

Stepping Up Knowledge Exchange Between Climate Adaptation Platforms (KE4CAP)

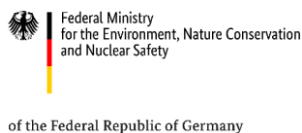
Synthesis of Survey Responses

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For more information and to join the KE4CAP community: [Climate Change Adaptation Knowledge Platforms Online Community of Practice](#)

Introduction

In July 2020, the '[Stepping up Knowledge Exchange between Climate Adaptation Platforms](#)' (KE4CAP) team reached out to the international climate adaptation (knowledge) platform (CAP) community to gather information from platform developers and operators on a series of 12 cross-cutting topics. These topics had been chosen to reflect the common areas of interest discussed during the first KE4CAP virtual knowledge exchange event in June 2020. The resulting survey aimed to solicit expert feedback on the existing status of CAPs, highlight innovations and practices that are working well, gain a better understanding of the value added (existing and potential) by CAPs, and identify challenges and areas for further enquiry.

Thank you to all those who responded. This first synthesis report brings together responses from 27 platforms from around the world. These platforms range from those that are just being developed, to those that have recently been implemented to many others that are now well-established.

The following report provides a synthesis, by topic, of the responses received relating to approaches being taken and challenges being faced by CAPs in each of the 12 areas. The individual chapters offer examples of successful and innovative practices CAP teams have implemented, summaries of the challenges being faced, and key interlinkages identified between topics. As such, each chapter provides a snapshot of the 'state of the art' of platforms' approaches and interests relating to each topic. Also included is background information on how the 27 CAPs are set up, including how they are financed and managed, the motivation for their development, the key sectors and user groups they support, and their main functions.

By synthesising this survey information, the KE4CAP team aims to kick-start a deeper knowledge sharing process between CAPs. This 'first full draft' report will continue to be updated throughout the KE4CAP project to include additional insights arising from the on-going series of KE4CAP knowledge exchange events. We will also be using the information to inform the direction and content of KE4CAP future events, including the final Synthesis Workshop to be held in September 2021.

You will notice that each topic chapter varies slightly in content and style. These differences reflect the different number and types of responses received for each of topic, and the perspectives and preferences of the different core team members who undertook the analysis. Each topic synthesis reflects the responses received, but the KE4CAP team recognises that these summaries are, and should be seen as, work in progress. In addition, the analysis of the information gained through the survey is ongoing. We hope to receive further responses as the KE4CAP community continues to grow.

If you have just joined the KE4CAP community, or have not yet had the opportunity to respond to the survey, please contact us and we can resend the link to the survey. If you would like to follow-up on any of the adopted practices, innovations or challenges, please do so by contacting one of the KE4CAP team, by raising questions at future KE4CAP events, or by following up with the specific platform involved.

We hope that this first synthesis of the survey responses proves useful to you. We would appreciate feedback on the value of the information to you and where and how you have used it. We also look forward to discussing these topics and issues further during our upcoming events.

The KE4CAP team

Participating Climate Adaptation Platforms (CAPs)

National platforms			
Australia	Climate Change in Australia	CCiA	https://climatechangeinaustralia.gov.au
Austria	National Climate Adaptation Portal of Austria		https://www.klimawandelanpassung.at
Belgium	Adapt2Climate		https://www.adapt2climate.be
Canada	Canada's Climate Change Adaptation Platform	CCAP	https://www.nrcan.gc.ca/climate-change/impacts-adaptations/what-adaptation/adapting-our-changing-climate
Canada	Canadian Centre for Climate Services, including ClimateData.ca	CCCS	https://www.canada.ca/en/environment-climate-change/services/climate-change/canadian-centre-climate-services.html https://climatedata.ca/
Canada	Intact Centre on Climate Adaptation		https://www.intactcentreclimateadaptation.ca
Finland	Climate Guide		https://climateguide.fi
Germany	German Climate Preparedness Portal	KLiVO	https://www.klivportal.de/EN/Home
India	Climate Change Information Portal		http://climatevulnerability.in
Ireland	Climate Ireland		https://www.climateireland.ie
Japan	Climate Change Adaptation Information Platform	A-PLAT	https://adaptation-platform.nies.go.jp/en/index.html
Netherlands	Knowledge Portal Spatial Adaptation	KPSA	www.spatialadaptation.com
Northern Ireland	Climate Northern Ireland	NIAdapts	https://www.climateinorthernireland.org.uk/NIAdapts
Philippines	in development		https://ccplanningtool.omlopezcenter.org/create-project-plan
Scotland	Adaptation Scotland		www.adaptationscotland.org.uk
Spain	Platform on Adaptation to Climate Change in Spain	AdapteCCa	https://www.adaptecca.es
Sweden	Swedish Portal for Climate Change Adaptation		https://www.klimatanpassning.se
Taiwan	Taiwan Climate Change Projection Information and Adaptation Knowledge Platform	TCCIP	https://tccip.ncdr.nat.gov.tw
Thailand	Thailand Adaptation Information Platform	T-PLAT	http://t-plat.deqp.go.th/en/home-page
UK	UK Climate Resilience Programme website	UK CRP	https://www.ukclimateresilience.org
Transnational platforms			
Alps	Climate Adaptation Platform for the Alps	CAPA	https://www.capa-eusalp.eu
Asia and the Pacific	Regional Climate Consortium for Asia and the Pacific	RCCAP	https://www.rccap.org
Asia-Pacific	Asia-Pacific Climate Change Adaptation Information Platform	AP-PLAT	https://ap-plat.nies.go.jp
Europe	Climate-ADAPT		https://climate-adapt.eea.europa.eu
Pacific	Pacific Climate Change Science	Pacific CCS	https://www.pacificclimatechangescience.org
Regional/sectoral platforms			
Australia	CoastAdapt		https://coastadapt.com.au
India	Climate Finance Knowledge Portal		https://climatefinanceknowledge.nabard.org

Topic 1: Co-evaluation, learning and capacity development to drive platform improvement

Description of topic

This topic focuses on how we use monitoring and evaluation approaches to better understand platform strengths and weaknesses, including identifying and using metrics to measure the relative success of a platform over time. This includes how we elicit and use user feedback, use cases and peer-learning to inform platform development, and in turn how we use these insights to build the capacity of those developing, maintaining and using the platform to support continuous platform improvement.

Questions posed in the survey

- What actions have you taken in this area that you believe have worked well?
- What challenges do you currently have, or foresee, related to this topic?

Responses

24/27

Adopted practices

User engagement and involvement

Online surveys are the most common method used to elicit user feedback on the platform. Surveys have, and are being used to elicit, various information including: user testing and feedback on available functionality, features, and tools; information on user needs; how the platform is being used; how satisfied users are; and how the platform is contributing to improved decision-making. All of this information is used to drive the ongoing and future development of the platform.

These surveys vary in openness, format and duration. Most surveys are conducted online, with some platforms also using offline surveys to reach certain user groups. Many of the surveys are 'open', allowing all users to provide responses. Other platforms have taken a more targeted approach to enable them to reach and disaggregate responses from specific groups of users, for example key reference groups, and users with different levels of knowledge of the platform.

Steering committees, networks, and other reference and expert user groups play a central role in the initial and ongoing (co-)development of platforms, with sufficient time and resources to support them. Many platforms host regular meetings (more than twice annually) with reference and "representative" user groups or networks to test and consult on the platform and its usefulness, and guide its development. Some platforms have hosted ad hoc meetings and workshops with users, including provider-user engagements, as opportunities and resources allow. Other engagements with users (i.e. those not focused on evaluation) are also used as additional opportunities to gain user feedback.

These meetings have recognised benefits, including the ability to:

- gain more detailed user feedback to help improve the relevance and usability of the platform;
- further elicit and respond to user needs and input to help make the platform more user friendly and user-orientated;
- test specific platform features, functionality and tools;
- learn how users are using the platform; and
- increase user buy-in and uptake of the platform and its services by encouraging ownership and agency amongst the user community.

Overall, these engagements with users provide key opportunities for co-design, co-production and co-learning.

The formality of these steering committees, networks and reference groups and their role in driving the development and improvement of the platform varies. In the most formalised example shared, a steering committee consisting of representatives from relevant organizations directs the overall implementation of the platform with the support of a working group, which acts as an intermediate body linking the steering committee and platform secretariat and helps to communicate needs for the development of content and the structure of the platform. A less formalised example is the use of research programmes collaborating with and using the platform to gather opinions and recommendations on the platform. Other platforms focus on and continually engage and operate in close collaboration with a specific network of stakeholders, and these interactions provide opportunities to elicit key insights on user needs, feedback and on how the platform is being used.

User workshops (including evaluation workshops), provider-user meetings and ‘consortia’ (both with specific network and more broadly) have been used to inform the early development of several platforms, test prototypes prior to launch, and in some cases co-develop the vision of the platform. In many cases these groups have become a reference group used to inform the ongoing development of platform. This continuing engagement has been particularly important for maintaining user buy-in.

Another source of user feedback comes from user enquiries about the platform, for example to platform support desks. These requests, in particular requests for help, can be tracked to better understand why users are accessing the platform/tool, what they are doing with the platform/tool and where possible gaps remain.

Tracking user interactions with the platform

Analytics, in particular the Google Analytics web analytics service and social media feeds, are commonly monitored by platforms and used to inform development. These are analysed to understand how many and how users are coming to, and interacting with, the platform and its tools. The approach to tracking and analysis of analytics varies in formality, with some platforms consistently monitoring these metrics and producing regular summary reports. Yet, the limitations of these metrics for capturing user behaviour and platform performance are well recognised and this data is considered subsidiary to more direct user feedback.

Platform monitoring, evaluation and reporting/learning

Few platforms have formal or thorough monitoring, evaluation and reporting (MER) or learning (MEL) procedures or frameworks in place. Many platforms have ad-hoc approaches that can be considered as MER, including regular consultations with users through the engagements described above. These have largely focused on platform development and on eliciting user feedback and needs as opposed to more detailed evaluations of platform impact. The lack of formal process is typically due to a lack of resources for full M&E (and in general - see below, ‘Shared challenges’) and the prioritisation of these resources for platform development over evaluation. Some platforms are also too new for MRE to be immediately useful, but early planning for such a process is important.

Of those few platforms reporting a formal MER/MEL process and framework, these processes are linked to wider local, sectoral, national and international policy and planning initiatives. For example, platforms have been evaluated as part of the evaluation of National Adaptation Plans, and in terms of their impact on shaping local and sectoral adaptation plans and activities. A thorough evaluation of Climate-ADAPT has been recently conducted in line with the EU planning and strategy cycle and as such will be repeated at regular intervals. Another MER framework is defined according to broader national objectives for climate policy and the role of scientific research within it. These MER efforts have typically utilised surveys and interviews, and in the case of Climate-ADAPT have facilitated the development of use-cases to demonstrate how people are using platform.

Selected innovations

Regarding **surveys**, the ability to disaggregate responses has yielded important insights. For example, one platform (CCiA) used a separate process for surveying 'registered users' and 'existing and potential users' on the usefulness and ease of use of tools available on the platform. While the more established and advanced 'registered users' found these tools useful and easy to use, the 'existing and potential users' have lower levels of expertise and found the platform hard to navigate and the tools too complicated to use.

Regarding **user engagement**, many platforms have built strong relationships with user groups and their representatives, and engage them on a regular basis. These have proven hugely valuable for gaining regular, high-quality user feedback, enabling user-testing, and generating buy-in and uptake of the CAP and its services.

Regarding **analytics**, some platforms are systematically using analytics to analyse the impacts of promotional campaigns, and one (Intact Centre) reports using analytics to track users' initial and follow-up actions relating to a particular web-based application (with users' permission) to inform the development of effective outreach materials, campaigns and to help residents overcome identified barriers to participation.

Regarding **MER/MEL**, the connection of the evaluation of the platform to the evaluation of the adaptation plan they inform enables accurate analysis of the relevance of the services offered by the platform. For example, the evaluation of one National Adaptation Plan included an evaluation of the national CAP (AdapteCCa) which enabled valuable co-analyses of compliance between the services provided on the platform and adaptation actions contemplated in the plan and its work programmes.

Shared challenges

Resources (time, capacity, funding)

By far the most commonly reported challenge is access to time and resources for undertaking rigorous MER. There is often no dedicated funding for this, or funding that is available is linked to specific projects or stages of development of the platform so there is no funding continuity to support ongoing MER processes. Restricted resources typically mean that platform development is prioritised over formal MER activities, which are perceived as playing an ancillary role. Even where large-scale evaluations have been successfully undertaken there are still lessons to be learned about what worked regarding eliciting user feedback.

Limited resources are also cited as a key challenge inhibiting user engagement and the understanding of user needs. A common challenge is having sufficient capacity, expertise and resources for undertaking regular and effective user engagement and co-development approaches with users. Designing and facilitating highly beneficial engagements requires considerable skill and financial resources. This includes the related challenge of how to decide *who* to engage and work with.

