

REACH OUT

shaping climate resilient cities



D1.6 Lessons learnt report on uptake and cross case learning

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Summary

The REACHOUT project, funded by the European Union’s Horizon research program, is dedicated to co-developing tools and climate services that support European cities to adapt to climate change and build resilience. Drawing on experiences from seven cities of varying sizes—Lillestrøm, Cork, Gdynia, Logroño, Milan, Athens, and Amsterdam, this report outlines key lessons learned from the project, particularly focusing on factors for successful uptake of climate services.

The concept of “uptake” in this report refers to how cities use and integrate climate services into their decision-making and planning processes. Uptake can take different forms. Some cities incorporated results from the tools into official policy documents, while others have used them to support internal discussions, planning processes, or cross-departmental collaboration. In some cases, municipalities have committed to long-term use of the tools, training staff and embedding them into city operations.

To evaluate the uptake of the tools and climate services co-developed within REACHOUT two main tracks were followed. The first was a scientific track, which involved PhD research on defining and measuring the success of climate services, including the development of an evaluation framework. The second track was a practice-oriented approach, which involved surveys and interviews with all participating cities. Through these efforts, feedback was gathered about enablers and barriers for uptake of climate services, as well as generalizable success factors could be distilled.

Cities demonstrated successful uptake of REACHOUT’s tools and climate services in various ways. Some cities reported an improved understanding of climate risks and adaptation options. In other cases, the project facilitated increased collaboration across city departments. Beyond internal collaboration, some cities also leveraged climate services to engage the public. Other cities successfully integrated the results of climate tools into official policy documents and strategic plans. Additionally, some cities took steps to ensure the long-term use of these tools by training staff and building local capacity.

Despite these successes, cities faced challenges in the uptake of climate services. Many cities struggled with data requirements, as certain tools depended on access to high-quality local data, which was not always easy to obtain for cities. Limited time and resources also posed challenges, with city staff often having competing priorities that made it difficult to dedicate time to co-developing the tools. Political and administrative barriers further complicated uptake, particularly when changes in local government disrupted continuity. Language barriers also played a role, as tools that were not available in local languages proved harder for city staff and stakeholders to use effectively.

From these experiences, several key lessons emerged on how to improve the uptake of climate services. An example of such a lesson is the early engagement with stakeholders. Involving municipal staff, policymakers, and decision-makers from the beginning better ensures that tools are tailored to local needs and that key users understand their benefits and are committed to the project. Policy integration is also key to success. When climate services are aligned with existing municipal priorities and included in policy frameworks, they are more likely to be used in decision-making. Another critical factor is ownership. Cities should designate a dedicated individual or team to take ownership of a tool, ensuring its continued use beyond the initial project period. These lessons learned, together with the evaluation framework for success can be used as guiding principles in future projects about climate services co-development.

In conclusion, the REACHOUT project has provided valuable insights into both the theoretical and practical aspects of successful climate service uptake. The project has demonstrated that climate services can be highly valuable, but their success depends on early and effective user involvement, capacity building, and strategic policy alignment. By incorporating the lessons learned into future projects, the uptake of climate services can be improved to ensure that they lead to meaningful, lasting improvements in climate resilience.

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1 Introduction

The European Horizon REACHOUT project is co-developing climate services within city hubs across Europe. The next generation climate services are enablers of improved analysis and understanding of impacts at local scales, while also bringing forward ambitions for adaptation and identifying associated measures for implementation. These climate services are enablers of transformations towards climate resilient cities.

The REACHOUT project aims to enhance the uptake and success of climate services, bridging the last mile, through co-developing tailored tools to boost urban resilience. It collaborates with a diverse group of European cities, bringing together stakeholders to co-develop innovative solutions. The cities within REACHOUT represent a varied portfolio of characteristics, differing in size, adaptation needs, and capabilities. The project includes four smaller cities (Lillestrøm, Cork, Gdynia, and Logrono) and three larger cities within Europe (Milan, Athens, and Amsterdam).

The REACHOUT project embraces and supports three key adaptation activities: 'Analysis', 'Ambition', and 'Action' (Triple-A). Recognizing the diverse needs and demands of the cities, the REACHOUT Triple-A Toolkit has been co-developed as a comprehensive and flexible set of resources to help communities understand climate-related risk (Analysis), identifying goals and future visions coupled with the identification of adaptation options (Ambition) and identify next steps for implementation to build resilience (Action). The resources in the Triple-A toolkit encompass not only technical tools, but also 'soft' tools to activate cities and engage a wide variety of stakeholders in the co-creation process of the next generation of climate services.

1.1 Uptake of climate services in the REACHOUT context

The cities' progress on their urban resilience journeys is influenced by the uptake of the tools and climate services co-developed as part of the Triple-A Toolkit. The uptake of tools and climate services by stakeholders, including municipalities, remains a challenge throughout Europe. Although progress is visible over the last decades, many tools and services still lack wider uptake and remain not fit-for-purpose (Findlater et al., 2021; Jacobs et al., 2020). Therefore, it is critical to understand what we mean by uptake, and how we can surface the main factors for successful uptake of climate services, particularly reflecting on the lessons learnt within the REACHOUT project as part of this deliverable.

We take a broad view of the 'uptake' of tools and services, seeing it as encompassing any desired outcomes from their development or use to support cities in advancing their adaptation efforts. The meaning of advancing adaptation efforts varies for each city, as they face different challenges and operate within unique contexts. For one city, the next step in adaptation might involve enhancing internal collaboration, while for another, it could mean formulating an adaptation strategy. As a result, 'uptake' can take on many different forms. Examples of the uptake of tools and climate services within the REACHOUT project are:

- Cities use the outcomes of a tool in a planning or policy document;
- Cities use (or express their intention to use) a tool to support an adaptation related process. For example to foster discussions among departments or other relevant stakeholders. Or to support the planning and implementation or adaptation measures;

- Cities adopt a tool for long-term use (or express their intention for it). For example, by promoting it as a resource for use by city staff and building the capacity to use it.

Taking these examples of uptake of tools and climate services in consideration, this deliverable presents a framework for evaluating the success of climate services. In addition, we assess the uptake of climate services product applications within the REACHOUT project and evaluate its success and identify enablers and barriers for uptake. Finally, we draw key learning for generalizable factors for successful climate services co-development and product uptake and impact.

In this context, we defined four main aims for this deliverable:

- 1). Present a framework for evaluating the success of climate services;
- 2). Compare uptake of climate services across REACHOUT cases;
- 3). Describe enablers and barriers of successful uptake of climate services;
- 4). Key learning and generalizable factors for successful climate service co-development and product uptake and impact.

The co-development process within the REACHOUT project is crucial for the uptake of tools and climate services. For this deliverable we recognize co-development is pivotal and take the main aspects of co-development along. For a more in-depth discussion of co-development we refer to the Deliverable: “*Findings from Hub Engagement activities*” (D1.7).

In addition, we identify two main different timescales of uptake, the first concerns the uptake during the project, and the second is uptake beyond the project. This deliverable primarily centres around uptake during the project but will also touch on uptake beyond the lifetime of the REACHOUT project. In this deliverable we specifically draw lessons beyond one case-study and take a comparative approach between city hubs and co-produced tools.

2 Key methods and approaches

This report draws on results from two parallel tracks focusing on evaluating and understanding the uptake of climate services within the REACHOUT project: 1) a scientific track and 2) a practice-oriented track. The scientific track involved scientific research on questions related to defining and evaluating the success of climate services for adaptation as part of a PhD research. This research aimed to increase clarity on the diverging views of a successful climate service and develop a scientifically sound approach for evaluation. REACHOUT cases are used to support this. The practice-oriented track included a set of ongoing evaluation activities as part of all REACHOUT working processes, such as using agile and iterative development cycles, carrying out regular evaluation surveys and conducting interviews with city representatives. The next sections detail the approaches and methods used.

Track 1: scientific research

2.1 Mixed research methods for defining and evaluating success

How can climate service success be defined, conceptualized, and evaluated? This is the central question of PhD research that was partly carried out in context of the REACHOUT project. Various approaches were taken to answer this question, including doing a systematic literature

review and carrying out a Delphi study with experts to develop a success definition. A Delphi study uses multiple iterations of 'dispersed discussion' (in this case, three survey rounds) to explore areas of agreement between experts. Based on outcomes of the two studies and reviewing best practices from scientific literature, an evaluation framework for climate services was developed. This evaluation framework was developed, tested, and evaluated in the REACHOUT project. The methods and results of the aforementioned studies are further detailed in Chapter 3 Defining and evaluating success.

