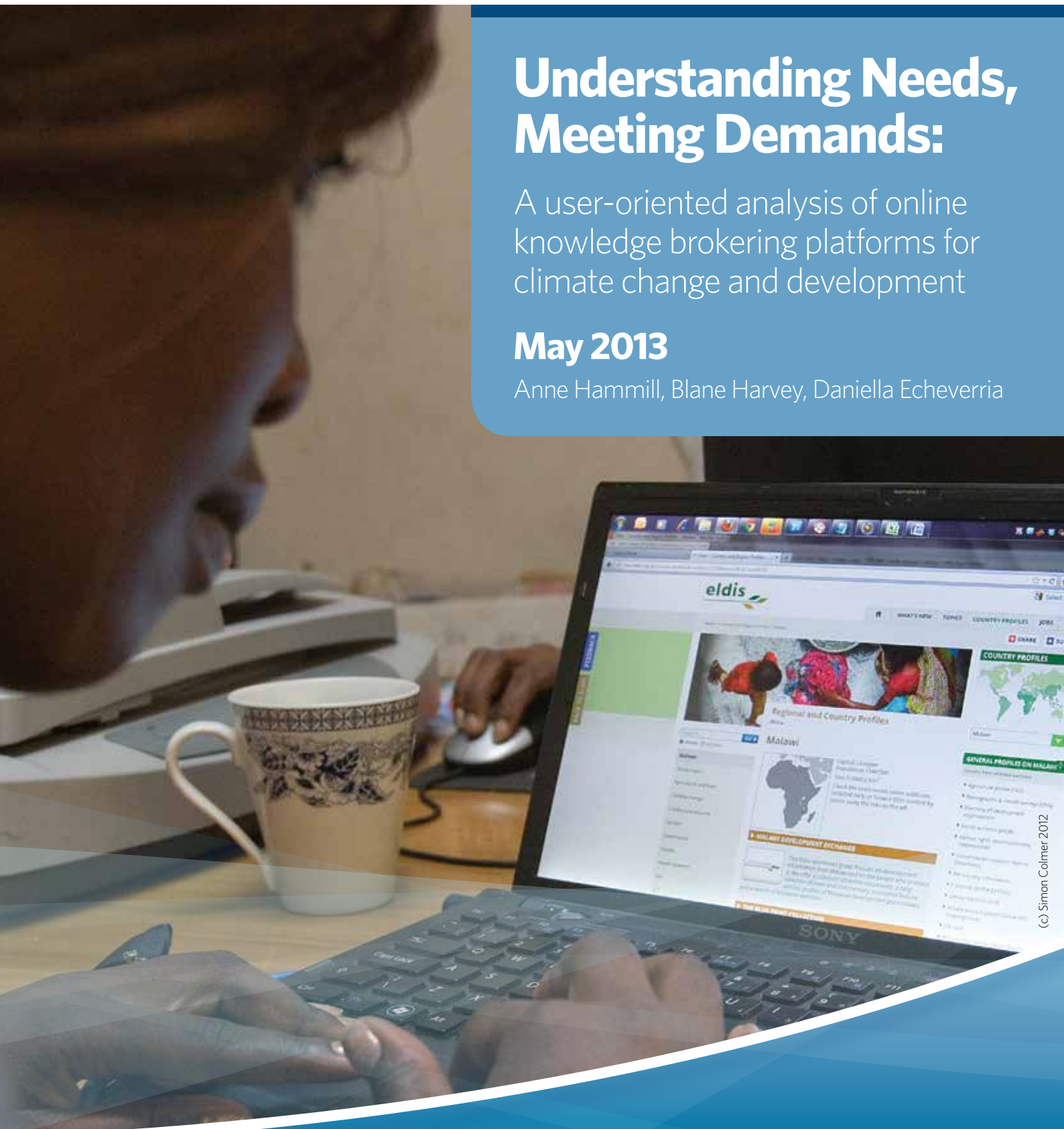# Understanding Needs, Meeting Demands:

A user-oriented analysis of online knowledge brokering platforms for climate change and development

May 2013

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Executive Summary

As more stakeholders take steps toward operationalizing climate compatible development (CCD), the demand for information and knowledge related to the concept is growing. But the landscape of information and knowledge sought is vast and fragmented, and the array of suppliers and users correspondingly diverse, making the gaps between research, policy and practice challenging to manage.