Meeting expectations and needs of diverse users

Linked to this last point is the common challenge of delivering a quality service for *all* audiences. Many CAPs have diverse audiences, and so have multiple user groups that they need to engage with. The difficulty here is understanding and managing the needs and expectations of diverse users, including new users and evolving user groups (e.g. new sectors and industries). This includes:

- Understanding who the users are and what their needs and capacities are.
- Understanding how users use the services/knowledge.
- Understanding how satisfied users are (and why).
- Identifying new users and their needs.

- Identifying and responding to evolving user needs.

With regards to responding to users' needs, the key challenges are:

- Deciphering between 'expressed' needs and 'real' needs, and communicating this back to users.
- Clustering user feedback across user groups to address it in effective ways.
- Prioritising what user needs to respond to and in what order.
- Developing capacities and systems to consistently integrate user feedback into platform development.

How to undertake useful MER/MEL

Another often cited challenge is how to measure and evaluate platform performance (which broadly entails uptake, impact on decision-making, and user satisfaction). There are key knowledge gaps around the development of appropriate metrics/criteria, evaluation frameworks, and monitoring schemes, and applying them transparently. The evolving nature of CAPs' users and their varying needs and capacities over time further complicates the development of metrics and their use and comparison between evaluations.

Other key challenges and needs cited in the survey

- Approaches to open data, tracking and competitiveness, particularly with regards to maintaining audiences and funding models.
- How to make better use of web-metrics.

[Linked topics](#)

Topic 2: Supporting and working with local actors – understanding user needs and capacities; identifying representatives and 'champions' to work with.

Topic 6: Retaining relevance of platforms in a fast-moving world – how to track use by, and levels of satisfaction of, diverse and emerging/new users; how to understand, respond to and manage their diverse and evolving needs and expectations; trade-off between resources for retaining relevance and those for monitoring, evaluation and reporting/learning.

Topic 8: Business models and value propositions for financing platforms – having funds and protocols for MEL of CAPs that would support demonstration of impact, and user engagement/co-development approaches that are essential for delivering an effective service and promoting user buy-in; using user feedback to highlight demand for new/updated features and functionality to leverage funding.

Topic 9: Quality assurance, credibility and usability of platforms – user needs and perceived relevance; legitimacy and quality of resources provided; considering who reviews and decides on quality.

Topic 10: Platform architecture and technical development – linking MEL with implementation; balancing funding for eliciting and incorporating user feedback into general platform design and 'true innovation' (i.e. developing advanced functionality that users don't realise they need, or could not envision).

Topic 2: Supporting and working with local actors

Description of topic

This topic focuses on how we connect and engage with local actors, in particular local authorities, both online and face-to-face (and how we link these two approaches). This includes how we encourage and support these users, including how we demonstrate the benefits of acting on climate change, and build their capacity to undertake adaptation assessments, planning and implementation of interventions. Central to this topic is how we understand and respond to the needs of users, their capacities and decision-making contexts.

Questions used in the survey

- What actions have you taken in this area that you believe have worked well?
- What challenges do you currently have, or foresee, related to this topic?

Responses

24/27

Adopted practices

Demand for climate-related information at the local level is increasing rapidly and platforms are working hard to meet these needs. But responding to this increasing demand has to take place within the context of the resources available to platforms, and, in some cases, the increasingly limited capacity of local users, especially where adaptation is not driven by national policy requirements.

Local users working with platforms are diverse and include local authorities and municipalities, city-wide organizations, local NGOs, community groups, individual users, and sectors with specific users at the local level (e.g. farmers). Also important in this context are the boundary groups such as consultancies and professional membership bodies that have an important role to play in enabling and facilitating connections with local users and in promoting the use of CAPs to help inform local action (and in informing the development of CAPs). Several respondents also indicated that many local authorities engage consultants to help develop and write adaptation plans as they lack the capacity and resources to work with detailed climate projection and other data.

The majority of platforms that responded to the survey are primarily national in scope but recognise the rapidly increasing demand for information at the local scale. Others are already more focussed at the local level usually working within a specific sector or by virtue of working with specific stakeholder groups.

In the context of supporting and working with local actors, scale is a real issue. For those countries with many different climatic regions, cultural differences, and/or native languages etc., working with local users can be highly complex and very resource intensive. In Canada, the decision has been made by CCAP to focus on the national level, but to adopt a 'network of networks' approach and link with regional or sectoral organisations that then have responsibility for providing connections to local users. In Australia, a similar approach is being adopted by CCiA of partnering with others to help meet the rising demand for information and capacity-building. Other platforms work in part through local climate centres (e.g. Local Climate Change Adaptation Centers in Japan) and Climate Action Regional Offices in Ireland) or local government organisations (e.g. the Federation of Canadian Municipalities in Canada and LGCAN in Northern Ireland).

All platforms are working increasingly closely with local users in developing and improving their platform's content and functionality. Approaches to engagement being used include inclusion of local users in stakeholder groups, on advisory panels, working directly with local groups, seeking on-

going feedback through questionnaires and responding directly to proactive requests from local users. User testing of information and tools developed for local users, and the resulting feedback are also seen as valuable.

Often, the information and other support resources being provided by platforms have been developed for other uses and are often too detailed and technical for local authorities to use within their own decision-making processes. To address this, many platforms now provide regional and local-scale scientific information and data, and various tools for use by local users e.g. municipal vulnerability mapping, community risk assessments etc. Some countries have established separate regional and local platforms (or related initiatives) that are compatible with the national platform but focus specifically on local user needs and are developed in consultation with them (e.g. in Netherlands, Sweden and Finland).

Capacity-building at the local level is a common theme among survey respondents. Many platforms run training and capacity-building webinars, workshops and events to help local users engage with the information, to introduce new information and to explain the value of improved features of a platform. Peer-to-peer learning is often encouraged by CAPs and, in some cases, facilitated e.g. by inviting speakers from the user community to share experiences, and providing mechanisms for knowledge exchange and partnership work across the community.

Platforms can also help local users by highlighting adaptation actions carried out successfully at the local level and explaining how such action has built on the information available (case studies, published examples etc.); this can both inspire confidence and highlight likely progress and pitfalls to other users. Some platforms are providing briefing materials (written, video) for use by local officials when talking with elected officers about adaptation. These focus on local solutions-based approaches and attempt to bypass the need for everyone to understand the details of adaptation. Other platforms have been active in attending external conferences targeting municipal planners, local officials, municipalities and communities both to explain the value of CAPs and to seek feedback and local expertise to enhance delivery. An additional focus on capacity building is that identified by CCiA (Australia) who are working directly with local authorities to help them better able to write the tender documents soliciting consultancy support, and to evaluate the work of the consultants they subsequently engage.

Given the complexity of working with local users, shared learning between CAPs is important. Climate-ADAPT, with their European-wide focus, has taken a lead in organising and facilitating a number of international conference sessions designed to facilitate knowledge exchange across the CAP community to discuss issues including working at the local level. Several CAPs are also working with web-based information services in other areas to exchange knowledge and expertise on meeting local user needs. In addition, research projects underpinning the development of CAPs, often include engagement with local users as an integral part of the research. Going further, embedding researchers within a local stakeholder organisation for a period of time helps to understand the local decision-making context such that the results can be better focussed to meet user needs.

Selected innovations

Some platforms have focused resources allocated to enhancing local use which allow them to work particularly closely with local stakeholders. Adaptation Scotland has a specific work package on 'place-based adaptation' where they collaborate with city, regional and local partners to establish local initiatives across Scotland. Within this work, it is important to understand local context, develop detailed business cases before establishing new initiatives, be clear on purpose and to ensure that there is local buy in as any initiative must be self-sustaining and able to secure ongoing funding to succeed.

In Northern Ireland (NI), NIAdapts is not a stand-alone platform but works through the more general Climate NI website. Working with LGCAN - a support group for the 11 local councils - NIAdapts provides an adaptation planning approach tailored to the specific local context, stripped back to essentials, and focusing on practical local action to be delivered by non-specialists. As there is no legislative backing for local authority action in Northern Ireland, the approach has been kept very simple to enable local officers to make a start. NIAdapts was developed in consultation with one Derry Council and volunteers from other local authorities within LGCAN, and the aim is for LGCAN to continue the shared learning moving forward, cementing the platform as a consistent framework for adaptation across the region. At present, the work is based on good will but hopefully enough has been achieved to avoid the risk of progress relying on just one individual in each council. Crucial to this achieving this progress was the fact that Climate NI is a trusted independent organisation and that the climate manager in Derry Council is an enthusiastic champion of the work.

The Intact Centre platform in Canada specialises in working with homeowners and communities (and others) to identify and reduce the impacts of extreme weather and climate change, for example helping homeowners reduce the risk of flooding. They work with a wide variety of stakeholders to complete community-based research projects and to develop peer-reviewed best practice guidelines and standards related to local climate resilience (flood, urban interface wildfire, urban heat, financial). A particular strength is their focus on working with collaborators to promote the work publicly through the media, presentations, webinars, keynote addresses and op-eds.

The Pacific CCS platform was developed with CSIRO Australia and 14 partner Pacific countries. A key feature that contributed to its success was the upfront appreciation of local differences; including the formal recognition of the sovereignty of the Pacific Island partners to ensure that all engagements were undertaken in an inclusive and culturally and politically sensitive manner which respected their intellectual property rights to scientific data and traditional local knowledge as related to their national climatology (see also Topic 5). Another key feature was the delivery of various scientific products in multiple local languages to facilitate outreach to stakeholders at all levels.

Shared challenges

Particularly in those countries with little political support and limited policy requirements for climate adaptation at the local level, establishing and sustaining long-term collaborative relationships with local users can be difficult. Active communication, connecting local/practical needs with national policy and providing examples of successful action can all help, but it can be difficult to gain traction.

Nearly all respondents mentioned the need to balance available resources with the diverse requirements from across the range of local users. Many CAPs are run by small core teams and there is a direct trade-off in resources between working with an increasing number of local users and, for example, the broader platform development.

Keeping platforms up-to-date is a common challenge raised in many responses. But it is particularly relevant here given the increasing pace of climate-related information and data generation and the need to reflect this in a manner suitable for local use. This effort is also linked to the increasing need for on-going capacity-building initiatives by CAPs to help local users at all stages of the adaptation cycle to understand and use the information provided appropriately.

Language can be a barrier in those countries with multiple native languages and also for trans-national platforms. To reach local users, platforms are considering or implementing the delivery of information in local languages to facilitate outreach to local and community stakeholders in a manner that also recognises the specific cultural contexts in which the information will be used. For trans-national platforms, English is often used as a common interface but may not be appealing to all.

Where countries have platforms at multiple levels (national, regional, local, sectoral) improving the interlinkages (interoperability, consistent use of information), including to help ensure local action reflects national policy, is an ongoing issue.

All the issues listed above raise the question of how far can/should individual CAPs go with respect to supporting and working with local users. The context (funding, resources, demand from local users) within which each platform operates is different, but some are taking the deliberate decision to limit the extent of their potential offer and to seek to partner more formally with others to facilitate the flow of information to local users.

Linked topics

Topic 1: Co-evaluation, learning and capacity development to drive platform improvement - for example, the conceptual development of the CAPA (Alps) platform was based on an Alpine-wide survey of user needs, including in particular, local authorities; networking with funding programmes for supporting regional and local adaptation in Alpine countries; and discussing and testing new developments and functionalities with EUSALP actors.

Topic 4: Communications, knowledge brokering and stewardship to stimulate and enable action - crucial to work within the local users' contexts using non-specialist language, to stimulate peer-to-peer knowledge exchange and learning, and to provide dedicated resources to help facilitate outreach to various stakeholders from local through to government.

Topic 5: Integration of cultural, including indigenous, knowledge, capacities and needs into platforms - an effective two-way dialogue with local users can enhance both the platform offer, in a form that recognises local languages and cultural contexts and helps integrate local knowledge and expertise into the information provided.

Topic 6: Retaining relevance in a fast-moving world - this is critical but challenging especially when trying to support action at the national, regional and local level when resources are limited in both amount and time they are available (e.g. limited to project-based times).

Topic 7: Integration and coherence across platforms - improving the connection between the local, regional and national platforms.

Topic 9: Quality assurance, credibility and usability of platforms - how to ensure the tools and products being delivered by platforms are helpful to local actors and sufficiently rigorous to reliably inform local action.

Topic 12: Social justice and equity - many CAPs work with local-level organizations which are typically better at understanding their at-risk and/or marginalized communities (with respect to climate change), and this presents an opportunity to better connect to adaptation solutions that advance equity.

Topic 3: The role of CAPs in supporting monitoring, reporting, and evaluation of progress in adaptation (and other areas)

Description of topic

This topic focuses on the role of platforms in contributing to national and international monitoring, reporting and evaluation (MRE) of adaptation actions. While this topic is important, it has not been a specific objective for many platforms to date. As such, this topic includes the perceived legitimacy of this role for platforms – whether it is a role that has been anticipated and to which platforms are able to contribute. It also includes the understanding of the implications in terms of the data, information, functionality and resources, as well as the technological systems and capabilities needed to carry out this role, and the enabling governance structures and institutional arrangements required.