Track 2: practice

2.2 Stocktaking survey

To better understand the needs, requirements, and general context of the cities, a stock-taking exercise was carried out at the start of the project. This involved completing an extensive survey by the city representative(s) supported by their city liaisons, through interviews and group discussions. The survey included topics such as stakeholder mapping, physical and socio-economic context, needs assessment and adaptation challenges, policy framework, and barriers and factors related to adaptation and climate services. Most relevant for the report are those questions focused on barriers for using climate services as experienced by the city representative and the factors they consider defining the success of climate services for their city as developed within REACHOUT. They provide a baseline of their experiences and wishes related to the uptake of climate services.

2.3 Longitudinal survey

An annual longitudinal evaluation survey was developed to monitor and evaluate the co-production process and final outcomes of the REACHOUT project. The longitudinal survey provides insights for each co-production cycle to support learning and draw up the lessons learned for co-production, uptake and barrier/enablers for climate services broadly. The longitudinal survey was completed by the city hub representatives with support of their liaisons between September and November each year, respectively in 2022 (Y1), 2023 (Y2) and 2024 (Y3). Most cities provided responses to every survey.

The survey encompassed three main parts with open questions only. The survey started with a few overarching questions about general experiences and challenges. The second part of the survey centered around stocktaking questions on ambitions and success of climate services. The third part delved into the experiences regarding the co-creation of tools, including enablers, barriers, and uptake.

2.4 City representative interviews

Semi-structured in-depth interviews were carried out with each of the city representatives at the end of the project (November & December 2024) to reflect on three years of climate service development and use. The city representatives were commonly based in municipal departments that were leading on climate action, and encompassed both senior and executing staff members. Based on earlier reflection meetings and documents, visual overviews were developed for each city, outlining:

- the **tools and services** the city worked on
- **results** of developing and/or using the services – *i.e. any reported use or benefit*
- supporting or constraining **practices** – *e.g. workshops, city liaison role*
- supporting or constraining **conditions** – *e.g. political, organizational, legal*

The visuals were used as an instrument to guide the discussion and further validate, identify, and map any results – and how and why they could be established. An example of such a visual overview is provided in Figure 1. The overall interviews are used as input for this deliverable.

2.5 Co-development process

Co-creation within the REACHOUT project is the overall process of collaboratively developing user-led climate services and tools, bringing together stakeholders within the municipality, as well as researchers and tool developers. These various stakeholders play distinct roles to ensure a comprehensive and effective co-development approach (Figure 2). City staff, full partners in the project, contribute local insights on climate service requirements, initiatives, and networks. Each city has a liaison, a project partner that is located in the same region, that serves as a crucial link, overseeing the execution of co-creation activities and supporting coordination with tool & service developers. Simultaneously, tool & service developers focus on crafting data, prototyping and model-based tools presented within the Triple-A Toolkit, identifying data needs and linking to existing data sources.

City liaisons further collaborate with city partners, organizing three local City Hub workshops, identifying stakeholders, and creating an enabling environment to enhance ownership. The liaisons play a pivotal role in maintaining regular communication between the city and tool developers, articulating adaptation and climate service needs, managing risks, and expressing the city's evolving requirements. At the start of each co-creation cycle, the climate service roadmaps for the city hubs were updated, outlining the climate services to work on in the next year and the goals to be achieved. For each climate service a 'user story' was developed to make these goals concrete, using the following sentence "As a <Role>, I want <Goal>, so that <Anticipated benefit>" (Lucassen et al., 2016).

Cross-case learning among the different cities within REACHOUT was facilitated through learning modules, co-creation lounges and during the general assemblies. Further information about the co-creation process and learnings can be found in D1.7 "Findings from Hub Engagement activities".

Climate services for the city of Logroño

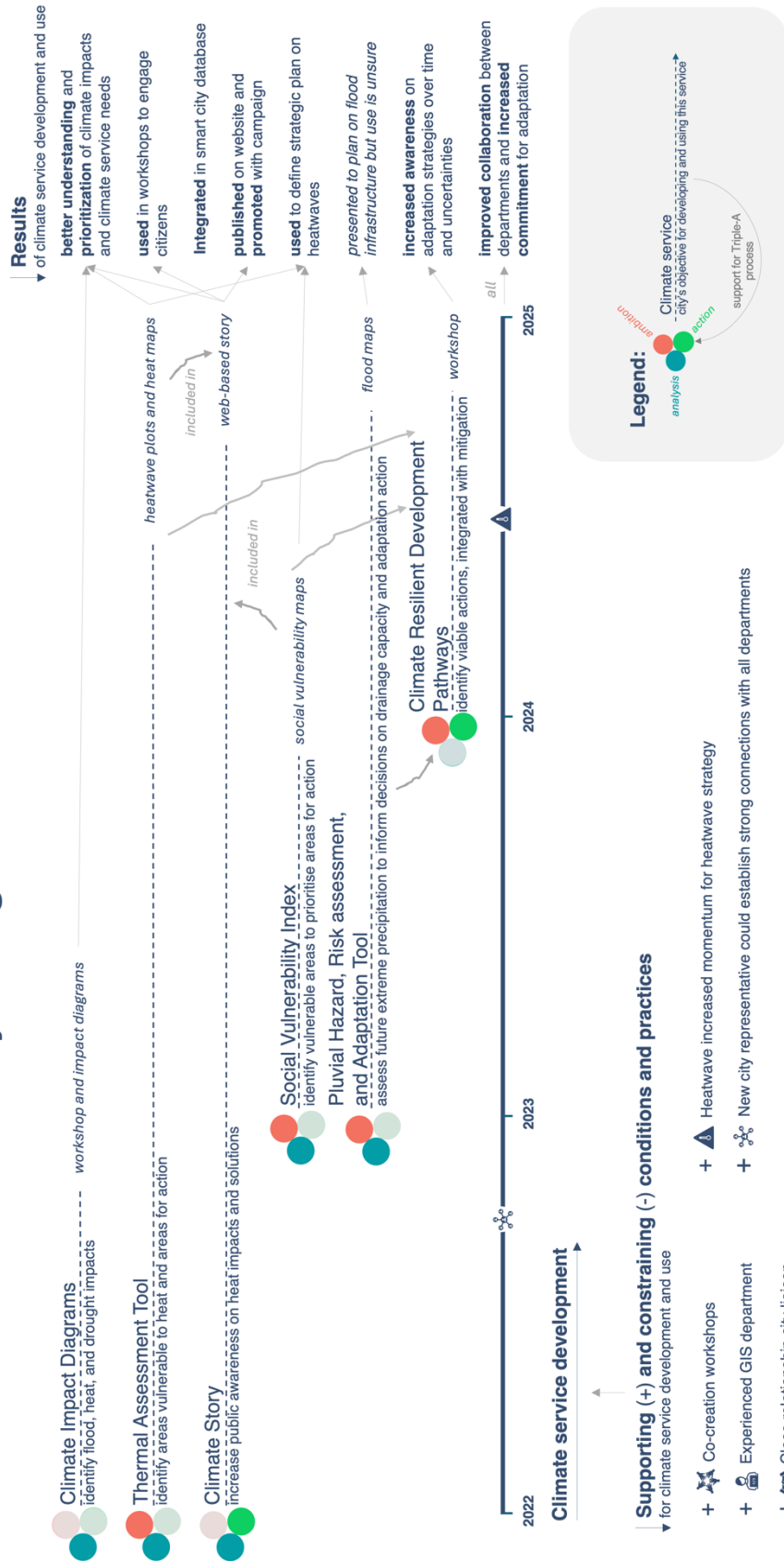


Figure 1: Visual overview of the climate services the city Logroño worked on, summarizing the results of developing and/or using the services as well as the supporting and constraining practices and conditions for development and use

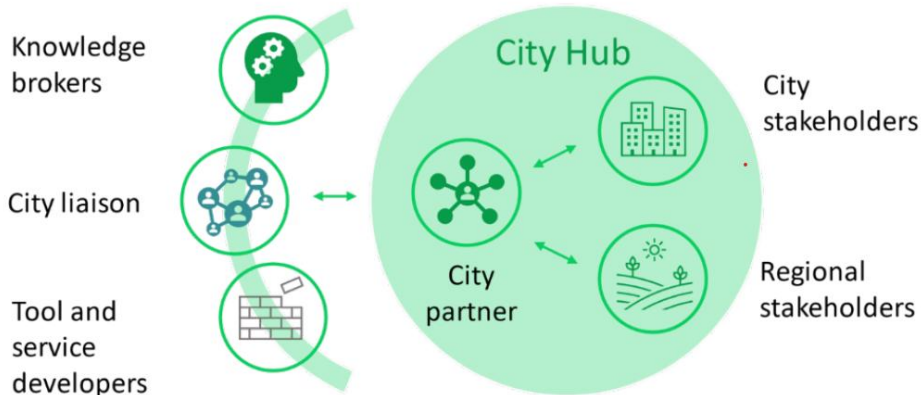


Figure 2: REACHOUT city hub model, including an overview of different REACHOUT roles in the co-creation process (source: 2nd policy brief REACHOUT, 2024).

