



# Communicating climate change adaptation information using web-based platforms

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**Abstract.** To facilitate progress in climate change adaptation policy and practice, it is important not only to ensure the production of accurate, comprehensive and relevant information, but also the easy, timely and affordable access to it. This can contribute to better-informed decisions and improve the design and implementation of adaptation policies and other relevant initiatives. Web-based platforms can play an important role in communicating and distributing data, information and knowledge that become constantly available, reaching out to a large group of potential users. Indeed in the last decade there has been an extensive increase in the number of platforms developed for this purpose in many fields including climate change adaptation. This short paper concentrates on the web-based adaptation platforms developed in Europe. It provides an overview of the recently emerged landscape, examines the basic characteristics of a set of platforms that operate at national, transnational and European level, and discusses some of the key challenges related to their development, maintenance and overall management. Findings presented in this short paper are discussed in greater detail in the Technical Report of the European Environment Agency “*Overview of climate change adaptation platforms in Europe*”.

## 1 Introduction

Adaptation has received significant attention over the past decade and is now widely perceived as a fundamental part of the societal and institutional response to climate change. This viewpoint has been reinforced by the recent Paris Agreement, which underlined the importance of adaptation, recognised its co-benefits with mitigation, and solidified the parity between the two domains, also along with climate finance (UNFCCC, 2015).

At national level, climate change adaptation (CCA) appears to be a constantly evolving and maturing policy field. Countries are steadily moving away from the early stages of the adaptation policy cycle, where they prepare the ground for adaptation and assess climate change risks and vulnerabilities, to more advanced stages, where they identify and assess adaptation options, implement and in some cases even monitor and evaluate policies<sup>1</sup>.

Taking a closer look at Europe, one can easily observe that countries have not evolved uniformly in this field but nevertheless their progress has been fast-paced. In 2014, for example, the European Environment Agency (EEA) carried out a self-assessment survey to collect information on the state-of-play of the national adaptation policy processes in European countries (EEA, 2014). Among the 33 countries that participated in this exercise, 21 reported that they had adopted a national adaptation strategy<sup>2</sup>, 12 that they had prepared an action plan<sup>3</sup>, but only four of them had started monitoring and evaluating policies at the time (EEA, 2014 – Table ES.1). Only a year later, the EEA Technical report on “*National monitoring, reporting and evaluation of climate*

<sup>2</sup>National Adaptation Strategy is a national document that articulates a country’s strategic vision with regard to climate change adaptation (EEA, 2014).

<sup>3</sup>National adaptation plan or action plan is a national document that articulates the implementation of a country’s climate change adaptation strategy, presenting a set of adaptation measures and information for their implementation (EEA, 2014).

<sup>1</sup><http://climate-adapt.eea.europa.eu/knowledge/tools/adaptation-support-tool>

*change adaptation in Europe*” presented evidence from fourteen European countries, which either had already developed a system for monitoring, reporting and evaluation of adaptation or were in the process of doing so in the coming years (EEA, 2015b).

The abovementioned achievements in the design and implementation of adaptation policies, as well as the need to progress further in this area, have urged for continuous improvement of the knowledge base on climate change and climate change adaptation, and provision of tailored information (Medri et al., 2012; Hammill et al., 2013). Relevant research activities have flourished in response to these demands, producing an ever-growing amount of data and information. However, research activities have not always been systematic nor adequately communicated. As a result the emerged knowledge landscape has been rather fragmented, characterised in many cases by limited interaction and poor communication across different policy domains and scientific fields, which restricted knowledge uptake and duplicated research efforts.

The acknowledgment of these issues highlighted the importance of ensuring the wide but also effective distribution of the produced data, information and knowledge rather than focusing on their production alone. In support of this goal, there has been a rise in the number of web-based adaptation platforms (EEA, 2015a) developed for this purpose, which intend, among others, to enhance the awareness of the need for adaptation, address knowledge gaps and bring together existing information sources, support capacity building in order to facilitate access to and use of climate data and information, and enable action.

This short paper provides a brief summary on the state of play of a set of key adaptation platforms that operate at national, transnational and European level, and presents some of the key challenges faced by platform developers and managers. Findings presented here draw on evidence presented in the EEA Technical report “*Overview of climate adaptation platforms in Europe*” (EEA, 2015a) where a more detailed discussion can be found.