Questions posed in the survey

- What actions have you taken in this area that you believe have worked well?
- What challenges do you currently have, or foresee, related to this topic?

Responses

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Adopted practices

Although most platforms do not have a primary role in monitoring, reporting and evaluation of national progress on adaptation, many do play a critical role within their respective adaptation landscapes, particularly as a means to promote, inspire and support adaptation action and being involved in discussions related to the development of adaptation indicators (A-Plat). This includes vertical and horizontal coordination (CCAP, AdapteCCa and NIAdapts) and the provision of information for policymakers preparing their respective MRE reports. Most platforms provide case studies and/or examples of users' journeys as the primary means of promoting, inspiring and supporting adaptation action. In some cases (Austria, CCiA and Adapt2Climate), information such as links to national progress reports and to related information is gathered and synthesised to facilitate reporting while others (KLiVO, Climate Ireland, Climate-ADAPT and the Dutch Spatial Planning Knowledge Portal) also provide links to their respective adaptation strategies. Engagement through regular meetings with relevant ministries and those responsible for scrutiny related to progress (e.g. the UK CRP links with the UK government's Climate Change Committee) also provides timely opportunities to inform MRE at the national level.

Climate-ADAPT works across the European Union (EU) with member states providing official government reports (self-reporting) on adaptation under Article 15 of the EU Monitoring Mechanism Regulation. National ministries manage the content of the reports and member countries may provide additional submissions on a voluntary basis. The European Commission has then developed specific guidelines to allow for the use of this information for multiple purposes, including for updating the country-specific information pages on Climate-ADAPT.

Evidence from platforms in the Asia-Pacific (Pacific CCS, RCCAP), Canada (CCCS), and Australia (CCiA), as well as within KE4CAP, show that enabling key climate service providers to work together strategically to advance products and services can also inspire and promote progress on adaptation. There appears to be considerable potential to enhance the capacity to measure, report and evaluate where users are going to access climate information and supporting resources, and to track what they are doing with those resources and what gaps remain.

Selected innovations

The Intact Centre (Canada) has built-in tracking and feedback functions makes it easy to monitor and report on adaptation progress. This capability also provides a means of continuously improving programmes and has supported the development of an online college-level Home Flood Risk Assessment Training Programme.

A new benchmarking tool for the Adaptation Capability Framework introduced by Adaptation Scotland seeks to assess how adaptation capability is maturing over time with potential utility in measuring adaptive capacity and preparedness.

Within Canada (CCCS), the climate service organizations have worked together to develop and oversee a new climate information portal: ClimateData.ca. The development process brought together key actors to develop a tool that has national coverage and to reach consensus on the best available resources and tools.

Shared challenges

In general, the majority of platforms see their primary role as sharing knowledge, data and other resources and view monitoring, reporting and evaluation of progress on adaptation as being beyond their current mandate and resource allocation. For some, their role in such a process is limited by perceived legitimacy or having processes and capabilities to track and validate such action, including access to required information. Challenges are also linked to the complexity associated with developing such a capability, as well as complexities associated with matching the scale of the existing and evolving risk with the proposed and implemented adaptation measures.

One or two countries are developing tools specifically designed for this MER purpose. Others see the potential for such but doing so would require formal recognition of such a role within the work programme (and finances) and the development of new platform solutions that provide the technical features and properties needed.

Undertaking such a role is seen as particularly challenging for transnational platforms due to many of the same reasons as for national platforms, amplified by the number of countries, departments and agencies involved.

Linked topics

Monitoring, evaluation and reporting on progress related to adaptation (and resilience) actions is strongly related to the need for continuous learning and improvement (**Topic 1: Co-evaluation, learning and capacity development to drive platform improvement**) and retaining relevance (**Topic 6: Retaining relevance of platforms in a fast-moving world**) in that MER can inform requirements and priorities in these two areas. There is also a link to technological developments (**Topic 10: Platform architecture and technical development**) in that monitoring and evaluation can be used indirectly to help identify and promote the need for changes in the platform architecture towards e.g. greater integration with other initiatives.

There is also a strong link to **Topic 4: Communications, knowledge brokering and stewardship to stimulate and enable action** which includes demonstrating the added value of such platforms.

Topic 4: Communications, knowledge brokering and stewardship to stimulate and enable action

Description of topic

This topic focuses on how we use communications to increase the visibility, uptake and use of the platform (for example through promotional and motivational activities), including the use of storylines, use cases and user journeys. This includes how we use knowledge synthesis, brokering and packaging to support actionable learning, and how content and knowledge stewardship can support transparency, legacy (ensuring insights and learning continue to be found), and line of sight between related content. This also includes efforts to support communications in different languages, and to promote understanding of technical terminology.

Questions used in the survey

- What actions have you taken in this area that you believe have worked well?
- What challenges do you currently have, or foresee, related to this topic?

Responses

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Adopted practices

Knowledge sharing

The survey responses included mention of numerous knowledge brokering good practices, including:

- taking a standardised approach to content that focuses on key aspects for readers, e.g. through following a specific template;
- focusing on providing comprehensive details but in a brief, concise way;
- including relevant links to other content and services;
- providing contact details, e.g. for the actors authoring the work and organisations involved;
- using clear, plain, uncomplicated language and avoiding scientific jargon and abbreviations;
- keeping the site up to date, for example by sharing frequent news updates and publishing new content;
- hosting content in ways that supports openness (of data and content) and accessibility, for example not using paywalls and ensuring the platform can be accessed through widely used devices and browsers;
- being transparent about how the knowledge was developed, and by whom.

Several platforms actively link and drive their users to other websites and platforms. These include e-learning platforms and an RSS feed on current affairs in the field of climate change (Climate Finance Knowledge Portal), and links to work in adjacent countries to ensure users are supplied with relevant additional knowledge generated elsewhere in the wider region (NIAdapts).

The importance of convening actors to share knowledge is emphasised by multiple platforms. Different models are used and the options and entry-points for users to contribute content (e.g. directly or via platform administrators) vary between platforms. For example, CoastAdapt approached and advertised for candidates to provide case studies of their activities, and offered payment and provided a 'mentor' to guide the case study development. Similarly, the Intact Centre gathers and shares personal and institutional case studies to illustrate the practical applicability of using best practices, and to motivate others to do so. Many others, including the Swedish platform,

work directly with national government agencies to provide specific content linked to national policies.

To further enable the (offline) sharing of content and knowledge between users some platforms have developed discussion forums (e.g. Climate Finance Knowledge Portal) and other similar facilities to connect across users with specific requirements.

Closely linked to this are case studies, which are used by platforms (including KLiVO, CCCS and Climate-ADAPT) to showcase/demonstrate how climate information and knowledge, including from the platform itself, are being used in decision-making. These case studies provide inspiration and help build capacity and expertise to enable the effective use of climate information to support adaptation action.

Most platforms undertake targeted knowledge curation and sharing to meet the knowledge needs and preferences of users. This includes the collation of selected reports, news, and videos (e.g. TCCIP) and information on relevant policy initiatives, e.g. NIAdapts charts and shares information on the progress of adaptation plans in Northern Ireland.

Knowledge translation, synthesis & tailoring

Several platforms provide multiple language translations of the whole platform (e.g. CCCS, Adapt2Climate, climateguide.fi), and of key content for users in general (TCCIP translates select international resources into the national language), and for specific groups (CCCS translates key presentations from workshops and information sessions into the audience's language, including indigenous dialects).

Some platforms actively co-develop knowledge products and resources with experts and users. This model, which is used by CCS among others, “supports strong knowledge brokering and stewardship and empowers users, over the long-term, to consider climate change in their decisions”.

Most, if not all platforms develop a range of communication and knowledge products for, and tailored to, different audiences. Examples include:

- Pacific CCS provided:
 - technical and non-technical summaries for all science outputs;
 - local language translations for many (not all) of these outputs;
 - delivery of novel communication products using different media including digital animations of scientifically informed key messaging (e.g. [Climate Crab](#), [Cloud Nasara](#)) for local communities, schools, church groups etc.; and
 - content to enhance 'train the trainer' capabilities, to enable local practitioners (e.g. national meteorological services) to reach out to their local stakeholders at a sectoral/local community level to communicate and raise awareness of climate change science and impacts.
- Adaptation Scotland has produced '[Climate ready places](#)', an interactive resource that supports the communication of the difference between adapting and not adapting across six typical Scottish landscapes.
- TCCIP has provided translated climate projections in the "Scientific Report on Climate Change in Taiwan". The most important graphs from this report have been reorganized into a "Climate Change Atlas of Taiwan".
- Climate-ADAPT provides a synthesis of knowledge on main topics and sectors.
- NIAdapts provides:
 - Guides for specific user groups with knowledge synthesised from a wide range of sources such as the Met. Office and outputs from the CLIMATE project to provide professionals with a clear guide to follow on adaptation.

- Service Area factsheets, which aim to empower non-specialists to feel supported with background knowledge when engaging with colleagues in local councils .
- Many platforms translate and transform climate information, products and tools into user-friendly and accessible resources; tailor key presentations to include examples, information and scenarios that relate to the audience (making the content relatable and inspiring); and develop resources with guidance from scientific experts but simplified for a general audience.
- CCCS Climatedata.ca packages relevant climate information, data and products into Sectorial Modules (e.g., on Health), in order to support targeted and actionable learning. These modules are built in collaboration with experts and users and are linked to case studies/use cases. A training working group from across levels of government, climate service providers, and academia are working together to develop plug and play material on topics such as climate science, projections, uncertainty, and extremes. In the future, CCCS will adapt the services, products and tools for an indigenous audience, including translation into indigenous languages.

This tailored online knowledge is often used alongside face-to-face engagement with stakeholders, including with respect to training and capacity building (e.g. Pacific CCS, NIAdapts and Climate Ireland).

User support

Supporting users to get the most out of using the platforms and the services and knowledge they provide is key to enabling action. To this end most platforms provide user support. This includes specific guides on how to use the platform (e.g. AdapteCCa), and information packages for new users on how to get started on the platform (e.g. how to build one's profile), and reference to how-to information (e.g. CCAP).

Many platforms provide specific guidance on how to adapt to climate change. For example, NIAdapts provides a highly practical 'How To' guide that includes, for example, "What do you need to know" and "What do you need to do", plus information sheets on climate change, current policies etc. CCiA provides a Projections Help Desk and CCCS provides key resources designed to help users' understanding of technical terminology.

Communications for visibility and knowledge dissemination

All platforms take a multifaceted approach to communications for disseminating knowledge, increasing the visibility of the platform, and for engaging with existing and new users.

Compelling storytelling and relatability have proven important for gaining traction amongst readers. For example, collaborations with residents to share stories of their climate-related challenges and what they have done to overcome these have proven effective for engaging stakeholders with the Intact Centre platform.

Centralising the platform as a go-to repository has proven successful for increasing uptake. For example, Canada's CCAP communication strategy requires users to go to the Adaptation Platform workspace in order to retrieve information and documents for meetings, webinar information etc. thereby driving users to the platform. Similarly, Climate-ADAPT benefits from a protocol where projects funded by the EU must disseminate their work via the platform.

"Multipliers", "champions", and networks have played important roles in platform visibility and uptake. For example, KLiVO encourages climate service providers and network members to incorporate the platform logo and link on their website; other platforms encourage relevant national government agencies to link through to the platform. Similarly, T-PLAT is featured on and was launched by official Thai government websites. With regards to networks, CAPA leverages the EU Strategy for the Alpine Region (EUSALP) network of actors and transnational bodies and are

developing a package of dissemination materials that members can use to promote CAPA in their home organisations, regions and countries. AdapteCCa is building on the network and activities of the LIFE SHARA (Sharing Awareness and Governance of Adaptation to Climate Change in Spain) and National Plans for Adaptation to Climate Change (PNACC) projects, which are also being used to disseminate the platform and informally gather opinions and recommendations.

Social media (Twitter, Facebook, LinkedIn etc.) plays a prominent role in platforms' outreach. Platform newsletters, typically released every 2-3 months, are commonly used to share news, forthcoming events, calls for proposals, and new content with readers. Canada's CCAP also broadcasts a quarterly message from the Chair of the platform. Mainstream media also plays an important role in giving platforms visibility, particularly when they are first launched. The Intact Centre uses various analytics to track the uptake of different communications products and services, and uses the results to improve them.

Participation and exhibition at conferences, events, seminars, webinars, meetings and fora also play a significant role in platforms' outreach. For some this takes place in context of networks supporting the platform (e.g. AdapteCCa is represented through PNACC and LIFE SHARA). Several platforms host their own events, for example seminars for different focus groups to promote content and knowledge on the platform (TCCIP), regional information seminars (AdapteCCa), and full conferences (KLiVO). In-person meetings (or, more recently, online) presentations, face-to-face training and capacity building, and open days all play a role in increasing the visibility of, and user engagement with, platforms.

Outreach materials cited include flyers, brochures, postcards, pens, posters, and digital multimedia including videos (e.g. KLiVO), animated features (e.g. Pacific CCS), and media stories (e.g. CCiA).