3 Defining and evaluating success

What constitutes a successful climate service for adaptation? And how can the success of these services be evaluated? These questions are central to PhD research that was partly conducted within the context of the REACHOUT project. This chapter presents the results of three studies, reported on in the following (expected) publications:

- Boon, E., Wright, S.J., Biesbroek, R., Goosen, H., Ludwig, F., 2022. Successful climate services for adaptation: What we know, don't know and need to know. *Clim. Serv.* 27, 100314. <https://doi.org/10.1016/j.cliser.2022.100314>
- Boon, E., Meijering, J.V., Biesbroek, R., Ludwig, F., 2024. Defining successful climate services for adaptation with experts. *Environ. Sci. Policy* 152, 103641. <https://doi.org/10.1016/j.envsci.2023.103641>
- Boon, E., Body, N.S., Biesbroek, R., Developing and testing an evaluation framework for climate services for adaptation. *Status: revised manuscript under review for scientific publication, submitted Nov. 2024.*

A fourth study was carried out in the REACHOUT project, monitoring success perceptions over time of stakeholders engaged in a climate service co-production process. It investigates if and why success perceptions change throughout the process. The analysis of this study is still ongoing, hence the results could not be included in this report but are expected to be published in 2025.

Some parts of the following sections are nearly identical to the original text of above-mentioned publications. This chapter starts by discussing what we know about successful climate services for adaptation (section 3.1). Thereafter it introduces a definition for successful climate services for adaptation (section 3.2). It concludes by presenting a practical applicable framework for evaluating climate services (section 3.3).

3.1 What do we know about successful climate services?

Climate services are increasingly recognized as important instruments to help society adapt to the long-term impacts of climate change. Accordingly, investments in (Cortekar et al., 2020; Hewitt et al., 2020; Street, 2016) and research on (Boon et al., 2022; Larosa and Mysiak, 2019) climate services have been rapidly growing. A common concern, however is, that climate services often fall short in reaching the last mile to support adaptation action (Perrels et al., 2020). This raises the question if and when climate services truly deliver their intended benefits. To address this question, Boon et al (2022) systematically mapped and reviewed peer-reviewed literature to increase clarity on defining, evaluating, and understanding the critical drivers of climate service success.

The study revealed that insights on climate service success are rich but also scattered, and most often originate from western and developed countries. Different views towards climate services and their success lead to the study of different and sometimes overlapping objects, processes, and levels. For example, some studies examine specific development projects and user-producer relationships to improve usability, while others view climate services within a broader knowledge infrastructure, emphasizing aligned processes, networks, and scientific advancements. Climate services also vary in scope: some focus on generating new knowledge ("developing usable science"), while others adapt existing science for decision-making contexts. Evaluation approaches differ accordingly, assessing either utility for users or broader scientific contributions.

Furthermore, while literature is replete with discussions on 'good practice', what constitutes success is hardly defined. The study revealed multiple dimensions of success that are implicitly used, such as user satisfaction, uptake, comprehension, integration of information in decision-making, information quality, quality of the (co-)production process, and the quality of relationships between producers and users. Moreover, the success of climate services is poorly evaluated. There are a mere few publications that systemically evaluate climate services, with clearly described methods and evaluation criteria. In general, evaluation does not appear to be a standard practice in climate service development and implementation as noted by other researchers (Vaughan et al., 2018).

Despite the different perspectives on success, literature agrees on the importance of context and the configurational nature of success: different processes and service types may work well in certain contexts but are less successful in others. To advance our understanding, four key elements were identified as central to analyzing, evaluating, and understanding climate service success: the service itself, production processes, use processes, and the context in which information is produced and used. For an elaboration of these elements, see Boon et al. (2022).

3.2 How can we define the success of climate services?

The diverging views on climate service lead to varied approaches, outputs, and outcomes in climate services, potentially leading to misguided investment. Establishing a shared understanding of what defines a successful climate service would greatly support evaluation practices in the field. This would not only enhance accountability for existing services but also promote more efficient and effective development of new ones by embedding evaluation into the development process. To this end, Boon et al. (2024) used a Delphi method to engage climate services experts and explore areas of agreement of what defines a successful climate service for adaptation.

Participating experts included both scientists and practitioners working on climate services worldwide. After three rounds of consultation through online surveys, there was high agreement among the experts that 12 criteria are especially relevant for defining successful climate services for adaptation, see Table 1.

The selected criteria reflect a central role for users in determining the success of a climate service, as many criteria are about their perceptions and capacities for using it. This is in line with recent calls for developing more user-driven services (e.g. see Findlater et al., 2021; Hermansen et al., 2021; Lourenço et al., 2015). It is notable that process criteria were hardly selected, while in literature the design of the process is often mentioned in developing such services. This may reflect differences in perspectives on what defines climate services in general, viewing them either as products or as processes (Alexander and Dessai, 2019; Findlater et al., 2021).

Table 1: Success criteria for climate services for adaptation (Boon et al., 2024).

ID	Element title and description
E1	<p>The climate service has tangible or intangible benefits for the user Think of feeling more safe, being better prepared or an increase of income, employment, or literacy.</p>
E2	<p>Timely delivery The climate service is delivered in time to inform an intended decision or to satisfy a need in a specific timeline.</p>
E3	<p>Climate service increases users' understanding of an issue The climate service increases the users' understanding of an issue. For example: users may feel better informed on future impacts or are capable to reframe the problem and identify possible solutions.</p>
E5	<p>Users build the capacity for using services Users learn how they can use the climate service and how it may benefit their decision-making, which in turn may drive future demand for services.</p>
E15	<p>Acknowledgement and communication of uncertainty The climate service acknowledges and communicates the uncertainty associated with climate change information.</p>
E17	<p>Communication format is tailored to users The climate service communication format and messaging strategies are tailored to the users and their needs, think of using appropriate language and suitable media.</p>
E22	<p>Accessible climate service Users can access, interact with, and understand the climate service.</p>
E23	<p>Credible information Users perceive the information in the climate service as reliable and trustworthy.</p>
E25	<p>Establishment of trust between users and producers The users and producers of a climate service establish a relationship of trust</p>
E26	<p>Interaction between users and producers is tailored to context The nature and frequency of interaction between producers and users – from highly collaborative to consultative – is tailored to the context (e.g. user and decision context).</p>
E27	<p>Relevant information Users perceive the information in the climate service as relevant to their needs, problems and/or decision-making.</p>
E28	<p>Better decision-making for adaptation The climate service contributes to better decision-making for adaptation, e.g. through informing policies or actions that decrease climate vulnerability or improve adaptive capacity.</p>

3.3 How can we evaluate the success of climate services?

Having agreed upon success criteria of climate services offers opportunities to advance the field of climate services by including them in the design process and using them for evaluation. This led to a study that aimed to develop an evaluation framework. The next sections elaborate on this study, and how it was applied to the REACHOUT project.

3.3.1 Why develop an evaluation framework?

The poor evaluation of climate services in both research and practice (Boon et al., 2022; Jahan et al., 2023; Tall et al., 2018), hinders reporting on successes and failures, learning about what works and what doesn't, and improving climate services. One of the reasons for limited evaluation, is the lack of a standardized and operationalized evaluation framework (Bremer et al., 2021). Therefore, Boon et al (under review) aimed to develop and test a framework that allows the robust and systematic evaluation of climate services that can be applied in both research and project settings. Robust here means that it is conceptually coherent and that the best available methods are used to measure success criteria. Systematic refers to that it guides the evaluation of different services in the same comprehensive way, allowing comparison between climate services as well as monitoring over time. Practically applicable is about keeping it simple and pragmatic. Given the range of possible climate services, we aimed to develop a framework that is flexible and can be used for different types of evaluation (e.g. formative, developmental, summative).

3.3.2 How was the framework developed?

The framework was developed and tested in three steps. First, a framework was designed using the 12 success criteria (Table 1).

Scientific literature was reviewed to identify what indicator or combination of indicators would be most suitable to measure each criterion. In the second step, the framework was applied to two climate service cases of the REACHOUT project: climate stories for the municipality of Milan, Italy and the municipality of Lillestrøm, Norway. Finally, based on the application to the two cases, the evaluation framework was evaluated using three criteria: usability, credibility, and transparency.