## 2 Data collection and analytical framework

Fourteen national platforms (Austria, Denmark, Finland, France, Germany, Hungary, Ireland, Spain, Norway, The Netherlands, Poland, Switzerland, Sweden, The United Kingdom), three transnational platforms (Alpine region, Baltic Sea Region, Pyrenees) and the European Climate Adaptation Platform (Climate-ADAPT) were considered in this work (see Supplement). For each of the platforms, the scope, history, targeted users, funding models, and their links with climate services and disaster risk reduction platforms were explored. Moreover, the main challenges faced by platform developers and managers, along with some reflections and lessons learned were discussed. Information

was collected through three expert meetings on adaptation platforms: in June 2013 and 2014, in Copenhagen, and in November 2013, in Vienna. Additional information was collected through a series of targeted interviews with platform managers. The collected material was analysed qualitatively through content analysis. The accuracy and correctness of all the information and conclusions were checked and confirmed by member countries through a consultation process.

## 3 Results

### 3.1 Overview of climate change adaptation platforms in Europe

While exploring the adaptation platform landscape in Europe, it became apparent that a large number of platforms were developed with the aim to support adaptation policy and action. At the national level, national governments have supported in many cases the launch and maintenance of adaptation platforms as part of the development and implementation of their national adaptation strategies and plans. On the other hand, European countries without a national adaptation platform tend to consult transnational platforms that are of relevance for their context and territory, or the European Climate Adaptation Platform, Climate-ADAPT for this purpose.

The platforms considered in this study vary in terms of their history (e.g. length of lifetime, development pathway), specific scope (e.g. the role that they serve, the services that they provide), and operational and business model (e.g. the context in which they operate, whether (or not) they developed as part of a country’s national adaptation strategy or plan). At the time of the data collection, only a few platforms had an operational lifetime of more than three years (Austria, Denmark, Finland, France, Germany, Norway, Sweden and the United Kingdom). Out of the fourteen national adaptation platforms investigated, seven were launched in the context of a national adaptation strategy or plan (Austria, Denmark, France, Germany, Poland, Spain and Switzerland), while the majority of them had been developed using project-based funds (e.g. Austria, Germany, Ireland, Poland, CAPA, the Pyrenees) provided through national or EU funding mechanisms. In many of these cases, however, funding periods were limited, which had certain implications for a range of decisions related, for example, to the extent and scope of the information and services provided by the platforms, up to their actual maintenance and update.

In terms of content, certain differences were identified, which depended primarily on the specific characteristics and mandate of the individual platform. However, research project results, guidance, decision-support tools, examples of policy action at sub-national, national, and transnational levels, and experiences from practice and implemented adaptation measures constitute the information most often published on platforms. Finally, despite the differences in certain of their aspects, platforms’ potential to act as efficient and ef-

fective means for communicating information and enabling and empowering adaptation was widely acknowledged.

### 3.2 Reflexions: key challenges related to the platform development, management and maintenance

Analysis of all information collected from the workshops and interviews revealed a number of challenges related to the development, maintenance and management of the adaptation platforms. These have been grouped in seven categories as follows:

#### 3.2.1 Funding

Many platform managers identified available funding as one of the most critical challenges. This challenge relates primarily to the nature (e.g. project-based) and sustainability of the funding schemes that usually support platforms' development and maintenance. Among the most usually discussed implications were the short-term perspective of the project-based funds that are often available for developing platforms versus the long-term perspective that is required for setting a platform's strategic plan, and the request to meet multiple user expectations when budget is restricted. Managers underlined that funding and business models should be carefully designed at an early stage of the platforms' development process in order to secure the financial resources needed for their ongoing enhancement. Associated policies, legislation and other initiatives, as well as their specific requirements, should also be taken into account when relevant decisions are made.

#### 3.2.2 Understanding and engaging with users

While climate scientists seek for a better understanding of the weather and climate processes, decision-makers usually look for the minimum amount of relevant and understandable information that would allow them to make the "right" decisions (Buontempo et al., 2014). Acknowledging, understanding but also considering the different needs, expectations and competences of information providers and users, and accepting that these might change over time is critical for the successful management of a platform. Such aspects can be better understood when engaging with users. Additionally, this can help build trust between information providers and users, support a transparent and regular communication and learning, and avoid pitfalls such as the unrealistic expectations (Otto et al., 2016), which may, in turn, influence the acceptance and perceived usefulness of a platform.

Platform developers and managers discussed the importance of communicating and engaging with users during all stages of a platform's lifetime. Experience so far has revealed multiple challenges starting with the actual identification of the targeted user group of a platform; understanding and meeting diverse user needs and expectations; establishing feedback mechanisms; improving the utility of in-

formation and tools available on the platform considering user skills; sustaining users' interest in the platform. Several mechanisms can be useful for this purpose (e.g. workshops, training events, participation in conferences, newsletters, social media). Yet their selection should be careful and tailored to the characteristics of the individual platform and those of its intended users.