Selected innovations

Regarding **knowledge sharing**, the approach taken by CoastAdapt - to approach, pay and mentor candidates to provide case studies of their activities – is unique.

Regarding **knowledge translation**, several platforms have produced innovative knowledge products that translate climate change adaptation for specific audiences. Examples includes TCCIP's "Climate Change Atlas of Taiwan" and novel communication products developed by Pacific CCCS (e.g. Climate Crab, Cloud Nasara).

Regarding **outreach**, key success factors include the telling of real, relatable stories (Intact Centre), and the leveraging of multipliers, champions and networks as active agents for promoting the platform.

Regarding **communications** in general, Adaptation Scotland highlight that arts and creative practitioners can be hugely beneficial to projects and platforms. As a result, Adaptation Scotland are increasingly viewing creative and cultural practices as an integral part of their work.

Shared challenges

Technical:

- For aiding navigation of the platform and discovery of content: Search Engine Optimization (SEO), optimize keywords, search and filter function.
- Managing and linking across multiple portals, and supporting users to understand and navigate multiple portals that have different purposes, without confusing them.

Connecting knowledge:

- Linking more effectively to other initiatives.
- For end-of-life platforms - facilitating an effective transition for current users to new/other more contemporary websites and portals.

Uptake/attracting users:

- Tailoring content for different users; in particular how to reduce technicality without losing important details, and how to best communicate with local actors with simple language and infographics.
- Engaging existing and new users and increasing uptake across all audiences; this includes how to develop and implement marketing and communication strategies.
- Building relationships with users of the platform where activities are solely or mostly online, or where closer engagement with users is undertaken by another actor/organisation (e.g. sub-contracted).
- Parallel distribution of the platform between traditional media and social media
- Encouraging engagement and contributions from users.

Resource requirement of and a lack of resources/funding for:

- Promoting constant engagement and inspiration; reminding key persons to take action.
- Providing and/or contracting professional communication services.
- Language translation - of content and whole platform.
- Keeping up with demand and being able to meet opportunities (e.g., attending events).
- Matchmaking and linking stakeholders
- Tailoring communication approaches and products to meet specific user needs.

Instigating action – moving from knowledge to action:

- How to inspire users to turn ideas into actions.
- How to build users' capacity to take action:
 - How to develop climate champions who can synthesise information for their own organisations.
 - How to increase the climate literacy of the public, to mainstream climate change and adaptation decision-making.
 - How to increase the public's intake of key climate concepts and considerations to support decision-making.

Innovating:

- How to integrate creative and cultural practice into adaptation projects, platforms and services.
- How to avoid dissemination and knowledge exchange being tokenistic, an afterthought and poorly resourced.

Linked topics

Topic 1: Co-evaluation, learning and capacity development to drive platform improvement – knowledge exchange networks built up during the development of a platform or involved in ongoing improvements can provide a key group of champions willing to promote the platform and knowledge sharing to users. For MEL, the development of cases studies can be used to evaluate impact but also to offer inspiration and demonstration to users on how to incorporate knowledge from the platform into their own work.

Topic 7: Integration and coherence across platforms – connections with other knowledge providers (including websites, networks, platforms). There are multiple ways in which this can be done, for example RSS feeds, links to resources on other platforms etc. Knowledge curation can aim to provide holistic packages of knowledge and resources for users from across multiple websites.

Topic 8: Business models and value propositions for financing platforms – in some cases this work is reliant on effective communication with external projects and networks.

Topic 9: Quality assurance, credibility and usability of platforms – perception of quality and trustworthiness of data is key to successful knowledge brokering. This is a particular issue for

platforms featuring user-contributed content, which is essential for peer-to-peer learning, but may not have been peer-reviewed.

Topic 10: Platform architecture and technical development – SEO and search functionality for content discovery.

Topic 11: Governance of platforms - connecting to (and harmonising) multiple platforms with different specialisms; transitioning to newer platforms (end-of-life planning). Connectivity with government departments and other key actors and networks.

Topic 5: Integration of cultural, including indigenous, knowledge, capacities and needs into CAPs

Description of topic

This topic focuses on understanding the needs and values of indigenous communities and different cultural groups, and integrating these into platform design and delivery. Considering the nature of cultural and societal differences that exist within and across countries, the potential value of that diversity for adaptation and resilience actions and the challenges that diversity presents when stimulating and enabling coherent and effective action, this is a topic that needs particular attention. It includes how we integrate cultural (including indigenous) knowledge in ways that recognise the ownership of that knowledge, and how we use the extended nature of platforms (i.e. beyond just the web) to support the inclusion and representation of these groups in adaptation decision-making.

Questions used in the survey

- What actions have you taken in this area that you believe have worked well?
- What challenges do you currently have, or foresee, related to this topic?

Responses

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Adopted practices

Common good practices revolve around inclusive and culturally and politically sensitive engagement (CCiA, Intact Centre, RCCAP) targeting cultures and indigenous communities in the co-development and co-design of content (Pacific CCCS) and when showcasing content and capabilities (CoastAdapt, T-PLAT, Climate Ireland). This level of engagement is particularly important when including local knowledge of indigenous communities and different cultural groups (T-PLAT) within the platform. To enhance its impact, it is suggested that this engagement should result in the building of trusted relationship (RCCAP) such that the knowledge exchange processes become embedded in those communities.

Other approaches identified included the provision of region-specific information with relevant scientific and research data and integrating good practices on the platform (Climate Finance Knowledge Portal, Climate Ireland) through case studies, success stories, voice-overs and video-bytes from those working on the ground, especially with place-based adaptation initiatives (Adaptation Scotland). The availability of online templates to support users who supply this type of information can be useful (Climate Ireland, Climate-ADAPT). Also identified were initiatives including information and resources that tackle challenges of particular interest (e.g. impacts information of interest to Arctic indigenous people and their livelihoods (climateguide.fi) and risk communication and disaster risk management information targeting immigrant communities (National Adaptation Portal for Austria).

Selected innovations

Examples of innovative perspectives include the use of both technical and non-technical summaries of all science outputs and translation into local languages. Such measures can enhance meeting the knowledge and knowledge-sharing needs of different users with positive impacts on cross-border and cross-culture engagement and action. Highlights include using different and culturally appropriate media, including digital animation of scientific messages (Climate Crab and Coad Nasara within Pacific CCCS) and developing content that enhances train-the-trainer's capabilities enabling local practitioners to reach out to their respective communities.

Establishing a series of satellite platforms linked to the parent website as repositories for specific information (Pacific CCS) can be a workable option, including to address the language issue. It was noted that in this case these data and information are password protected in recognition of their national ownership and value.

The CCCS is currently looking at issuing a contract for an indigenous organization to help the platform adapt its services, products and tools for an indigenous audience, including translation. Within the CCAP, three national indigenous organisations are members of the national plenary and have led sessions on indigenous-led adaptation approaches which highlighted the need for self-determined decisions for climate action.

Shared challenges

Commonly identified challenges relate to being better equipped, resourced and knowledgeable to integrate cultural, including indigenous knowledge, capacities and needs into CAPs. It is recognised that reaching out to and building and sustaining relationships with and across the diverse cultures that exist in many countries, especially where that aim is to appropriately reflect that diversity in the products and services available is resource intensive and therefore challenged by the availability of human and financial resources.

The type of engagement required (understanding what works well, where and why) requires further development, including through the sharing of experiences and lessons learnt. The responses suggest that engagement is mainly done by actively participating in workshops and climate-related meetings that target or to some extent engage these communities (either at the level of national organisations or one-on-one as the opportunities arise). This further development includes consideration of how 'best' to engage particularly when that diversity is real (in terms of different world views), large and evolving (in terms of perception and action) and how to scale up from individual community to a regional or national level effort.

Responses related to using a CAP, particularly a web-based platform, raised further challenges linked to supportive technologies, mechanisms and capacity building. Among these are those related to: identifying which organizations to include and how to prioritise different organizations; introducing and supporting these organisations and communities in linking to adaptation and resilience and sustaining these relationships; integrating socio-cultural considerations in a way that is equitable and respectful; and consideration of options outside of the 'conventional' online platform that can effectively engage and deliver (e.g., where technologies are a limiting factor). These challenges point the need for further capacity building both within these culturally diverse and indigenous communities, and also with those responsible for providing the products and services.

Other identified challenges relate to the lack of willingness to share data and knowledge (or supportive mechanisms to help) including recognition of the ownership of traditional knowledge alongside climate information and other knowledge and analytical tools. The fact that many indigenous (and other) communities see disaster risk reduction as a priority whereas climate change is not an immediate threat is a barrier to climate action beyond DRR.

Faced with these challenges, many platforms rely on others (platform users, knowledge brokers or intermediaries) to reach out to these diverse cultures and indigenous communities which can be challenging in itself as it depends on the capacities of others and effectiveness of those relationships.

Although information and data are being used by indigenous users and different cultures, that available is still lacking in terms of the inclusion of traditional knowledge and of specifically targeting those users and communities. To a certain degree these deficiencies stems from a lack of understanding of the extent to which cultural differences are playing a role, the degree to which both formal and informal social networks, power dynamics, and levers of change come into play, and how to use these and other means to improve inclusion; and the lack of other cultural aspects related to knowledge sharing mechanisms. On the inclusion of traditional knowledge, the lack of a

compilation of a database of local wisdom or adaptation and resilience actions already being taken by indigenous communities is noted as a particular barrier.

Linked topics

Topic 1: Co-evaluation, learning and capacity development to drive platform improvement. There is a lack of processes for evaluating the impacts of such engagement over time on the platform and on attribution to actions taken.

Topic 3: The role of platforms in supporting the monitoring, reporting and evaluation of progress in adaptation. Monitoring, reporting and evaluating of the relative success of information provision to inform action by different cultures and indigenous communities is a common challenge, especially when engagement is project-based and time-bound.

Topic 6: Retaining relevance of platforms in a fast-moving world. There is a link to maintaining relevance regarding ensuring that data and information is up-to-date when there is not continued or sufficient engagement or lack of formal agreements to share knowledge and data.

Topic 6: Retaining relevance of CAPs in a fast-moving world

Description of topic

This topic focuses on how platforms continuously renew their content and functionality to meet users' evolving needs and capabilities. This includes establishing processes and mechanisms that allow for, prioritise, and enable the tailoring and updating of tools, resources and content in response to evolving policy, practice and science. This also includes how we leverage and build on the work of others to introduce improvements and innovations that continue to meet evolving user needs and that facilitate the translation of relevant new data, science and information.

Questions used in the survey

- What actions have you taken in this area that you believe have worked well?
- What challenges do you currently have, or foresee, related to this topic?

Responses

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Adopted practices

In order to meet evolving user requirements and capabilities, CAPs are adopting a wide range of approaches to keep abreast of user requirements and capabilities as they progress through the process of adaptation planning (from understanding to planning, implementation and monitoring), and to ensure that information contained on CAPs remains up-to-date and in accordance with the latest advances in science, policy and user requirements and capabilities.

User Requirements

To better understand evolving users' requirements and capabilities and to inform updating of information and tools contained on CAPs, survey responses indicate that a range of actions are being taken by CAPs:

- CAPs are engaging directly with users at meetings, workshops and forums to understand evolving user requirements. For example, Climate Ireland hosted the 2nd International Climate Adaptation Platforms Meeting which included representatives from a wide range of CAPs and a user group consisting of local and sectoral adaptation practitioners. As part of the workshop activities, the user group identified their expectations of what a CAP should provide in terms of functionality, information and tools. These expectations were then assessed against the functionality, information and data provided by each platform represented at the workshop, and areas of improvement identified.
- CAPs are working directly with adaptation practitioners and users, through training workshops and capacity building events, to understand how information and tools contained on CAPs are currently being used, and to obtain feedback and recommendations to inform further development.
- Through participation in national and international research projects and networks, CAPs are developing an understanding of the range of information and tools being provided through CAPs to support users and gaining a more comprehensive understanding of the full range of potential user requirements.

Information Update

In order to ensure that information and tools contained on platforms are updated according to advances in climate change and adaptation science and in line with user requirements and capabilities, the survey responses indicate that CAPs are undertaking a range of actions:

- A number of CAPs are putting in place updating processes and procedures to ensure regular and systematic updating of materials. These include: the establishment of working groups which include policy-makers, academics, and adaptation practitioners; and the establishment of steering groups and committees to support the prioritisation of updating information and data contained on CAPs.
- CAPs are ensuring flexibility in platform design and architecture which allows for information to be updated quickly and routinely, and out-of-date information to be removed (e.g. T-PLAT).
- CAPs invite contributions from partners (e.g. SMEs, adaptation experts, international practitioners) to develop articles and contribute to discussion forums. Platforms also integrate news feeds to ensure the provision of the latest information on climate change and adaptation.