3.3.3 What does the evaluation framework entail?

Three materials were developed in context of the evaluation framework, the evaluation framework itself, a protocol for evaluation, and a guidance for development and evaluation, see Figure 3. In this section we outline the main elements and principles of the evaluation framework. For the complete evaluation framework, we refer to the manuscript *Developing and testing an evaluation framework for climate services for adaptation* by Boon, E., Body, N.S. and Biesbroek, R, (status: under review, publication expected 2025). This document also includes a protocol describing important process steps to apply the framework, and guidance for integrating evaluation already in the development stages of the of a climate service.

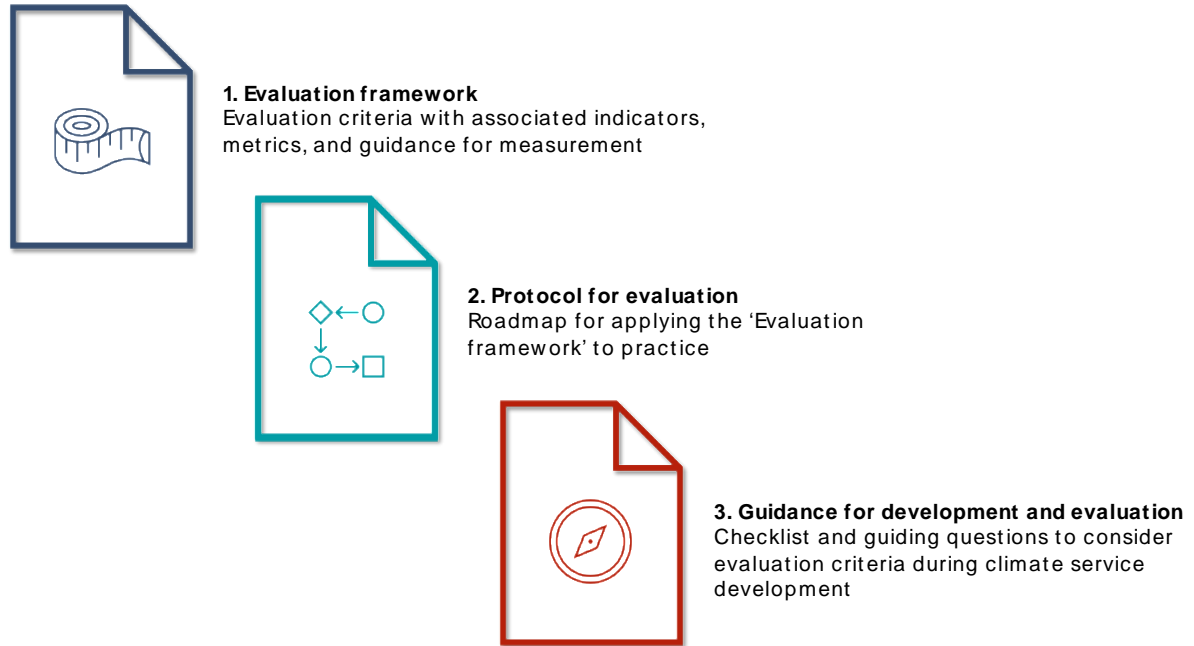


Figure 3: Evaluation framework and supporting materials.

The basic principles of the framework can be summarized as follows:

- 1 It can be used for different types of evaluation (e.g. summative, formative, developmental) and applied to the broad range of possible climate services.
- 2 It is based on 12 success criteria which were selected by experts (Boon et al., 2024). If deemed necessary for a specific climate service or context, criteria can be added.
- 3 It offers a total of 20 indicators with supporting metrics and directions to measure the criteria. Data is collected through a combination of interviews with users and producer and desk study.
- 4 Each criterion is evaluated on a scale from 1: unsuccessful to 5: successful, allowing easy comparison between climate services and monitoring over time. The robustness of the rating is assessed by considering the representativeness of the sample and the extent to which evidence was validated through multiple sources.

An example of the operationalization of a criterion is provided in Box 1. This criterion is measured through two indicators and illustrates the choice for a combination of both objective assessment and individual success perceptions.

Box 1: Operationalization of the criterion P1. Interaction between users and produces is tailored to context.

P1. Interaction between users and producers is tailored to context

This criterion evaluates if the interaction methods between the users and producers is tailored to the context in which the climate service is produced. Interaction method here refers to the nature and frequency of interactions. For example, interactions may be highly collaborative or more consultative, take place regularly or occasionally, and they may be face-to-face, online and/or through written correspondence. The most suitable method may depend on the users’ needs and capacities and their decision-context (e.g. see Lemos et al., 2019; Meadow et al., 2015). For example, in-person interaction may be more suitable when the climate service involves more complex climate change information or when there are trust issues regarding the use of science (Lemos et al., 2019). To clarify, this criterion is not evaluated ‘better’ if it involves close and frequent interactions as is advocated in many climate service publications and guidelines, rather it evaluates if it suits the context. There is, however, no encompassing framework or overview of evidence describing what type of interaction is most effective, when, and for whom to guide the assessment of this criterion. As an alternative approach, we suggest assessing this element using two complementary indicators. First, we evaluate the degree of tailoring efforts related to the interactions (P1.1) by reviewing the extent to which alternative interaction methods were considered and that the selected method was validated to meet the users and their decision-context:

b) The extent to which the interaction method(s) was/were validated with users to match the users and their decision-making context

a) The extent to which alternative interactions methods were considered to match the users and their decision-making context.		There was <u>no or hardly any validation</u> with users on the interaction method(s)	There was <u>some validation</u> with users on the interaction method(s)	There was <u>wide validation</u> with users on the interaction method(s)
	There was <u>no or hardly any consideration</u> of alternative interaction methods.	1 Very low	2 Low	3 Medium
	There was <u>some consideration</u> of alternative interaction methods.	2 Low	3 Medium	4 High
	There was <u>wide consideration</u> of alternative interaction methods.	3 Medium	4 High	5 Very high

Second, we evaluate the degree of perceived suitability of the interaction (P1.2) to evaluate the extent to which the tailoring succeeded as experienced by the targeted users: User agreement or disagreement that the interaction between user and producers is tailored to the context on a 5-point Likert scale:

- 1 strongly disagree
- 2 disagree
- 3 neither agree/nor disagree
- 4 agree
- 5 strongly agree

3.3.4 What is the added value of the framework?

Climate service users, practitioners, and researchers, including evaluators who applied the framework in two case studies (see Box 2), provided feedback on the evaluation framework. Its value was assessed based on the criteria of usability, credibility, and transparency (United Nations Evaluation Group, 2017). Application of the framework to the two cases shows that the framework was usable to evaluate the criteria consistently, supported by clear metrics and instructions for measurement. More generally, the framework was seen as practical for various purposes, such as inclusion in terms of reference for tender calls, business model development, design criteria, guiding development processes, supporting monitoring and evaluation, and fostering insights into effective and ineffective practices. It was also regarded as credible and transparent, though further testing across different service types and contexts, along with potential enhancements to the evaluation materials, would be beneficial. The framework was particularly appreciated by stakeholders working on the 'producing side' of climate services.

3.3.5 How can evaluation efforts be improved in practice?

The study underscores that effective evaluation is most successful when incorporated early in the development phase of a climate service. This approach not only facilitates efficient data collection but also helps establish more accurate assessments by clearly defining users and objectives, and creating channels for user interaction. Such integration can ultimately contribute to more successful services. To encourage the adoption of the evaluation framework and nurture an evaluation culture, two promising strategies emerge: 1) advocating the use of success criteria as a practical tool to guide and structure the development of climate services. Raising awareness of these criteria can lay the groundwork for more systematic evaluation efforts; 2) emphasizing the importance of evaluation to avoid misleading or ineffective services. This can be achieved by mandating the application and evaluation of success criteria as part of the design or reporting requirements set by commissioning bodies.

Box 2: Testing the framework in two climate service case studies (Boon et al., 2024).