#### 3.2.3 Identifying relevant data, information and knowledge for a platform

The amount of data, information and knowledge relevant to climate change and adaptation is growing constantly. At the same time, stakeholder needs change as they progress along the different stages of the adaptation policy cycle and thus not only do they acquire new experience, but also have to respond to different questions. This translates to different information requests, which should be reflected in the selection of content per se (e.g., ensuring that the scope of the platform and the type of information published on it meets user needs), as well as in the platform's overall maintenance (e.g., ensuring a dynamic and regular update of the information published on the platform). Platform managers acknowledged that content selection should be embedded in a decision-making framework that uses clear criteria and considers also the appropriateness of the content for the group of users targeted by the platform. A similar procedure can be followed for identifying other updates that might need to be performed.

#### 3.2.4 Presenting relevant data, information and knowledge on platforms

Although adaptation-related information and knowledge have been significantly improved in recent years, their uptake by policy makers has not followed the same trend (e.g. see Moser and Luers, 2008; Dilling and Lemos, 2011). To a large extent the use of such products is still dependent on the way that they are presented, especially when we are looking at users beyond the members of the scientific community.

In the case of adaptation platforms, their perceived relevance and usefulness often relate to the usability of the information and tools that they provide. The information presented on adaptation platforms should consider the different backgrounds, levels of experience and capabilities of the intended users. For example, it is important that the information published on a platform uses a language that is understandable by a range of users (Otto et al., 2016). Furthermore, interactive features are often seen as an element that can improve information exchange among users and hence their engagement with a platform. Such features can also be used for evaluating whether a platform meets its objectives or not. Nevertheless decisions on the introduction of such elements, or other technological changes, should be made with

caution, considering if the intended users could easily accept them.

When it comes to common challenges related to this theme, platform managers referred to difficulty in providing the right amount of information for a diverse group of users; striking balance between relevance, user-friendliness, scientific quality and completeness; presenting information in an understandable way and multiple languages; making use of visualisation techniques and aids that are appropriate for the target audience.

### 3.2.5 Design and structural elements of platforms

The design and layout of a platform affects to a great extent how user-friendly the platform is perceived by its users. This is determined by a range of factors such as users' prior experience with platforms and their IT skills. Attention should be placed on ensuring that content on platforms is easily accessible and that navigation flows are logical and self-evident from different user perspectives.

Platform developers often choose to link or embed national adaptation platforms in existing websites (most often being the websites of the Ministry of the Environment of each country). This type of integration offers opportunities for improving links with other policy fields and reaching out to a much wider audience. Also it usually requires a considerably lower investment of resources. Yet it may also impose certain restrictions compared to having a stand-alone platform (e.g. the need to cope with certain limitations due to the design standards of the host website).

### 3.2.6 Developing links across sectors, scales and platforms

In order to ensure a more efficient use of the available resources and avoid duplication of work, it is important to establish links across sectors, scales and platforms. Until now, such examples have been rather limited. This has been mainly due to the fact that recent platform developments have taken place quite rapidly, therefore constraining the timely establishment of synergies between relevant projects and other initiatives (see Barnard, 2011; Karali et al., 2016). To develop such links, it is critical to understand and describe the expectations and possible benefits from such collaborations, as well as to clearly define the roles and responsibilities of all partners involved (Karali et al., 2016). Platform managers highlighted that constant and transparent communication and good coordination are essential for supporting such processes. Identification of common or similar priority areas and establishment of institutional links may serve as the first steps towards the achievement of this goal.

### 3.2.7 Monitoring and evaluation of platforms

In an attempt to ensure that adaptation platforms support decision-making for adaptation policy and planning, it is important to set regular and long-term monitoring and evaluation (M&E) activities. Collected information may inform decisions about updates and adjustments required on platforms, and thus improve platforms' overall value for their users. Until now there has been little experience in this area. Most likely this has been a result of the short lifetime of most platforms, which indeed limited their meaningful evaluation. Consequently this area remains rather unexplored and seen as a challenge for the majority of the platform managers. Difficulties relate, among others, to the need to develop a M&E scheme at an early stage and link it to the mandate and specific goals of a platform; identify the right indicators to assess the success and overall impact of a platform; use the information produced from monitoring and evaluation activities as part of an on-going learning process. Considering the multiple drivers that underpin and influence adaptation policy and action makes attribution of impact to an adaptation platform a rather difficult task. Thus, it is suggested that M&E of adaptation platforms be integrated into the wider national level adaptation M&E system.