Selected Innovations

CAPs are taking a number of innovative actions including:

- Establishing of dedicated working groups. To support the updating of the climateguide.fi, a renewal working group has been established which comprises representatives from research institutions and government ministries; this working group plays a key role in helping to prioritise content update. To support the development of Canada's CCAP, an intricate governance structure has been established to support and oversee the development and renewal of the content and functionality of platforms to meet evolving user needs and capabilities. As part of this governance structure, dedicated committees have been established to oversee and develop the various components of the platform and include: a data working group; a product working group; sectoral module working groups; a project management working group; an outreach working group; an agreement advisory group; and a training sub-group.
- Establishing of quality assurance processes. CAPs are establishing updating mechanisms to guarantee the regular and systematic updating of information and data. For example, all information contained on Climate-ADAPT is detailed in a database which reflects the main structure of the platform (main navigation menu and submenus) and the Climate-ADAPT webpages. In this matrix, each of the webpages is associated with the following parameters: frequency of updating, estimation of effort needed, experts responsible of the webpage contents, workflow (from inception to review and the adoption of the webpages text, contents and other elements). This approach supports the prioritisation and updating of information.
- Engaging with wider discourse on CAPs. By engaging with international policy and practice, Climate Adaptation Services (responsible for the Dutch platforms) is developing an understanding of the full range of support being made available through CAPs to support adaptation planning. On this basis, they are anticipating the needs of their users and working proactively to ensure their ability to meet potential future user needs.
- Enabling users to establish their own user profile on the platform. From such a profile, users can incorporate additional resources and information on adaptation into the platform, and interact with the AdapteCCa community (requires registration).
- Working directly with users: By working directly with users in the development of adaptation plans and strategies, CAPs including Climate Ireland and the Intact Centre are gaining an operational understanding of user needs and capacities for adaptation planning which supports the prioritisation and development of updated and new content and functionality.

- By expanding its network to include private sectors and professors from diverse research backgrounds, TCCIP has provided a forum (a section of their 'climate column') that enables these engaged experts to share their innovative adaptation experience and research insights. The aim is to enhance the opportunities to inspire more actions by their target audience.

Shared Challenges

Survey responses indicate that continuously renewing the content and functionality of CAPs is challenging for CAP providers with a number of specifics identified:

- Many CAPs focus on a wide range of users (e.g. local authorities, sectoral planners and the general public) and keeping platforms up-to-date with content for a broad range of users, both new and existing, is challenging.
- Understanding user requirements and updating information contained on platforms to reflect evolving user needs is challenging in terms of financial and IT resourcing. For the latter, resource is required for both updating the platform according to information requirements and also in relation to technological development and needs (e.g. the provision of responsive platforms accessible both on desktop and mobile devices).
- The policy environment is evolving fast, e.g. the publication of the EU Green deal and upcoming EU Adaptation Strategy, and keeping platforms up-to-date with this new information is a challenge.
- Keeping staff up-to-date with new approaches, technologies and methods to present information coherently, robustly and in a user-friendly format is challenging.

Linked topics

Topic 1. Co-evaluation, learning and capacity development to drive improvement - retaining relevance is intrinsically linked to Topic 1 as responses indicated that when updating the content or functionality, there is reference to working with users and other experts to evaluate those updates.

Topic 9. Quality assurance, credibility and usability of platforms - efforts to retain relevance require on-going quality assurance and often involve engagement of users to assure them of credibility and usability of the platform.

Topic 7: Integration and coherence across CAPs

Description of topic

This topic focuses on how platforms can realise and enhance inter-platform, trans-national and trans-regional cooperation. This includes advancing content coherence, data and information sharing, and technical interoperability (operational models, standards, technology) across platforms supporting similar users. This includes defining relative roles and means of cooperating and interfacing between e.g. different government bodies and sectoral platforms, and what governance structures and arrangements are needed to support coherence across platforms.

Questions used in the survey

- What actions have you taken in this area that you believe have worked well?
- What challenges do you currently have, or foresee, related to this topic?

Responses

22/27

Adopted practices

Enhancing integration and coherence takes place in various directions. Firstly, there is the vertical integration, for instance through connecting national platforms to international platforms, such as Climate-ADAPT (European), AP-PLAT (Asia-Pacific region), and CAPA (Alps region). There are also examples of connecting the national platform to regional and local platforms domestically (e.g. in the Netherlands).

Secondly, there is horizontal integration, when integration of societal sectors is taking place, for instance when a connection is established with knowledge infrastructure for health (CCCA). Connection with the mitigation domain, being the other side of the climate change coin, appears not to be addressed by the survey respondents.

Thirdly, we see examples of deliberate content integration (e.g. data and tools, e.g. climateguide.fi), which is at the heart of many CAPs. This integration can take shape through actually incorporating certain data and tools into the platform (RCCAP, KPSA) or providing a directory for links to various libraries and datasets. The latter, with the platform having the ambition of being a single-entry point or hub (Adapt2Climate, Intact Centre, Sweden) appears to be a common denominator of most CAPs.

These various forms of enhancing integration and coherence are often established through personal and organisational connections and alliances and linkages among platforms.

Selected innovations

Innovation in enhancing integration and coherence is not an easy thing to do. It is particularly a matter of doing, overcoming all the burdens and challenges. The Dutch KPSA provides an example of an attempt to establish both vertical (alignment with regional and local platform), horizontal (multisector approach, inter-ministerial) and content integration (incorporation of the national climate impact atlas).

The Swedish national platform also highlighted the usefulness of earlier dialogues between the Nordic platforms, which could also be a mechanism to help drive integration across platforms within a particular region.

Shared challenges

The need for enhancing integration and coherence is expected to increase as our world is becoming a world of digital platforms. In the early days of CAPs, there was no real need for integration and coherence as these platforms were establishing the foundation of the knowledge infrastructure. Looking forward, the capacity and resources needed to keep up with all the latest developments in this world of platforms and – above all – to establish effective connections is generally acknowledged to be a major challenge.

The ‘overarching coordination’ of the integration process can be easily overlooked in terms of importance and required capacity. Comprehensively evaluating datasets for instance is very time consuming. Most platforms are managed by different institutions and agencies, and the value of integration and coherence may not be equal between parties. A coordinated and collaborative approach to ensuring everyone receives maximum benefit is needed. Another challenge relates to defining the roles: the crossover of roles is intrinsic and agreeing a robust framework to support this crossover whilst maintaining individual roles is noted as being particularly challenging.

Linked topics

Topic 1: Co-evaluation, learning and capacity development to drive platform improvement. The need for integration and coherence increases as the platform evolves. The bigger the platform, the more important internal and external connections and embeddedness are. The challenge grows disproportionately as soon as the content grows beyond what a single person can understand and oversee.

Topic 6: Retaining relevance of platforms in a fast-moving world. Integration and coherence are, to a large extent, about connections to the outside world, which is fast-moving and imposes discourses and stimuli that CAPs must take into account to retain relevance.

Topic 9: Quality assurance, credibility and usability of platforms. CAPs can only function in a credible and usable way when connected with the dynamic policy domains and academia, but also with societal developments as a whole. Coherence and integration are a necessary condition for being credible and usable as a platform.

Topic 10: Platform architecture and technical development. The quest for integration and coherence has technical aspects to it as the growing content of a platform leads to an expanding array of linkages both within the platform and externally. This not only demands a certain vigilance from the operators of the platform but also of the platform as a technical system. It is expected that further technical innovations and developments will be needed to accommodate the growing need to enhance the integration and coherence of platforms.

Topic 8: Business models and value propositions for financing CAPs

Description of topic

This topic focuses on how we develop and refine an agreed value proposition and business model for a platform to gain buy-in and funding. This includes how we establish, communicate and evaluate the business model; how we allow and enable innovations in the platform business model, including adapting the model used at different stages of platform development; and what alternative models exist and how they work, for example private-public partnership models. It also includes how we manage intellectual property and other commercial and vested interests versus enhancing public value, and how we build an understanding of the market for the platform including the target audience and other, potentially competing, providers.

Questions used in the survey

- What actions have you taken in this area that you believe have worked well?
- What challenges do you currently have, or foresee, related to this topic?

Responses

17/27

Adopted practices

CAPs are taking a number of approaches:

- **Securing core funding and public private partnerships:** Traditionally, CAPs have been funded through project-based public funding. New business models are emerging where core funding is provided by national governments and relates to the update and maintenance of CAPs while public private partnerships allow for the further development of tools and services. For example, core funding of the CCCS (Canada) is provided federally and on an eleven-year basis. Through partnerships with public and private partners, further development of CCCS products and services is undertaken. The TCCIP is working actively with the private sector to develop tailored products to support financial disclosures.
- **CAPs are demonstrating their value by embedding themselves within the wider adaptation process.** At the transnational scale, CAPA (Alps) aims to better position itself within the wider EU-Strategy for the Alpine Region by acting as a cross-sectoral knowledge broker. At the national scale, the National Climate Change Adaptation Platform for Austria has explicitly linked to national adaptation policy process and ensured funding from federal bodies. Climate Ireland has successfully positioned itself within Ireland's National Adaptation Framework as a key national resource supporting adaptation decision-making at local and sectoral levels.
- **CAPs are defining and refining their value proposition in the context of the existing climate services landscape.** The UK CRP aims to position itself within the overall climate services landscape to demonstrate the role and effectiveness of adaptation platforms and underpinning research as part of the wider climate services agenda.

Selected innovations

Survey responses highlight a number of success stories particularly in relation to embedding CAPs within the wider adaptation process and securing core funding arrangements. For example, Climate Ireland has successfully secured longer term operational funding by embedding itself within the wider adaptation planning process. Through public private partnerships, CAPs are expanding their

reach and engaging in co-development of information and tools with specific end user groups (on a geographical and sectoral basis).

An example of a value proposition is that by the CCCS that has created regional hubs (regional climate service organisations) working with the Canadian provinces, who provided their own resources, to increase local capacity. In order to develop the appropriate platform, the CCCS entered into a partnership (via an agreement) with a private organization, who is the main 'host' and operator of the climate information portal, resulting in an effective private-public partnership model.

Shared challenges

Survey responses indicate that defining the value proposition and business models for CAPs is challenging. This is particularly the case for long term planning where there is a requirement to not only ensure the maintenance and upkeep of the platform but also anticipate future trends and activities in relation to evolving user requirements, available information, changing policies and technology development. For the most part, CAPs are funded publicly and on a project basis, so the short-term nature of the funding is a challenge for CAPs in terms of ensuring continuity and developing longer term business models. Moreover, the short-term nature of project-based funding means that significant efforts need to be repeatedly targeted at securing the next round of funding rather than focussing on, for example, platform development. In the absence of a long-term development strategy, garnering stakeholder buy-in and support is difficult while resource constraints mean that platforms have to prioritise specific areas of development in the context of short-term requirements rather than as part of a longer-term strategic plan. For example, project funders often prefer to fund new features and tools rather than the basic operation and maintenance of the platform.

Linked topics

Topic 1: Co-evaluation, learning and capacity development to drive platform improvement. These are all tasks or pursuits that require a strong value proposition and a business model that can provide sustainable funding to support platform improvements. Project funding can support some of these activities, but such funding is challenging, piece-meal and focussed on introducing new content and functionality rather than maintenance of existing aspects of the platform

Topic 6: Retaining relevance of platforms in a fast-moving world. Retaining relevance and having a sustainable business model go hand-in-hand; you need to retain relevance to sustain and attract funding and you need sustainable funding to retain relevance. This is a dilemma noted by several platforms.

Topic 11: Governance of platforms. Many platforms have a primary funder (government) sometimes drawing on multiple ministries and/or are dependent on project-based funding, especially to fund enhancements of the platform. Broadening the governance arrangements, allowing others to have a stake in the platform or pursuing PPP arrangements with a strong value proposition can be advantageous in terms of securing funding.

Topic 9: Quality assurance, credibility and usability of CAPs

Description of topic

This topic focuses on the development of standardised procedures for quality assurance that help ensure the relevance, usability, and legitimacy of the content hosted on a platform. This includes how we evaluate the quality of source data and knowledge; ensure credibility, transparency, legitimacy and pedigree; and understand user needs, capacities, use journeys, values and perceptions. It also includes the development and adoption of shared and high-level standards for knowledge management and data stewardship (for example those developed by the International Organization for Standardization, and for FAIR - findable, accessible, interoperable, and reusable - data).

Questions used in the survey

- What actions have you taken in this area that you believe have worked well?
- What challenges do you currently have, or foresee, related to this topic?

Responses

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Adopted practices

As CAPs develop, the issue of quality assurance is of increasing interest to both developers and users. The more mature and complex the platform, the more important are ensuring the relevance, usability, and legitimacy of all the content. This does not suggest that QA/QC regarding credibility and usability is not a concern for those developing platforms; addressing these issues from the beginning is critical and will grow such capacity within the team to deal with the evolving complexity as the platform and its users mature.

In the context of QA/QC, most platform providers make use of boards, such as steering groups (Climate Ireland), advisory panels, user groups (KPSA), and experts or peers (climateguide.fi, T-PLAT). These bodies are seen as legitimate components of the platform governance structure; CCCS has established a specific sub-committees within their governance structure dedicated to quality assurance, helping to ensure the credibility and usability of the data and products hosted on the platform.