Two REACHOUT cases: Climate stories for the cities of Milan and Lillestrøm

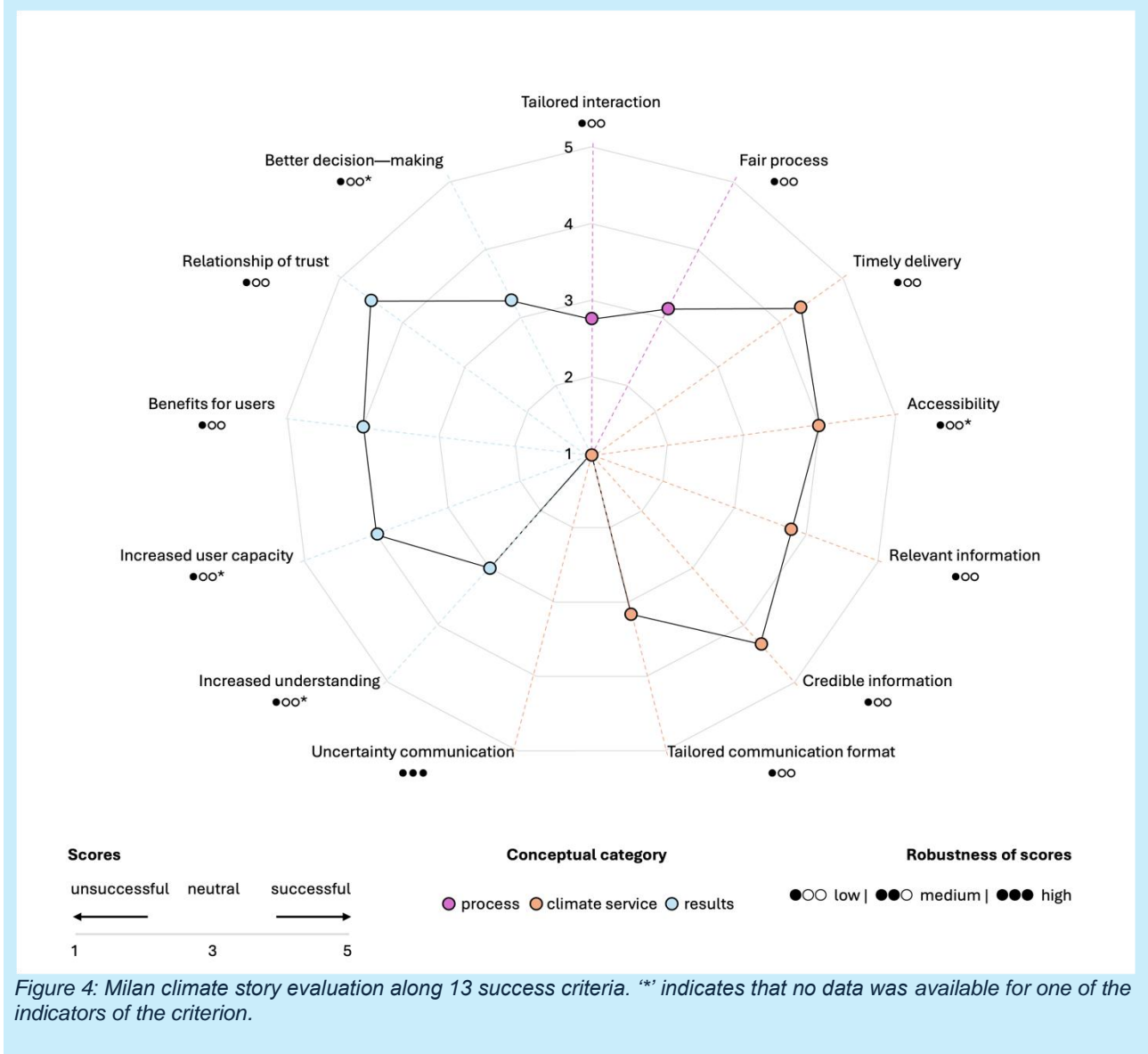
The climate stories of Milan and Lillestrøm, developed under the REACHOUT project, served as test cases for the evaluation framework. Though similar in development process, service type, and target audience, they differed in development context and implementation. Both stories focused on climate change adaptation and aimed to convey a specific message to a defined audience using the 'Hero's Journey' narrative structure (Barel, 2020). The stories are presented via scrollable webpages featuring text, graphs, maps, infographics, photos, videos, and character illustrations. The cities differed in climate challenges, size, and adaptation maturity, making them valuable for evaluating diverse aspects of climate services, including co-production and both data-driven and narrative elements.

Evaluation methods

The climate stories were evaluated using 13 criteria, including an added criterion, 'Fair Process,' to complement the original 12. Data collection involved alternating rounds of interviews with key stakeholders and desk study to confirm findings and address any gaps. Stakeholders included city representatives and story producers. City representatives participated in two rounds of interviews: the first, post-implementation, focused on development and the product; the second, conducted at least six months later, addressed outcomes. Story producers were interviewed as a group in April 2024. Semi-structured interviews with the key stakeholders featured open questions for general insights and closed questions to assess the specific criteria. The desk study reviewed documents related to the process, draft story versions, meeting notes, climate story intake-templates, and project outputs, as well as user statistics and a survey integrated into the story. Transcripts and desk study findings were analyzed to create and validate summaries of the process, climate story product, and any results of using and producing the service, which informed preliminary and final ratings for the success criteria. The summaries were used to establish tentative and final ratings for each of the success criteria

Evaluation results

Evaluation ratings for both cases are shown in spider diagrams (Figure 4 for Milan, Figure 5 for Lillestrøm). The evaluations of the criteria show similar patterns. Process-related criteria average around 3 (neutral), while most product- and result-related criteria hover around 4 (more successful). The outlier is "uncertainty communication," rated 1 (unsuccessful). Most of the criteria exhibit low evaluation robustness. This stems from the fact that many criteria rely on indicators measuring the perceived success of the targeted users—in this case, citizens—who were not involved in developing the story. The absence of interaction channels limited opportunities to engage them in the evaluation process. Instead, data for these indicators was gathered through interviews with various city representatives involved in the story, who are also residents of the city. However, they cannot be considered representative of the entire population. Nevertheless, the evaluation found that city representatives were enthusiastic about using stories to effectively and accessibly communicate their message. The process also enhanced their skills in climate services and collaboration between departments on adaptation efforts. Both cities expressed a commitment to improving and expanding their stories, incorporating citizen feedback for refinement. This offers opportunities for a more robust evaluation of the criteria in the future.



4 Overarching lessons learnt from practice: uptake and cross-case learning

Overarching lessons learnt about the uptake of tools and climate services during the REACHOUT project are drawn from a set of evaluation activities that were conducted throughout the project (see Chapter 2), including surveys and interviews. A cross-case comparison between the cities and co-developed tools provides insights into main enablers and barriers for the uptake of climate services within the REACHOUT project. We close the report with overarching lessons learnt about successful uptake of climate services within and beyond the lifetime of the project.

4.1 Cross-case comparison of uptake of tools and services

In this section we report on and discuss the uptake of the REACHOUT tools and services by the cities. As explained in section 1.1, we take a broad perspective to ‘uptake’, recognizing that it can manifest in various ways, depending on each city’s current needs and priorities for advancing their adaptation efforts. During the reflection meetings, the cities broadly reported on eight forms of uptake, which are in line with the success criteria of the evaluation framework presented in Table 1. Please note that these findings are not exhaustive and are merely based on what has been exchanged during the reflection meetings.

- **Increased understanding**

Most cities report that the tools helped them to build a better understanding of a climate adaptation related topic, such as how climate hazards/risks manifest in their area, advantages and disadvantages of different adaptation strategies, or the role of uncertainty in adaptation planning (see Table 2). In Gdynia, for example, The Climate Resilient Cities Toolbox together with the Systemic Implementation of blue-green Infrastructure solutions in the city supported the city to better understand the use of Nature Based Solutions and their costs.

Table 2: Cities that reported on developing an increased understanding.

City hub	Tool(s)/Service(s)	Area(s) of increased understanding
Amsterdam	Science practice labs; Comparative Assessment of Risk Scores from Public and Private Data Providers	Better understanding of the gap between the needs of real estate investors and what is offered by commercial data providers, concerning flood risk assessments of assets.
Athens	Pluvial Hazard, Risk assessment; and Adaptation Tool	Better understanding of areas vulnerable to flooding.
Gdynia	Climate Impact Diagrams; Climate Resilient Cities Toolbox; Systemic Implementation of blue-green Infrastructure solutions in the city	Improved knowledge base related to climate hazards and solutions, including a better understanding of nature-based solutions and their costs.

Logroño	Climate Impact Diagrams; Thermal Assessment Tool	Better understanding of climate impacts, effectiveness of adaptation strategies over time, and the role of uncertainties.
Milan	Pluvial Hazard, Risk assessment, and Adaptation Tool	Improved knowledge base on flood risks.

- **Increased collaboration with internal and external stakeholders**

All cities reported on establishing new valuable relationships and supporting discussions with stakeholders as a result of developing and/or applying the tools (see Table 3). This led to increased collaboration. Mostly, collaborations internal to the city organization were established. These were experienced as a great benefit of working on the tools and services, as they are needed for advancing the cities' adaptation efforts. Some cities were also able to establish engagement and collaboration with external stakeholders. For example, Milan and Logroño interacted with citizens using their climate stories, and APG Amsterdam had valuable exchanges with peer organizations.

Table 3: Cities that reported on an increased collaboration.