## 4 Concluding remarks

Adaptation policy is a very dynamic and continuously evolving field. Similarly, the widely acknowledged need for the use of scientific evidence by a large part of the policy and decision-makers' community, and the public at large (Vaughan et al., 2016) has impacted the "demand for" and the "production of" adaptation information and knowledge. To facilitate the uptake of these products, it is essential to establish efficient communication and dissemination channels. The emerging field of climate services, namely the climate adaptation platforms, aim to contribute to the achievement of this goal, by promoting a wider access to data, information, knowledge, and guidance.

This short paper described briefly the adaptation platforms' landscape in Europe and discussed some of the key challenges faced by platform developers and operators. (A thorough analysis and discussion of findings are presented in the EEA (2015b) report "*Overview of climate change adaptation platforms in Europe*"). Many of these challenges are interlinked and relate to more than one aspect of a platform's development, management and maintenance, therefore adding further to their complexity and difficulty to overcome them. An expert workshop on climate change adaptation platforms, organised by the EEA with the support of the European Topic Centre on Climate Change impacts, vulnerability and Adaptation (ETC/CCA) in June 2016, underlined that some of the issues discussed here are still seen as challenging areas and hence call for our efforts to explore how we could best overcome them. The EEA aims to continue

sharing its experience and lessons-learned from the maintenance and update of the European Climate Adaptation Platform (Climate-ADAPT) and to keep organising events and other activities in an attempt to give the opportunity to platform managers to exchange their insights, share their concerns, learn and get inspired from each other.

**Data availability.** A table listing the platforms that the authors looked at can be found in the Supplement. Additional data can be found here: <https://www.eea.europa.eu/publications/overview-of-climate-change-adaptation>.

**The Supplement related to this article is available online at <https://doi.org/10.5194/asr-14-241-2017-supplement>.**

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## References

Barnard, G.: Seeking a cure for portal proliferation syndrome. Climate and Development Knowledge Network, available at: <http://news.trust.org/item/20110620134400-tqso1/> (last access: 16 June 2017), 2011.

- Buontempo, C., Hewitt, C. D., Doblás-Reyes, F. J., and Dessai, S.: Climate service development, delivery and use in Europe at monthly to inter-annual timescales, *Climate Risk Management*, 6, 1–5, <https://doi.org/10.1016/j.crm.2014.10.002>, 2014.
- Dilling, L. and Lemos, M. C.: Creating usable science: Opportunities and constraints for climate knowledge use and their implications for science policy, *Global Environ. Change*, 21, 680–689, <https://doi.org/10.1016/j.gloenvcha.2010.11.006>, 2011.
- EEA: National adaptation policy processes in European countries – 2014, EEA Report, No 4/2014, ISSN 1977-8449, 2014.
- EEA: Overview of climate change adaptation platforms in Europe, EEA Technical report, No 5/2015, ISSN 1725-2237, 2015a.
- EEA: National monitoring, reporting and evaluation of climate change adaptation in Europe, No 20/2015, ISSN 1725-2237, 2015b.
- Hammill, A., Harvey, B., and Echeverria, D.: Knowledge for action: an analysis of the use of online climate knowledge brokering platforms, *Knowledge Management for Development Journal*, 9, 72–92, 2013.
- Karali, E., Swart, R., and Thijsse P.: Links to Climate-ADAPT. CLIPC Deliverable No 4.5, <http://www.clipc.eu/content/content.php?htm=147> (last access: 16 June 2017).
- Medri, S., Banos de Guisasola, E., and Gualdi, S.: Overview of the main international climate services, CMCC Research Papers Issue RP0134, available at: <http://www.cmcc.it/wp-content/uploads/2013/05/rp0134-serc-06-2012.pdf> (last access: 16 June 2017), 2012.
- Moser, S. C. and Luers, A. L.: Managing climate risks in California: The need to engage resource managers for successful adaptation to change, *Climatic Change*, 87 (Suppl. 1), 309–322, <https://doi.org/10.1007/s10584-007-9384-7>, 2008.
- Otto, J., Brown, C., Buontempo, C., Doblás-Reyes, F., Jacob, D., Jukes, M., Keup-Thiel, E., Kurnik, B., Schulz, J., Taylor, A., Verhoelst, T., and Walton, P.: Uncertainty: Lessons learned for climate services, *B. Am. Meteorol. Soc.*, 97, ES265–ES269, <https://doi.org/10.1175/BAMS-D-16-0173.1>, 2016.
- UNFCCC: Paris Agreement, [https://unfccc.int/files/essential\\_background/convention/application/pdf/english\\_paris\\_agreement.pdf](https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf), 2015.
- Vaughan, C., Bujam L., Kruczkiewicz, A., and Goddard, L.: Identifying research priorities to advance climate services, *Climate Services*, 4, 65–74, <https://doi.org/10.1016/j.cliser.2016.11.004>, 2016.