For decisions on a more daily basis some platform providers rely explicitly on their own internal routines and expertise (KPSA, CCCS, Climate-ADAPT). Only a few seem to have a dedicated quality assurance process with criteria in place (KLiVO, CAPA and CCCS), though others mention the ambition to develop such. Working with climate data also implies that platform providers place a certain trust in data providers (Climate Ireland, Pacific CCS, T-PLAT).

Selected innovations

CAPA has established a standard operational procedure for reviewing and editing new content proposed for publication on the platform. This includes direct communication with the external authors/editors, comprehensive and clear criteria for the selection of relevant resources, and the provision of online, step-by-step guidance for external editors.

Requiring users to register with their email address when downloading data provides an opportunity to contact them if there appears to be an error in the data set at a later stage (CCCS).

Shared challenges

Enhancing quality assurance implies investing up-front and sustaining that capacity and capability to deliver on-going improvements. Sufficient capacity is a key issue as considerable expertise is needed to 'judge' that all sources and their descriptions are correct and trustworthy. This challenge is further increased/enhanced as when resources are limited, documentation and metadata associated with content are often insufficient to provide adequate audit trails.

A further challenge identified is related to making available data and information that is owned by others. This can pose restrictions as to the extent quality assurance can be applied and often requires reliance on the providers for quality assurance of data and information. Another challenge related to quality assurance being beyond the control of the platform provider is dealing with the need to update or address errors for an external product developed with project-based (research) funding after that original funding has ceased.

Another practical challenge identified is the need to act when certain tags have been refined during years of management for various reasons (e.g. a new sector or area of interest is added) that create inconsistencies within a database. In such cases a large effort is needed to ensure that all database items are coherently described. A further challenge arises when trying to address users' needs when the available data and/or information is limited. This often results in platforms trying to balance the provision of information that may not be of the highest quality with not providing any information to support decisions, which could potentially lead to no adaptation or even maladaptation.

Linked topics

Topic 1: Co-evaluation, learning and capacity development to drive platform improvement. Quality assurance is increasingly being done by engaging users in the process, and requires learning and capacity building with the aim of improving the quality of content and functionality to promote its use.

Topic 4: Communications, knowledge brokering and stewardship to stimulate and enable action. Communications and engagement with users are seen as critically important in enhancing the perceived quality and usability of the platform content – increasing the transparency of the process towards enhancing users' trust and confidence.

Topic 6: Retaining relevance of platforms in a fast-moving world. Retaining relevance through updating and bringing in new content and functionality increases the need for putting in place processes to ensure credibility and usability.

Topic 11: Governance of platforms. Governance structures are put in place which ensure the relevance, usability, and legitimacy of the content hosted on a platform.

Topic 10: Platform architecture and technical development

Description of topic

This topic focuses on how we approach the design and development of CAPs, including modular development; co-development approaches and user consultation/testing; user friendly design and information architecture good practice; technology for integrating and visualising different types of data and information; technology for dynamic integration with other platforms; managing heterogeneous and incomplete data; developing interactive and 'smart' features to support users; and the advantages and disadvantages of different operating systems.

Questions used in the survey

- What actions have you taken in this area that you believe have worked well?
- What challenges do you currently have, or foresee, related to this topic?

Responses

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Adopted practices

User testing and co-design/co-production approaches

Platforms commonly take a user-centric, iterative approach to platform design to make the platform as user-friendly to use as possible. User-friendly design "ensures that users can intuitively navigate the platform, easily explore and find the information they are looking for, quickly understand the information they find, and apply the information in decision-making" (ClimateData.ca). This includes employing case studies to guide development and user testing to ensure the technical architecture and features are fit for purpose and acceptable to users. For example, the new version of CCiA is using iterative user acceptance testing of menus, information flow, tools, pages, and content to direct the design of the platform. For ClimateData.ca, users have been brought in at various stages to gather feedback and make improvements; this includes for early gathering and analysis of user needs following targeted user engagement; testing and validation of the initial 'user-friendly' web design; and periodic/opportunistic focused consultations to inform enhancements. This user testing is carried out in different ways, for example in user workshops and via online surveys (see Topic 1 for more detail).

As well as testing for usability, Climate Ireland has employed user testing to assess the value of improvements by applying the same user testing methodology to existing and new versions of the platform.

As for Topic 1, collaborative development and co-design/co-development approaches are widely considered as highly valuable for developing platforms that are both useful and used. For example, TCCIP utilises a co-development mechanism with users and technical experts to develop optimal data display layout and web interfaces, and the Intact Centre co-develops all of their materials, resources, and courses with internal (university) and external (industry, academia, government) collaborators and sources. The Pacific CCCS platform cites trusted, highly interactive and collaborative partnerships as central to their achieving a high volume of users.

Technical design features

Platforms contain various functionality and features to meet the needs of their audience.

The ability to perform quick and accurate (and in some cases faceted and 'smart') searches is widely considered important for ensuring users to find what they need and quickly. In the Intact Centre platform, 'smart' features, based on the user's input into programs, are utilized "to ensure all

outputs from online tools, courses and feedback forms deliver results that are relevant, to the point and not redundant (which limits frustration of the user)".

In addition to straight searches most platforms allow users to browse content by characteristics such as theme or sector, enabling users to take different pathways through the content on the platform. Many platforms also use map-based visualisations to allow users to search content by geographical location. Some platforms allow users to earmark content for later reference, for example CAPA allows registered users "to compile, edit and manage their own individual collections of items in their personalised work space".

The CCCS employs a modular design based on "the development of separate and individual entities (tools, functions, information/data) that, once all combined, provides a wholesome experience and comprehensive information to users to help them adapt". An example of this is the integration of sectorial modules within the platform, each of which is designed to meet the needs of particular users with specific data, information and knowledge products.

Some platforms contain entry points tailored for different needs. For example, A-PLAT has different entry-points for different audiences (e.g., local government, school children) to ensure that the information and experience provided are tailored to meet their needs.

Most platforms are purpose-built but some use existing software and customize it to meet their needs. For example, Canada's CCAP uses IGLOO and has worked with the company to customize the platform to suit the needs of the CCAP secretariat and platform members.

Compatibility with operating systems, widely used internet browsers and various devices ensure that users can use the platforms smoothly regardless of their choice of device.

Diverse content types

Most platforms contain diverse types of data and information, and diverse ways of visualising this information. For example, the CCCS contains content including observations, projections, climate variables and indices, and employs different visualisation methods including maps, graphs/charts, analysis tools, and data layering to visualise this data. Others contain large datasets of visual information. For example, AdapteCCa hosts an image bank of adaptation to climate change, with more than 300 photographs on impacts, vulnerability and adaptation to climate change in Spain.

The use of data visualisations is a particular focus of several platforms for supporting knowledge brokering and translation.

Platform integration and interoperability

The issues of integration and interoperability are becoming increasingly important as they add value. For example, a collaboration between AdapteCCa and Climate-ADAPT has enabled AdapteCCa to share a module of practical cases containing more than 30 real experiences of adaptation to climate change implemented in different places in Spain alongside practical cases developed in Europe. Platforms such as TTCIP are also developing and sharing APIs to enable the dynamic incorporation of their services with other technical programs.

Selected innovations

The 'smart' features used by the Intact Centre to actively tailor the content being provided to the user according to their input to the platform is a valuable innovation and one that can really improve users' experience and thus uptake of information from the platform.

The collaboration between AdapteCCa and Climate-ADAPT demonstrates the significant value that can be added through linking national and regional-level platforms.

Shared challenges

Understanding and meeting user needs:

- Undertaking enough user consultation and testing.
- Understanding what developments and information are useful, understandable, and effective.
- Ensuring that all relevant content is easily findable by users.
- Identifying a comprehensively representative cohort of users for the use case development and user testing.
- Meeting diverse user needs; in particular specialised needs that are not relevant for central development.

Technical development:

- Improving search engines to meet the needs of users.
- Maintaining easy to use and navigate architecture while increasing content.
- Developing and integrating interactive functionality such as comments sections.
- Agreeing on the scope and framing for the developing of different sections of the platform by different actors.
- Keeping pace with technical design and technologies used on other platforms, and which users have come to expect.
- Developing built-in capacity for data visualisation and data analytics.
- Supporting two-way knowledge sharing.
- Ensuring maximum accessibility for as much of the target audience(s) as possible.
- Innovating in new areas, such as Artificial Intelligence.

Capacity:

- Building staff capacity and/or employing full time IT expertise to maintain, improve and modify the platform.

Linked topics

Topic 4: Communications, knowledge brokering and stewardship to stimulate and enable action – development of functionality that enables easy navigation, knowledge discovery, promotes accessibility, and creates a good user experience.

Topic 7: Integration and coherence across platforms – technical development enables the dynamic integration of and interoperability between platforms.

Topic 8: Business models and value propositions for financing platforms – use of user testing to demonstrate demand and added value.

Topic 11: Governance of platforms – agreeing on the scope and framing for the development of different sections of the platform by different actors.

Topic 11: Governance of CAPs

Description of topic

This topic focuses on how to use different structures, mechanisms and relationships to support the strategic and operational management of a platform. This includes how to make decisions on and prioritize content, technologies and related innovations; how to develop relationships with other entities; how to go about resourcing and financing a platform; and how to engage with users, research and policy communities (including what roles they play in the operation and development of the platform). This has ramifications for who decides how and why a platform is impactful, how it is updated and maintained, and what influence it has on what processes.

Questions used in the survey

- What actions have you taken in this area that you believe have worked well?
- What challenges do you currently have, or foresee, related to this topic?

Responses

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Adopted practices for the governance of platforms

Many platforms are managed by government department or agencies supported by one or more working groups which focus on specific areas of platform requirements, and a coordination team responsible for delivery.

‘Advisory groups/steering committees/program boards’ provide oversight, strategic direction and, in many cases, links to policy and user requirements. They also provide advice and recommendations on the work programme and guidance on priority actions related to further development of the platform. Responses indicated that their value is greatly enhanced if the members are able to act as champions for the platform including in the context of increasing the legitimacy and credibility.

Supporting ‘working groups/committees’ tend to be focussed on specific areas of interest to the platform and are usually responsible for developing content, coordinating with respective users and networks, enhancing synergies across national, regional, and local activities, advising on engagement and communication, identifying gaps, innovations and new technologies, and considering new data and research. For larger, more complex platforms, there can be a number of working groups focussed on different areas (e.g. CCCS has at least 6 and Climate-ADAPT uses the European Topic Centre that draws on a wide range of experts). As such, members provide a considerable breadth of experience and expertise when contributing to platform development and content, and networking via such groups is seen as contributing to increasing the reach of a platform.

Day-to-day implementation of the platform in terms of content, IT, dissemination and reporting is usually carried out by a small, dedicated ‘core team/coordination unit/secretariat’. Such teams (usually 2-5 people) are responsible for the regular management and maintenance of platforms, the updating of content and functionality, responding to requests for information, monitoring use, and reporting on progress. They provide a core focus for the overall governance structure (‘stability’) and support the outward-facing elements of a platform.

Within this generic, top-down approach, there are many variations tailored to deliver individual platform requirements, remit, functioning and intragovernmental relationships. The governance structure may also vary somewhat depending on the financing arrangement (private, research-led, government-led). Within Europe, there are several platforms (Climate-ADAPT, CAPA, UK CRP) that are supported, at least in part, by research funding from the European Commission or other funding

agencies which bring additional governance and reporting requirements but also opportunities for wider engagement.

The complexity of governance systems mentioned in the survey varies widely from, for example, a multilevel governance system used by the national platform in Austria (where the federal state system means the federal government, state governments and local authorities all have their own competences as regards legislation and execution), to a deliberately simple 2-tier approach adopted, for example, by T-PLAT as they seek to establish their new platform.

Responses also indicated that governance structures have developed over time and need to be sufficiently flexible to allow for gradual changes as platforms and their roles evolve. Several of the more established platforms are now considering updating their governance structures. For example, climateguide.fi are planning a renewal process which will include reviewing the governance and finance models as the platform moves towards more decentralized content production and greater engagement across organizations.

Several respondents highlighted the need for the governance structure to help drive engagement by enabling the development of closer ties with relevant players. They also see these players having a role to play with respect to expectation management. The majority of platforms have particularly strong links with the research community, for example via membership on working groups, provision of funding for specific research projects tasked with generating new input and ideas, and through requirements for newly contracted research to make the outputs and datasets available on the platform.

As platforms develop there is a recognised need for governance structures to facilitate the periodic review of the content and use of the platform to ensure on-going performance meets stated aims and objectives. This aspect of governance includes issues related to establishing quality control, ensuring the flow of information, adopting criteria for updating information, etc.

Selected Innovations

KliVO has developed a robust governance structure with the two responsible government agencies each bringing different expertise to the table (climate information and adaptation services). They work with an Inter-ministerial Working Group which helps coordinate work across government and provides additional legitimacy for the platform. Both the Environment Agency and the Met. Office work with networks that support the platform, and the platform is also supported by a research and development project that generates new input and ideas.