City hub	Tool(s)/Service(s)	Type of stakeholder(s)
Amsterdam	REACT tool; Science Practice Labs	The labs facilitated valuable exchanges with peers. The REACT tool supported internal discussion on how to approach the assessment of physical climate risk.
Athens	Climate story; Climate Resilient Cities Toolbox	Supported collaboration between city departments.
Cork	FloodAdapt; Social Vulnerability Index; Climate Resilient Development Pathways	Established relationships with other departments and which led to incorporating adaptation in their agenda's.
Gdynia	All tools	Supported collaboration between siloed departments.
Lillestrøm	Climate story; Climate Resilient Cities Toolbox, Crowdscore Module for Climate Hazard Mapping	Increased cooperation between departments and consequently, increased attention for adaptation. The Crowdscore module supported establishing connections to citizens.
Logroño	All tools	Increased collaboration between departments and increased commitment for adaptation. The Climate Story enabled established valuable connections to citizens.
Milan	Climate Story	Supported interaction with citizens.

- **Used at events**

Various cities used a finalized tool or service at an event, both internal and external to the city organizations (see Table 4). The cities of Athens, Logroño, and Milan, for example, used climate story to open presentations and to guide workshops. The city of Cork collaborated with the University of Cork to apply the Crowdscore Module for Climate Hazard Mapping available for education.

Table 4: Cities that reported on the use of tools or services at events.

City hub	Tool(s)/Service(s)	Type of event(s)
Athens	Climate Story	Presentations.
Cork	Crowdsource Module for Climate Hazard Mapping	Education.
Logroño	Climate Story	Workshops.
Milan	Climate Story	Presentations and workshops.

- Adopted as a city resource and capacity building**

Various tools were adopted by the cities as resource for future use (see Table 5). Some of these tools have already been used to support actual processes, others are perceived as promising for a later moment. The cities of Milan and Lillestrøm, for example, expressed their intention to continue developing climate stories for other topics. Other cities have mainly invested in building the capacity to use the Climate Resilient Cities Toolbox (e.g. Athens) and Climate Resilient Development Pathways (e.g. Logroño) on the longer-term.

Table 5: Cities that reported on building capacity for a tool or service and adopted it as a resource.

City hub	Tool(s)/Service(s)	Type of resource(s)
Athens	Climate Story; Climate Resilient Cities Toolbox; Thermal Assessment Tool	Intention to apply Climate Story; Build capacity for applying Climate Resilient Cities Toolbox and intention to apply it; Identified projects to apply Thermal Assessment Tool.
Cork	Climate Story; Climate Resilient Development Pathways; Flood Adapt	Intention to apply Climate Story; Build capacity for applying Climate Resilient Development Pathways; Build capacity for applying FloodAdapt, incl. a training workshop.
Gdynia	Climate Resilient Cities Toolbox	Build capacity for applying Climate Resilient Cities Toolbox.
Lillestrøm	Climate Story;	Intention to create future Climate Stories.
Logroño	Climate Resilient Development Pathways; Thermal Assessment Tool	Thermal Assessment Tool data integrated in smart city database; build capacity for applying Climate Resilient Development Pathways.
Milan	Climate Story; Thermal Assessment Tool	Intention to create future Climate Stories; Thermal Assessment Tool data integrated in city heat map.

- Citizen engagement tools implemented**

Three cities published tools on their municipal website, with the goal to connect to citizens on climate adaptation (see Table 6). These include the Climate Stories and the Crowdsourcing Module for Climate Hazard Mapping (Lillestrøm). These tools were (or are planned to be) supported by a communication campaign. In Lillestrøm, for example, the Climate Story was highlighted in a news item on their website, on various social media, and on digital posters in the city center including QR codes to the story.

Table 6: Cities that reported the implementation of citizen tools or services.

City hub	Tool(s)/Service(s)	Way of implementation
Gdynia	Climate Story	Published on cities' website 'Gdynia in Climate', communication campaign for it is planned.
Lillestrøm	Crowdsource Module for Climate Hazard Mapping; Climate Story	Both tools were published on the city's website and promoted for citizens with a communication campaign.
Logroño	Climate Story	Published on the city's website and promoted with for citizens with a communication campaign.

- **Supported internal prioritization of adaptation efforts**

For two cities that are more at the beginning of their adaptation journey, two tools helped them to better prioritize their focus related to adaptation (see Table 7). The Climate Impact Diagrams helped both Gdynia and Logroño to develop insight on what climate hazard they want to focus on first. More broadly, the Assessment of Risk Management Capabilities was experienced as very helpful to Gdynia in deciding what capacities and activities of the cities' organization need to be strengthened in support of adaptation.

Table 7: Cities that reported on tools or services supporting internal prioritization processes.

City hub	Tool(s)/Service(s)	Prioritization
Gdynia	Climate Impact Diagrams; Assessment of Risk Management Capabilities	Prioritized climate hazards and capacity development to focus on.
Logroño	Climate Impact Diagrams	Prioritized climate hazards to focus on.

- **Increased capacity related to climate services in general**

Developing and using the tools in the REACHOUT project also led to increased capacities related to climate services in general (see Table 8). This includes developing a better understanding what type of service they need and being up to date with the latest climate service innovations related to flood management.

Table 8: Cities that reported on developing an increased capacity for climate services.

City hub	Tool(s)/Service(s)	Area of increased climate service capacity
Gdynia	All tools	The project empowered the city to develop and use climate tools and better positioned them in the broader European context. The Climate Impact Diagrams were specifically helpful to better understand their climate service needs.
Cork	Climate Resilient Development Pathways; Flood Adapt	Awareness of and capacity for working with state-of-the-art tools and methods for flood risk management.
Logroño	Climate Impact Diagrams, Climate Story, Thermal Assessment Tool	Beter understanding of their climate service needs.

- **Supported the policy-making processes and documents**

In some cities, the tools and services have been already used to support actual running policy processes, or their outputs are used in policy documents (see Table 9). In Logroño, for example, data and figures from Thermal Assessment Tool together with the Social Vulnerability Index were included in their strategic plan on heat waves. Lillestrøm received great input from citizens in their Crowdsourcing Module for Climate Hazard Mapping for updating their cloudburst maps and plans. Milan used the Climate Story in their citizen assembly to inform climate policy.

Table 9: Cities that reported on tools or services supporting their policy-making.

City hub	Tool(s)/Service(s)	Supported policy process
Lillestrøm	Crowdsourcing Module for Climate Hazard Mapping	Citizens inputs in the Crowdsourcing tool is used to validate and update the cloudburst maps and inform their cloudburst plan.
Logrono	Thermal Assessment Tool, Social Vulnerability Index	Data and maps from both tools have been included in the cities' strategic plan on heatwaves, released in the summer of 2024.
Milan	Climate Story, Thermal Assessment Tool	The Climate Story is used as an instrument to interact with citizens in their monthly 'citizen assembly', which is an important pillar in implementing their Air and Climate plan. The input from the citizens assembly is in turn used to inform policy. The Thermal Assessment Tool data is used to update various plans, such as the Energy Poverty Plan.

4.2 Barriers and enablers for uptake of CS

The main enablers and barriers for the uptake of tools and climate services are drawn from a cross-case comparison between the cities' co-developed tools within the REACHOUT project.

The initial stock-taking survey indicated a set of barriers that could be expected within the REACHOUT project and/or would possibly require efforts to be overcome (Figure 6). Two key barriers showed the highest ranking by the city representatives, respectively "climate services lack practical relevance for end-users" and "limited capacity to interpret and analyse climate information". The third most important barrier indicates that formats and platforms are not user-friendly and too complicated to use. This initial set of barriers was closely considered during the co-development process within the REACHOUT project.

