠ όπως το MLW που σχετίζονται με το περιβάλλον και να ενσωματώσουν στη συνέχεια τις γνώσεις τους στη συνέλευση.

#### Προτάσεις

- Αξιοποίηση των αποτελεσμάτων από έργα ΕτΠ για χάραξη πολιτικής και καθοδήγηση των ειδικών. Ενσωμάτωση προτάσεων από έργα όπως το MLW, που βασίζονται σε στοιχεία που συλλέγονται από επιστήμονες πολίτες, στις αποφάσεις πολιτικής και στις αξιολογήσεις των ειδικών [1-3].

#### Παρακολούθηση

- Δημιουργία παρατηρητήριων πολιτών για την παρακολούθηση της αποτελεσματικότητας των κρατικών μέτρων. Δίνεται η δυνατότητα στους πολίτες να παρακολουθούν τον αντίκτυπο των κρατικών μέτρων, όπως είναι οι προσπάθειες ελέγχου των απορριμμάτων στις ακτές, μέσω παρατηρητήριων πολιτών που είχαν προηγουμένως δημιουργηθεί ή θα δημιουργηθούν στην τελευταία φάση της συνέλευσης.
- Παροχή ενημερώσεων για την υλοποίηση πολιτικών μέτρων με βάση στοιχεία και παρατηρούμενες αλλαγές στα επίπεδα απορριμμάτων. Ενημέρωση των συμμετεχόντων στη συνέλευση σχετικά με την πρόοδο εφαρμογής των πολιτικών μέτρων και παρακολούθηση των αλλαγών στα επίπεδα απορριμμάτων για την αξιολόγηση της αποτελεσματικότητας των μέτρων που εφαρμόζονται, ιδιαίτερα στις παράκτιες περιοχές.

#### Σε ποιους απευθύνεται

- [Διοργανωτές]
- [Εμπειρογνώμονες]
- [Κοινωνία των Πολιτών]
- [Πολίτες]

Figure 23 - Marine LitterWatch citizen science card activity description

## BiciZen

- Project description: BiciZen is a collaborative platform aiming to make cities and regions bikeable. BiciZen is a mobile phone app that allows users to crowdsourcse information about their cycling experiences, suggest improvements to cycling infrastructure, and report positive cycling experiences. BiciZen is open to concerned cyclists, city planners, and researchers who wish to document and study cycling phenomena, including patterns of bicycle flows or participation in cycling events. The data collected on the BiciZen platform will provide a historical record of cycling incidents, events, and commentary that can be consulted by all stakeholders and help advance co-creation and citizen science in the realm of active travel and bicycle mobility.
- BiciZen is open and accessible and can be used by any organisation or group to document the cycling issues they have in their city. It can be used in any city in the world.
- Objective: BiciZen aims to make cities more bike-friendly. The collaborative platform allows cyclists to share information, build community, inform local decision-makers about the conditions of the bicycle network and generate new knowledge that would not be possible working alone.
- What does it consist of? BiciZen launched in June 2023, and the platform has received 6.307 contributions from more than 200 users. Users are able to report information about their everyday cycling experience: conflicts with other users, obstructions in bicycle lanes, inadequate urban design, full bicycle parking locations, or bicycle theft. BiciZen is an open tool that cities can use to document the conditions of urban cycling in their area. It also

serves as a platform for cycling organisations to highlight issues not receiving the attention they need. For example, cycling activists in Sant Cugat currently utilise BiciZen to document the invasion of motor vehicles in bicycle lanes. As an ephemeral phenomenon that can disappear instantly, the BiciZen platform helps capture the frequency and timing of these bike lane invasions. Citizen scientists are also using it to document bicycle thefts. BiciZen allows users to report stolen bicycles and provides researchers with data on this understudied phenomenon.

- Language: English, Spanish, Catalan, Dutch, Portuguese and Finnish (soon in French and German)
- Place / Influence: Worldwide / Local

**Developed by:** Institut de Tecnologia i Ciències Ambientals (ICTA-UAB)

#Bikability #BicycleLanes #BicycleTheft #BicycleParking #HappyCycling

#### **Inclusivity and accessibility of the tools and materials**

- Citizen's involvement
- Equitable use
- Flexibility in use
- Simple and Intuitive Use
- Clear content
- Perceptible Information
- Tolerance for Error
- Low Physical Effort
- Size and Space for Approach and Use
- Social, spatial and economic inclusiveness
- Security and protection of data

#### **How can the project and its related activities contribute to climate action?**

The project can help detect citizens' demand for active mobility. Many ride a bike to reduce their transportation-related emissions. Cities must shift transportation choices to non-motorized modes, such as walking and cycling. To make this shift, we need to improve the experience of active travellers (cyclists and pedestrians). The BiciZen platform can identify specific needs and concerns among the cycling community to improve the cycling network and encourage more active transportation. The BiciZen platform can capture concerns through the open comment function in the platform.