A similar approach is used by AdapteCCa. They also give an example of an effective working group; the climate change scenario viewer, one of the platform tools, maintains its own system of permanent updating and communication with users through a specific working group. This group involves the Spanish Climate Change Office, the Biodiversity Foundation, the State Meteorology Agency and the Spanish National Research Council who jointly make decisions on its development and respond to user queries. This approach ensures the viewer is a living tool that responds to user needs.

To address the challenges to information architecture and information flow from the addition of new content, Australia's CCiA platform is planning to adopt a modular approach that has the objective of making the site 'growable'. This approach will be strengthened by designating a production manager who will have editorial and content control (subject to organisational policy and procedure).

Both Canada's CCAP and Adapt2Climate (Belgium) stress the added value achieved by giving ownership of activities to specific working groups that are part of the overall governance structure. The adoption of online approaches has facilitated this approach by allowing all members to

contribute as appropriate to documents and discussion thus helping to ensure the on-going provision of up-to-date information.

Shared challenges

Most governance structures are flexible to some degree, but the major on-going challenge for most platforms is how to provide a governance structure and framework to ensure continuity and sustainability in a rapidly evolving world. Potentially disruptive transitions that were mentioned include abrupt changes to funding arrangements, the ending of collaborative partnerships, and the need to significantly augment governance structures to take account of a new or evolving delivery model (e.g. moving from a single portal to a network of platforms).

A lack of available resources (time, money, expertise) is also a common issue. As the audience for a platform grows, maintaining existing and developing new relationships requires considerable effort and resources. Expectations and demands from users are also increasing. Operationally, many platforms are run as projects with constraints in terms of project duration and available resources. As one respondent put it “no project lasts forever” but the challenge is how to find an approach for securing resources across suitable timescales that allow platforms to continually develop and meet evolving needs.

In aiming to meet these user requirements several of the more established platforms in particular are now questioning how best to streamline increasingly complex governance structures. All the structures have a genuine purpose but administering and coordinating their work requires increasing administrative effort, and there is a need to balance input by members and participating organisations without impeding their ability to actually provide relevant services.

This links with the issue of how best to effectively expand governance structures when an ecosystem of linked platforms is being developed to help inform practitioners and decision-makers. This is happening in a number of countries and across regions as new platforms are being established e.g. at different geographic scales, to address particular sectoral concerns or to link adaptation action with related issues such as disaster risk reduction.

More broadly, several platforms reflected on the need to integrate and embed the knowledge, information and data they provide into the wider decision-making process. Whilst government departments and agencies are often involved in the governance of platforms and can bring much to the table, they need to be encouraged to recognise platforms as an integral part of the wider knowledge base to support adaptation policy development and action.

Linked topics

Topic 1: Co-evaluation, learning and capacity development to drive platform improvement - continuous feedback from experts at all governance levels provides initial evidence of platform strengths and weaknesses and can direct overall implementation. Governance structure must allow evaluation and integration of feedback into overall development plans.

Topic 6: Retaining relevance of platforms in a fast-moving world - governance structure needs to prioritize the continuous renewal of content and functionality

Topic 7: Integration and coherence across platforms - achieving interoperability and coherence will likely require an additional level of governance.

Topic 9: Quality assurance, credibility and usability of platforms - governance structures must be in place which ensures the relevance, usability, and legitimacy of the content hosted on the platform.

Topic 12: Social justice and equity

Description of topic

This topic focuses on how to identify and give a voice to those that are not well heard or represented, and how to work with those that are less engaged in climate change adaptation. This includes how to use platforms to enhance inclusivity, and how to understand the needs and capacities of these groups and what barriers inhibit their ability to act. In particular, it includes facilitating access to knowledge for different and potentially overlooked user groups and promoting actions to engender engagement that recognises their values and shared and differentiated priorities.

Questions used in the survey

- What actions have you taken in this area that you believe have worked well?
- What challenges do you currently have, or foresee, related to this topic?

Responses

17/27

Adopted practices

Social justice and equity (inclusion) are recognised by most platforms as aspects that they should be considering when designing and developing their platforms, and also when delivering and updating its content and functionality (climateguide.fi). Respondents identified specific actions that they are taking along these lines related to content and improving access. For some, these aspects are emerging as critical to success and further efforts are now under development.

To address these issues, actions include outreach and engagement from the beginning to better understand all users' needs as well as co-developing and tailoring products (CCCS) and ensuring that users engaged include those who are not well heard or represented in the field of climate adaptation (Climate Finance Knowledge Portal). The Intact Centre has used targeted communication strategies while TCCIP has engaged experts with the aim of including more social content into their platform.

In terms of content, addressing local needs and issues have been included by providing case studies conducted by local experts (Regional Climate Consortium for Asia and the Pacific), translation of scientific knowledge and climate data into simple language, the use of infographics that are easy to understand and meet the needs of specific target groups (T-PLAT), and by offering open and free access to data and information (CCiA). Including social justice and equity in research projects and then reflecting them on the platform (UK CRP) is seen as enhancing awareness of these concerns and potential solutions. To address concerns related to inclusion, Climate-ADAPT deliberately works to ensure that all relevant policy sectors and European geographical areas and countries are equally well covered, and that they are equally represented in terms of knowledge and information. This includes systematically identifying any gaps and then developing and implementing plans and actions to close those gaps.

Social justice and equity is also being considered when developing functionality of platforms. For example, offering alternative pathways to planning for those with limited technical capacity (eCCET planning tool) and enhancing accessibility by offering resources in a variety of mediums (Intact Centre) are seen as contributing to addressing equity and inclusion concerns.

Increasing the awareness of disadvantaged and more vulnerable groups of the existence, content, functionality and benefits of accessing and using a platform at local and national level meetings or training sessions (Climate Finance Knowledge Portal) has also had positive impacts.

Selected innovations

A potential way forward in terms of addressing social justice and equity concerns is to apply an 'equity lens' when developing content (e.g., supporting all stages of adaptation planning and implementation and beginning from a human-centred approach rather than just an economic approach (CCAP).

Respondents also mentioned training of the platform team on equity and inclusion (Intact Centre) and building a diverse team, including by engaging organisations that serve marginalised and at-risk populations, and by collaborating with other climate service providers who hold in-depth knowledge of these users' needs and existing gaps (CCCS). Respondents indicated that there are advantages to providing the space to fully explore these considerations, including in the context of informing the content and functionality of the platform.

Shared challenges

Common challenges centre around capacity and resources to address social justice and equity concerns within their respective platforms. Most respondents indicated that they were aware of and sensitive to the need, but these concerns were not specific drivers at the time of platform development, there is often a lack of capacity to engage or participate specifically (e.g., limited size of the team or team members primarily from the natural sciences) and often the platform content is technically focused. As a result, platform content, architecture and functionality do not specifically include achievements or innovations in this space.

On the matter of engagement, it was noted that reaching out to and engaging those that are not yet well represented is challenging and often needs a different approach than solely via a web-based platform, at least in the beginning. It was also noted that multi-channels of communication would increase options for engagement and accessibility. Contributing to this challenge is that socially driven organisations that could help with this engagement typically also have limited capacity and other priorities limiting their potential to contribute or support.

Another key challenge is understanding how to make a web-based platform barrier-free such that marginalised and under-represented groups and communities can also access the information they need to engage in decision-making and implementation of adaptation measures. Further to this challenge is being able to reflect the diverse planning 'habits' and processes. Addressing these aspects of equity raises again the challenge of capacity, including consideration of the size, make-up and capacity of the team to engage, and available resources to step back, consider how to improve the platform based on engagement and reflections of the sciences to address these concerns, and then to co-develop and deliver tailored products and services that address requirements.

Although a step in the right direction, addressing social justice and equity is seen as being more than just an issue of language translation, but also need to be reflected in the platform's architecture, functionality, and content (appropriate for the intended audience).

Respondents noted that they are looking to learn more about how to address these concerns and specifically mentioned sharing lessons learnt and exploring approaches to enhance inclusivity for indigenous peoples and for vulnerable and remote populations, including those with weak internet accessibility and capabilities.

Linked topics

Topic 1: Co-evaluation, learning and capacity development to drive platform improvement.

Includes developing team capacity and understanding of implications for platform content, architecture, functionality and design.

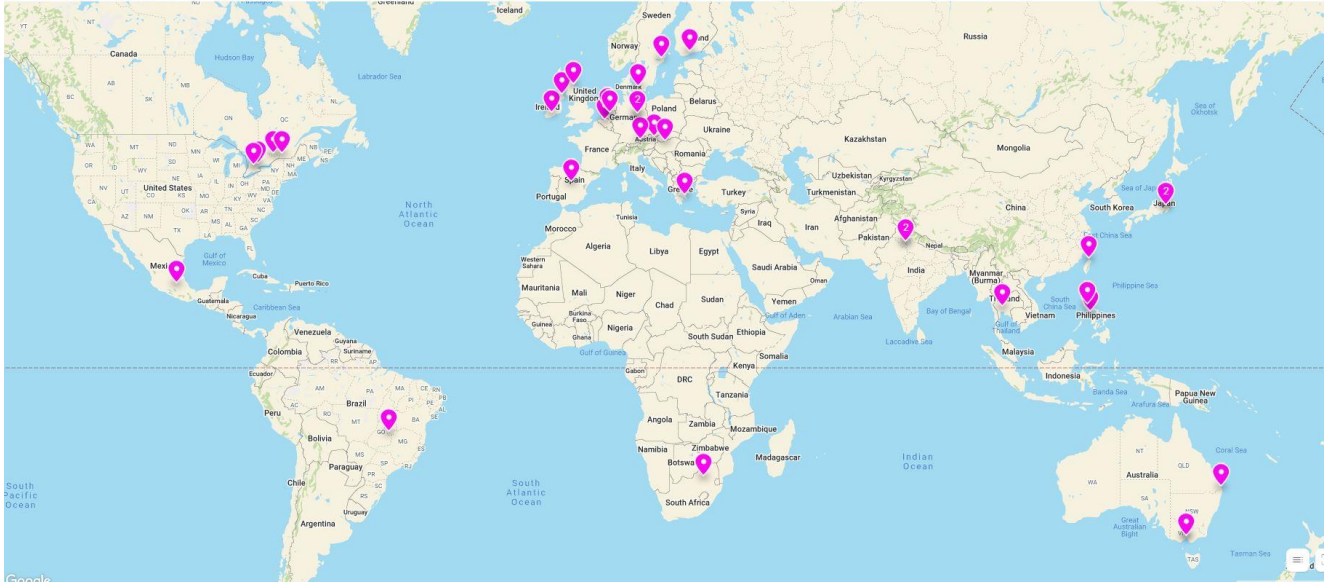
Topic 5: Integration of cultural, including indigenous, knowledge, capacities and needs into platforms. Reference to including consideration of cultural knowledge and indigenous communities' needs and capacities.

Topic 10: Platform architecture and technical development. Social equity and equity (inclusion) are not just a matter of "language translation" but responding to these needs should also influence the platform structure, architecture, content, etc. To reach out to those that are not yet well represented may require a different approach than a web-based platform at least in the beginning.

Appendix 1. Information on participating CAPs

The CAP landscape:

National platforms			
Australia	Climate Change in Australia	CCiA	https://climatechangeinaustralia.gov.au
Austria	National Climate Adaptation Portal of Austria		https://www.klimawandelanpassung.at
Belgium	Adapt2Climate		https://www.adapt2climate.be
Canada	Canada's Climate Change Adaptation Platform	CCAP	https://www.nrcan.gc.ca/climate-change/impacts-adaptations/what-adaptation/adapting-our-changing-climate
Canada	Canadian Centre for Climate Services, including ClimateData.ca	CCCS	https://www.canada.ca/en/environment-climate-change/services/climate-change/canadian-centre-climate-services.html https://climatedata.ca/
Canada	Intact Centre on Climate Adaptation		https://www.intactcentreclimateadaptation.ca
Finland	Climate Guide		https://climateguide.fi
Germany	German Climate Preparedness Portal	KLiVO	https://www.klivoportal.de/EN/Home
India	Climate Change Information Portal		http://climatevulnerability.in
Ireland	Climate Ireland		https://www.climateireland.ie
Japan	Climate Change Adaptation Information Platform	A-PLAT	https://adaptation-platform.nies.go.jp/en/index.html
Netherlands	Knowledge Portal Spatial Adaptation	KPSA	www.spatialadaptation.com
Northern Ireland	Climate Northern Ireland	NIAdapts	https://www.climateinorthernireland.org.uk/NIAdapts
Philippines	in development		https://ccplanningtool.omlopezcenter.org/create-project-plan
Scotland	Adaptation Scotland		www.adaptationscotland.org.uk
Spain	Platform on Adaptation to Climate Change in Spain	AdapteCCa	https://www.adaptecca.es
Sweden	Swedish Portal for Climate Change Adaptation		https://www.klimatanpassning.se
Taiwan	Taiwan Climate Change Projection Information and Adaptation Knowledge Platform	TCCIP	https://tccip.ncdr.nat.gov.tw
Thailand	Thailand Adaptation Information Platform	T-PLAT	http://t-plat.deqp.go.th/en/home-page
UK	UK Climate Resilience Programme website	UK CRP	https://www.ukclimateresilience.org
Transnational platforms			
Alps	Climate Adaptation Platform for the Alps	CAPA	https://www.capa-eusalp.eu
Asia and the Pacific	Regional Climate Consortium for Asia and the Pacific		https://www.rccap.org
Asia-Pacific	Asia-Pacific Climate Change Adaptation Information Platform	AP-PLAT	https://ap-plat.nies.go.jp
Europe	Climate-ADAPT		https://climate-adapt.eea.europa.eu
Pacific	Pacific Climate Change Science	Pacific CCS	https://www.pacificclimatechangescience.org
Regional/sectoral platforms			
Australia	CoastAdapt		https://coastadapt.com.au
India	Climate Finance Knowledge Portal		https://climatefinanceknowledge.nabard.org