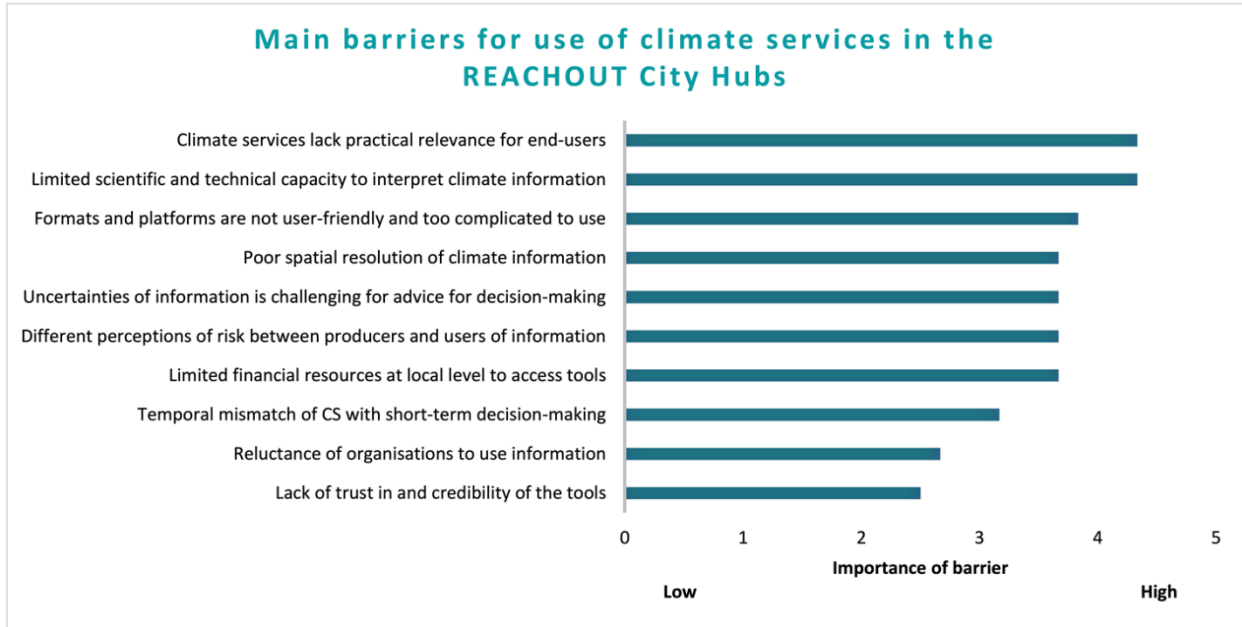


Figure 6: Main barriers for using climate services as defined by city representative in the initial stock-taking survey (5 = high importance of barrier, 1 = low importance of barrier) (source: D1.1, pg. 41).

Based on the longitudinal survey (see section 2.3) enablers and barriers for the uptake of climate services can be identified during the REACHOUT project lifetime, see Table 10. Some of the enablers and barriers are continuous throughout the project and others vary over time. The longitudinal survey was circulated annually and completed by the city representatives together with their liaisons (see section 2.3).

The longitudinal survey results (Table 10) show that the **city liaisons** and the **co-development process** are mentioned as key enablers for the uptake of tools and climate services throughout the REACHOUT project. Specifically, the annual workshops fostered exchange across city departments, which increased the interest and support for using the tools. A main barrier throughout the project was the **data requirements** from the cities to set up the tools. Obtaining suitable local data for the tools from the municipality's end was deemed challenging for almost all cities within the project. At the same time, reaching out to other departments or organizations in search of this data, also supported city stakeholders to established new connections and relationships.

A number of barriers for uptake were resolved after the first year, such as **clarity on timelines, roles, and expectations**. Also, a few barriers occurred from year two, such as **ensuring ownership** of the tool in the long run by the respective municipalities. In addition, **similar tools on the market** as co-developed by REACHOUT were bought and/or brought in by the municipality during the lifetime of the project. This reduced the interest by the municipality to continue the co-development process of the respective similar tool as part of the REACHOUT project.

Table 10: Key enablers and barriers for uptake of climate services based on annual longitudinal survey, completed by city representatives together with their liaisons. Y1 = year 1, Y2 = year 2, Y3 = year 3.

	Enablers	Barriers
Y1	<ul style="list-style-type: none"> • City liaisons. • Open and professional partners in the project • Right timing and importance of project topic, aligned with city plans and activities. • Learning program participation. • Cross-department exchange and learning. • Specific tools are highlighted to be promising. • Climate Stories as promising approach for communication outside of municipality. 	<ul style="list-style-type: none"> • Obtaining data to feed into the tools. • Tools are very technology driven. • Time demanding. • Unclear timelines. • Contact with other cities in the project has been limited. • Slow start due to COVID. • Some cities need to clarify the role of liaisons. • Need for more communication of project and its outcomes to general public/citizens. • Improve clarity on what cities can expect as main outcomes of the project.
Y2	<ul style="list-style-type: none"> • City liaisons. • Co-production process of tools encourages discussions among city administration staff. • Climate Stories as promising approach for communication outside of municipality. • Translation of tools and particularly their outcomes in the local language. 	<ul style="list-style-type: none"> • Data to be supplied by city. • Administration and technical capacity needed to set up the tools. • Tool testing and co-development takes too long. • Changes in local political context. • Finding department to “own” the tools long-term. • Similar tools on the market.
Y3	<ul style="list-style-type: none"> • Co-development process and strengthening of relationships with tool developers and city representatives. • Participation in various activities with project partners (Climateurope2 in Venice and Euresfo in Valencia) created deeper alignment and interest in tools. • Positive impact of the Climate Story, e.g. awareness raising. • Integrating the tools into the implementation of the Air and Climate Plan (Milano) increased interest in tools. • Tools like the Thermal Assessment Tool have proven valuable for identifying priority intervention areas. • Support for the development and understanding of the tools has been adequate, with structured activities engaging various stakeholders and integrating their needs into the tools developed. • The co-creation process became more structured, resulting in tools better shaped with local priorities. • Workshops fostered inter-departmental dialogue. 	<ul style="list-style-type: none"> • Meaningful communication across the cities to maximize shared learning, esp. about tools and how to use them. • Challenges in managing and harmonizing the data required for tool development. • Making tools comprehensible and usable for non-technical users. • Effective coordination among different municipal departments involved. • No full integration across municipal departments and managing complex feedback during the tool development process. • Reaching out to decision-makers/politicians about tools and their benefits/strengths. • Political changes in city government. • Hard to ensure long-term adoption and sustained commitment to REACHOUT products/outcomes. • Materializing the results or solutions achieved by the project into real urban policies and strategies.

Inter-departmental exchange and collaborations were both mentioned in the enablers and barriers section of Table . Particularly, the co-development workshops helped collaborations and dialogues across silos and municipal departments and was therefore regarded as an enabler for the uptake of climate services. Nevertheless, the complex nature of working across departments in a municipality was also raised as a barrier that slows down the co-development process and the uptake of tools and services.

A number of tools and their respective outcomes made it directly into policy documents and plans or supported the identification or implementation of measures and plans. E.g. in Milan the pluvial flood tool helped to identify interventions in risk-prone areas and the heat maps of the Thermal Assessment Tool landed in the latest heat plan of Logroño. It is complex to pinpoint why in certain cities specific tools ended up in policy documents and/or supported decisions and why other tools did not. During the final city hub interview (section 2.4) we asked the city representative of Logroño for their reason to include the heat maps in their heat plan. The answer was that the timing was correct as they were just developing the plans when the heat maps were ready. Another important enabler for uptake is the **timing and alignment with priorities** of the municipality.

Comparing the barriers from the stocktaking survey (Figure 6) and the barriers stemming from the longitudinal survey (Table) a few conclusions can be drawn. The third most important barrier identified in the stocktaking exercise “formats and platforms are not user-friendly and too complicated to use” is also mentioned in the longitudinal survey in year 2, respectively “making tools comprehensible and usable for non-technical users”. Ensuring that tools are **comprehensible** by climate service users and are **easy-to-use** remains a challenge for some of the REACHOUT tools. Most of the other barriers of the stocktaking survey are not explicitly mentioned in the outcomes of the longitudinal survey. Nevertheless, these barriers might still play a role in the uptake of the tools and climate services co-developed within REACHOUT.

4.3 Main lessons learned and factors for successful product uptake

The above sections provided insights into the uptake across cities, as well as barriers and enablers for successful product uptake. Based hereupon, and on further reflections expressed during the city hub interviews, main lessons learned and key factors for successful product uptake can be drawn. These lessons can be particularly useful for upcoming projects and activities related to climate services co-development and uptake.

Technical capacity and data

Clarify the data requirements at the beginning of tool co-development, specifically identifying which data is expected to be provided by the municipalities. It would be beneficial for the municipalities if tool developers outlined the specific input data required from them for each tool, including technical aspects such as time periods, file types etc. Vice versa, cities can strengthen their data management capacities and policies.

A liaison to facilitate exchange between the municipality and the tool developer. A city liaison who acts as a proactive intermediary between the city and the tool developer can provide significant support to the overall uptake of a tool. Their value is particularly evident in cities where the liaison and city representatives have developed strong personal relationships, leading

to frequent and informal interactions. The liaison understands the inner workings of the city and can effectively communicate this to the tool developers, allowing the city to avoid unnecessary discussions and calls. A key benefit of the city liaison is also in managing expectations between tool developers and the city, ensuring that the tools and services provided align with the city's adaptation needs. The liaisons also had a solid technical background allowing them to understand technical needs.

Identify the tool "owner" within the municipality in a timely manner. A team or specific individual within the municipality should be identified early in the project to take responsibility for the tool, ensuring its adoption and long-term usage. Depending on the tool's requirements, this could be a technical staff member who can support the operational aspects of the tool, as well as its maintenance.

Use of services

Provide a layman's overview document about the tool or service. Create a concise document describing the tool's main potential outcomes and how the tool can be used in practical and simple terms. This can be particularly useful to spark first interest in the tool and to showcase the tool to other staff members in the municipality, consultants or possibly citizens.

Translate climate services to the local language whenever possible. Offering the climate service in a local language is crucial for a successful uptake of the service, this also included guidance documents and co-development activities, such as workshops.

Policy implementation

Engage decision-makers and political leaders to leverage tool outcomes. Engaging decision-makers and political leaders in the project is crucial for ensuring the tools developed receive adequate commitment and can be used in policy processes. Furthermore, their involvement helps to align the project with local policies, priorities, and regulations, increasing the likelihood of institutional support and resource allocation.

Develop use-cases showing how the tools can support policy outcomes. At the outset of a project, it's essential to identify key use cases that demonstrate how the tools and outcomes can be integrated into specific plans, beyond, for example simply identifying risks and impacts. These use cases provide clear, practical examples of how the tools will support decision-making and inform planning processes.

Assessment of policy plans at the beginning of project. To ensure the successful integration of tools and outcomes into strategic policy plans, it is essential to assess both existing and upcoming policy plans at the start of the project and possibly identify associated use-cases (see above). This assessment helps to identify opportunities for alignment, gaps, and potential areas for improvement in incorporating climate data and tool-generated insights.

Commitment by city partner to the project. The commitment of the city partner to the project and its tools across all relevant levels of the municipality is critical when establishing a climate service co-production process and even already at the project proposal stage. The city partner shall help identifying suitable use cases (see above) and connect the tools to policy plans, documents, and activities.

Effective communication of project outcomes to citizens. Raising awareness through climate stories has deemed particularly powerful, as it personalizes the climate challenge and makes the issue more relatable. Sharing real-life examples of how the project contributes to addressing local climate issues can inspire action and motivate citizens to get involved, whether through adopting sustainable practices, participating in feedback opportunities, or supporting policy initiatives.

Communication and infrastructure

Multiple co-development cycles. Implementing multiple co-development cycles, which include workshops, is a key strategy to ensure continuous collaboration, refinement, and alignment of tools with the needs of the municipalities and stakeholders. These cycles provide opportunities for iterative feedback, improving the tools and outcomes over time.

Cross-learning between cities about tools and their applications. Cross-learning between cities is a valuable approach for sharing knowledge, experiences, and best practices regarding the development, implementation, and adoption of tools and how they are applied in the urban context. By fostering collaboration and dialogue between cities, municipalities can learn from one another's successes and challenges, improving their own processes and strategies. **One-to-one meetings between cities** offer a personalized, focused approach to cross-learning and collaboration. These meetings allow representatives from different cities to engage directly with one another, exchange knowledge, and address specific challenges related to the development, implementation, and uptake of tools.

4.4 Reflections on (successful) uptake beyond REACHOUT project lifetime

The main focus of this deliverable is on the uptake of the REACHOUT tools and climate services during the lifetime of the project. This section briefly reflects on a few aspects with respect to the (successful) uptake beyond the lifetime of the project.

One of the aspects that has not been highlighted in this report is the city hub concept. One of the main goals of the city hub concept was to upscale the tools to similar cities in the regions of the 7 cities directly engaged in the REACHOUT project. This was deemed particularly promising for bigger cities within the REACHOUT project. In practice, the city hubs primarily operated as internal working group within municipalities (see D1.7 "*Findings from Hub Engagement activities*" for more information). Nevertheless, some cities did invite external stakeholders, such as provinces or water boards, to their annual workshops. For instance APG/Amsterdam organised a 3rd workshop with an enlarged group of international investment stakeholders, to engage more stakeholders and allow for further uptake of the REACT tool. On another note, an additional workshop will be held in Aquila, Italy, to showcase the tools of REACHOUT and foster uptake. In the city of Maastricht (the Netherlands), the CRDP approach developed in REACHOUT is being applied leading to uptake of the tool beyond the project.

The final product, known as the "demonstrators", highlights the outcomes of REACHOUT and provides a practical way for city stakeholders to see how tools and services can be beneficial, creating a clear path for them to begin using the tools directly. These demonstrators are featured on a webpage that will remain accessible beyond the REACHOUT project's duration and continue to be used over time.

The Mission on Adaptation Tool Database offers an excellent opportunity to ensure continued uptake of the tools beyond the project. Up to this moment, three of the REACHOUT tools are already included in the database, respectively the Pluvial Flood Tool, the Social Vulnerability Index Tool (SVI-Tool) and the Climate Resilient City Toolbox (CRC-Tool). More are likely to follow.

Among the REACHOUT partners there is interest in fostering sustained collaborations across cities and research partners and connecting the REACHOUT project to on-going or new projects on the horizon. This could enable further uptake of the tools in the long term. For example, in Athens a connection is established between an urban planning project on NBS that just started in the city and the CRC-Tool, exploring options for continued usage of the tool.

5 Final reflections

This report on lessons learned from uptake and cross-case learning followed two main tracks. The first track presented a framework for evaluating the success of climate services, grounded in PhD research. The second track focused on assessing the uptake of climate service product applications within the REACHOUT project, learning from practical experiences. We evaluated the success of uptake comparing across cases and identified key enablers and barriers. Finally, we distilled key insights into generalizable factors for successful climate service product uptake. This last section of the report shares a few final remarks.

Overall, this deliverable shows that valuable uptake of climate services extends beyond the inclusion of figures or numbers in policy plans or documents, encompassing many benefits and success factors related to the process, such as exchange across departments and/or with citizens and building capacity for developing and using climate services. This resonates with the definition of climate service success established as part of the scientific track, including criteria related to the development process, the climate service product, and the results of using and/or producing climate services.

It is important to note that the success factors discussed in this deliverable are based on interviews, surveys, and other reflective moments from the perspective of stakeholders involved in the REACHOUT project. Notably, many of the reflections and success factors are centred on the process of uptake itself, with less emphasis on the technical quality of specific tools, their outcomes, or whether they are fit-for-purpose. One of the premisses of REACHOUT was that the relevance of tools, or so-called salience, would also lead to increased uptake. This has two sides to it, a demand side based on policy needs and a supply side, in other words: does the tool provide the needed information in an accessible way. As stressed above, the main reflections by city stakeholders concerned the demand side and the related process of uptake. We received little criticism on the outcome of the tools, which may imply that the tools were living up to the expectations, or in these situation the expert is trusted and followed.

Both the scientific research on evaluation and practical investigation of uptake emphasize the importance of considering success criteria at the start of climate service development project. A shared understanding of the 'why', 'what' and 'how' of a tool or service can guide the development process and support the uptake. The generalizable surfaced success factors together with the evaluation framework can support future project on climate services co-development.

The liaison played a crucial role in facilitating communication and coordination between municipalities and specialized service providers, acting like a “broker”. While this position may exist within a municipality, it is often implemented by a consultant who brings together technical knowledge and know-how of the municipal functioning in the local context. Given the complexity of many municipalities and tools, this intermediary function remains essential for ensuring efficient tool co-development suitable for decision-making purposes.

The role of the Triple-A approach in influencing the uptake of climate services was not particularly emphasized by stakeholders. However, ambition setting played a crucial role throughout the project in shifting the focus from adaptation to resilience, integrating adaptation with other urban challenges. There was notable interest in risk and solution assessments combined with vulnerability, such as the SVI tool, which was applied in many REACHOUT cities and integrated with other tools like TAT and FloodAdapt. This integration likely contributed to the overall uptake of the services. Finally, a shift was observed from reactionary, disaster-response, and risk-based planning toward a more resilience-focused approach, with an emphasis on forward-looking, novel structured planning approaches like Climate Resilient Development Pathways.

The lessons learned from the uptake process within the REACHOUT project are valuable for shaping future Horizon Europe initiatives, as well as other projects focused on the co-development and delivery of climate services. In particular, the process-related insights, such as the multiple co-development cycles of tools and the importance of liaisons, could be applied in future projects. However, it is important to note that not strictly following the identified success factors does not necessarily hinder the successful uptake of climate services. While this deliverable outlines what we learned in REACHOUT, additional lessons can be drawn from other projects and activities. Furthermore, we acknowledge the ongoing need for further advancements in the technical aspects of climate services, which are not as extensively covered in this deliverable but in Deliverable D3.10 on the lessons learnt on toolkit development and further innovation needs.

In conclusion, this deliverable highlights the valuable lessons learned from both theoretical frameworks and practical experiences, offering key insights into the successful uptake of climate service products, which can guide future efforts in the co-development and implementation of climate services.

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