Timescales

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Australia												
Austria												
Belgium												
Canada - CCA												
Canada - Intact												
Canada - CCCS												
Finland												
Germany												
India												
Ireland												
Japan												
Netherlands												
Northern Ireland												
Philippines												
Scotland	launched in 2005											at pilot stage
Spain												
Sweden												
Taiwan												
Thailand												
UK												
Alps												
Asia and the Pacific												
Asia-Pacific												
Europe												
Pacific												
Australia (coastal)												
India (finance)												

Motivation for establishing platforms

- National CAPs are primarily established by governments to provide underpinning support for national adaptation plans.
- Nearly all responses talk about provision of easily-accessible, up-to-date information: a single point of entry (one-stop shop) for information and tools, signposting to additional information, providing a common basis for action, and providing advice.
- Many mention their work in enabling connections by connecting and bringing together key groups, sharing learning, and providing an enabling environment to focus efforts.
- Some refer to using CAPs as a means of monitoring progress on adaptation actions
- Regional CAPs are often motivated by the need to link across national boundaries, to provide data and knowledge on a larger scale and to provide consistent information across areas.
- Sectoral CAPs are often established with the intention of filling existing knowledge gaps to help prepare specific groups to assess and address adaptation requirements.

Overarching scope of platforms

- Whilst enabling adaptation action is the primary focus of all CAPs, there are difference in the approaches being used.
- The provision of climate projections information, data and guidance is central to many; others link to existing (e.g. met. office) portals for such information.
- Some platforms focus more on providing practical tools and advice to inform risk assessments, adaptation planning and the implementation of actions.
- Many link to climate vulnerability and resilience information, but few specifically to platforms focussing on DRR or mitigation
- Regional platforms in particular highlighted their additional focus of looking at cross-sector, cross-boundary knowledge.

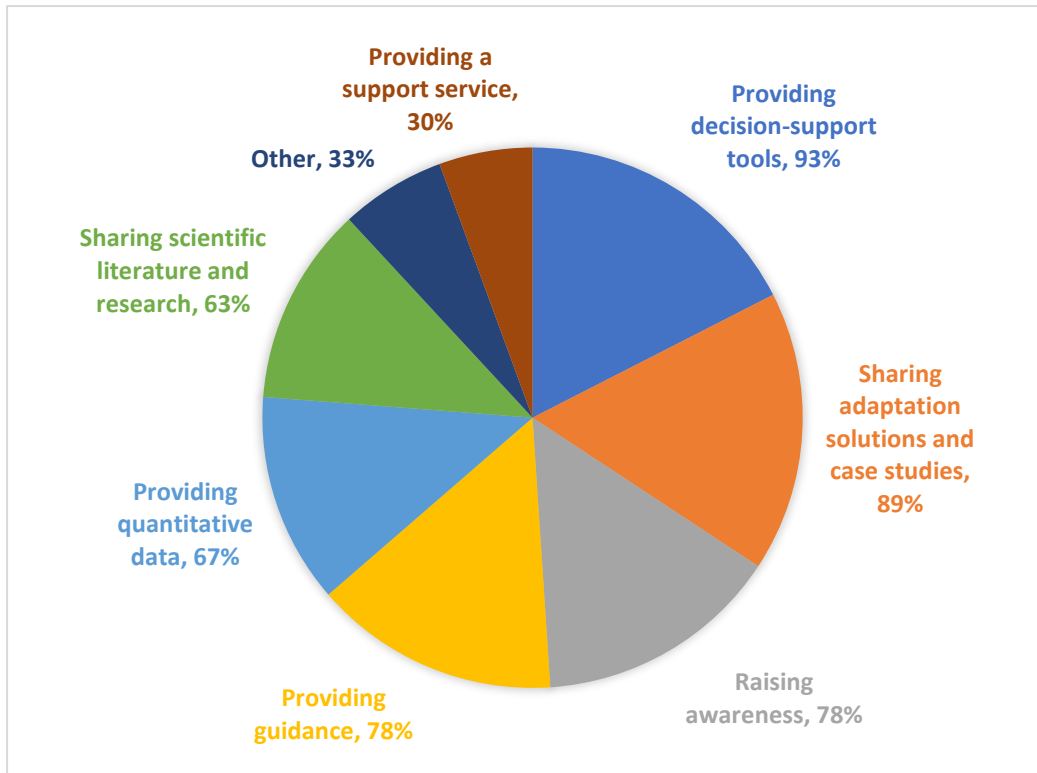
Funding for platforms

- For ~65% of platforms, the original funding was provided by central governments
- Some also had additional start-up input from e.g. local governments, national and regional development banks.
- In a number of examples, on-going funding is being provided from additional sources including research organisations and business organisations.
- Targeted research and other activities contributing information to platforms are often supported through external resources.
- A number of platforms in Europe are being developed and supported using funds from the European Commission (e.g. LIFE programme, Interreg programme).

Staff resources

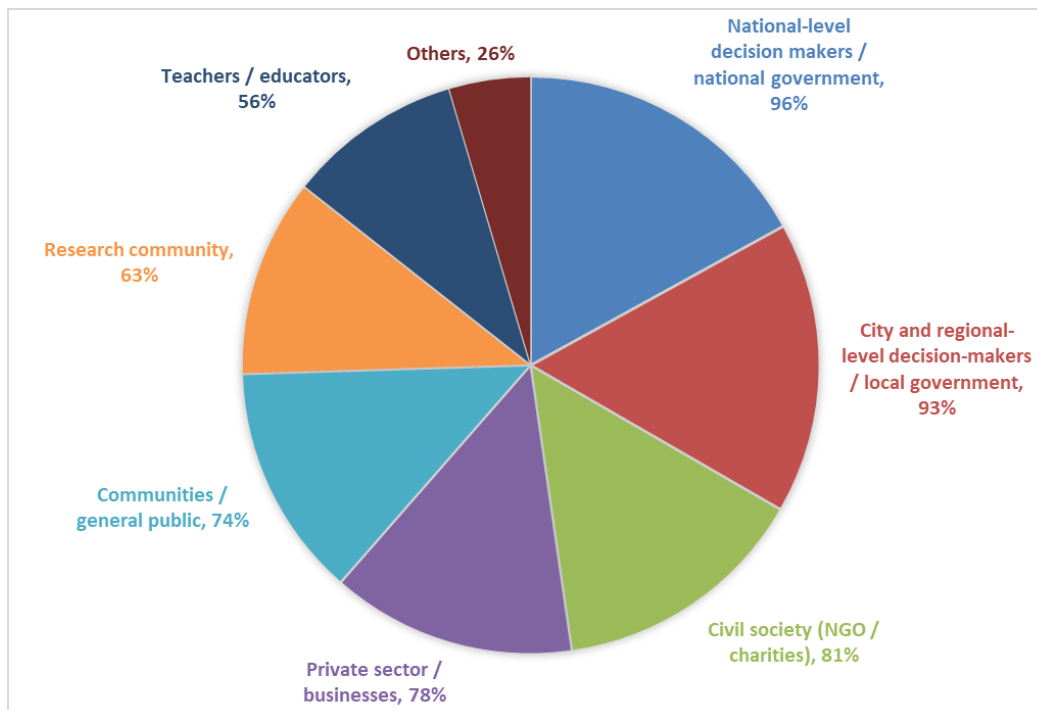
- In general, platform coordination teams tend to include 3-6 people but the range is wide with a number of platforms operating with just one person-equivalent.
- The number of people required tends to reflect the various expertise needed i.e. communications, web support, KE, administration etc.; many staff may be part-time.
- Many platforms rely on a much wider cohort of contributors providing content and of experts providing advice and guidance.

Main functions of platforms (% of platforms providing that function)



'Other' includes providing information on policies, information on funding schemes, and signposting to other initiatives.

Target audiences (% of platforms working with that audience)



'Other' includes for example media, purveyors, funding agencies.

Appendix 2. KE4CAP survey questions

Part 1

1. Name of platform
2. Platform website
3. Host organisation(s) developing and managing the platform
4. Main contact for the platform (name, organisation, role)
5. When was the platform launched?
6. When was the platform last updated?
7. Why was the platform established (motivation)?
8. What is the overarching scope of your platform (adaptation, resilience, mitigation and/or climate data and information)?
9. How is your platform funded now and has this changed since its development?
10. How many people are involved in managing/operating the platform (Please provide example of roles where possible, e.g. communications, management & coordination)?
11. What are the main functions of the platform? *[select all that are relevant]*
 - Raising awareness on the need for climate change adaptation
 - Providing guidance on how to undertake adaptation
 - Providing quantitative data for adaptation decision-making
 - Providing decision-support tools for adaptation decision-making
 - Providing a support (e.g. help desk) service
 - Sharing adaptation solutions and case studies
 - Sharing scientific literature and research on adaptation
 - Other (please list)
12. What are the intended/targeted audiences for the platform? *[select all that are relevant]*
 - National-level decision makers / national government
 - City and regional-level decision-makers / local government
 - Communities / general public
 - Teachers / educators
 - Private sector / businesses
 - Research community
 - Civil society (NGO / charities)
 - Others (please list)
13. Is the platform focusing on particular sectors and, if so which ones? *[select all that are relevant]*
 - Health
 - Agriculture
 - Oceans / fisheries
 - Forests and other ecosystems
 - Transport
 - Infrastructure / built environment
 - Trade
 - Finance / insurance
 - Disaster risk
 - Others
14. Would you like us to profile your platform within the KE4CAP network to enable better networking and to showcase and increase awareness of platforms being developed and operated.?

Part 2. Topic-specific questions related to your platform

Topic 1. Co-evaluation, learning and capacity development to drive platform improvement.

Topic 1 (co-learning). What actions have you taken in this area that you believe have worked well?

Topic 1 (co-learning). What challenges do you currently have, or foresee, related to this topic?

Topic 2. Supporting and working directly with local actors.

Topic 2 (local). What actions have you taken in this area that you believe have worked well?

Topic 2 (local). What challenges do you currently have, or foresee, related to this topic?

Topic 3. The role of platforms in supporting the monitoring, reporting and evaluation of progress in adaptation (and other areas).

Topic 3 (MRE). What actions have you taken in this area that you believe have worked well?

Topic 3 (MRE). What challenges do you currently have, or foresee, related to this topic?

Topic 4. Communications, knowledge brokering and stewardship to stimulate and enable action.

Topic 4 (communications). What actions have you taken in this area that have worked well?

Topic 4 (communications). What challenges do you currently have, or foresee, related to this topic?

Topic 5. Integration of cultural, including indigenous, knowledge, capacities and needs into

Topic 5 (cultural). What actions have you taken in this area that you believe have worked well?

Topic 5 (cultural). What challenges do you currently have, or foresee, related to this topic?

Topic 6. Retaining relevance of knowledge platforms in a fast-moving world.

Topic 6 (relevance). What actions have you taken in this area that you believe have worked well?

Topic 6 (relevance). What challenges do you currently have, or foresee, related to this topic?

Topic 7. Integration and coherence across platforms.

Topic 7 (coherence). What actions have you taken in this area that you believe have worked well?

Topic 7 (coherence). What challenges do you currently have, or foresee, related to this topic?

Topic 8. Business models and value propositions for financing knowledge platforms.

Topic 8 (business models). What actions have you taken in this area that you believe have worked well?

Topic 8 (business models). What challenges do you currently have, or foresee, related to this topic?

Topic 9. Quality assurance, credibility and usability of knowledge platforms.

Topic 9 (QA). What actions have you taken in this area that you believe have worked well?

Topic 9 (QA). What challenges do you currently have, or foresee, related to this topic?

Topic 10. Platform architecture and technical development.

Topic 10 (technical). What actions have you taken in this area that you believe have worked well?

Topic 10 (technical). What challenges do you currently have, or foresee, related to this topic?

Topic 11. Governance of platforms.

Topic 11 (governance). What actions have you taken in this area that you believe have worked well?

Topic 11 (governance). What challenges do you currently have, or foresee, related to this topic?

Topic 12. Social justice and equity.

Topic 12 (equity). What actions have you taken in this area that you believe have worked well?

Topic 12 (equity). What challenges do you currently have, or foresee, related to this topic?