Knowledge brokers and knowledge brokering play an important role in managing these gaps. Knowledge brokering is broadly understood as a set of intermediary activities that link knowledge production and use. It can range from making information more accessible and understandable to helping different actors develop a shared understanding of an issue that allows for the co-production of knowledge. The Internet has expanded the range of possibilities for knowledge brokering, offering greater reach, more access and new technologies for storing, filtering and translating knowledge into new formats. The recent proliferation of online climate knowledge brokering (CKB) platforms[1] speaks to the potential of information and communications technology-enabled knowledge brokering, as understanding and addressing the challenge of climate change across different scales brings together multiple sources and forms of knowledge.

Yet online CKB platforms run the risk of being supply-driven, established and managed with the assumption that making more knowledge available online will result in evidence-based policy and practice supporting CCD. Platforms are not necessarily designed with a thorough understanding of the range of user needs, priorities and preferences. This can result in services that are not fit for their purpose, gaps in information and knowledge provision, duplication of efforts and an overall misuse of resources. Moreover, most efforts at addressing the misalignment between knowledge supply and demand tend to focus on adjusting or expanding the supply. Unless knowledge brokers develop a clear understanding of what constitutes demand, these efforts will fall short of expectations.

This paper examines the current state of alignment between CKB platforms and the information-seeking and knowledge-sharing behaviour of users of online climate change information. It reviews the case for knowledge brokering and how brokering activities are put into practice online for climate change and development. The paper then outlines the results of research undertaken to understand how CKB platform users assess, access and apply knowledge. This research includes interviews and surveys with over 200 online climate change information users to understand their needs, preferences and behaviours. The research also involved in-depth case studies of four CKB platforms: AfricaAdapt, Climate Finance Options, Climate Change Policy & Practice and the Eldis Climate Change Resource Guide. The paper highlights key findings and recommendations regarding user behaviours and preferences, potential areas for innovation in online knowledge brokering and the need for taking CKB beyond its online functions.

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[1] By *platform* we mean a technology package that integrates a number of tools available in the marketplace (for purchase or for free) that one can acquire, install, or rent, which is then tailored for the use of a targeted user group (Wenger, White & Smith 2009).

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Acronyms and Abbreviations

AA	AfricaAdapt
CCP&P	Climate Change Policy & Practice
CCD	climate compatible development
CKB	climate knowledge brokering
CDKN	Climate and Development Knowledge Network
CFO	Climate Finance Options
CSO	civil society organizations
DFID	United Kingdom's Department for International Development
ECCRG	Eldis Climate Change Resource Guide
ENDA-TM	Environnement et développement du Tiers Monde
FARA	Forum for Agricultural Research in Africa
ICPAC	IGAD Climate Prediction and Application Centre
ICT	information and communications technologies
IDRC	International Development Research Centre
IDS	Institute of Development Studies
IGAD	Intergovernmental Authority on Development
IISD	International Institute for Sustainable Development
ITU	International Telecommunication Union
KB	knowledge brokering
NGO	non-governmental organization
SDC	Swiss Development Cooperation
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change's (UNFCCC)

1.0 Introduction

As more stakeholders take steps toward operationalizing climate compatible development (CCD), the demand for information and knowledge related to the concept is growing. However, the landscape of information and knowledge sought is vast and fragmented; it can range from introductory explanations on the causes of climate change and scientific projections of future climate conditions, to descriptions of renewable energy technologies, experiences with weather index insurance and the state of international climate negotiations. What is more, the array of stakeholders supplying and using this information and knowledge is correspondingly diverse, making the gaps between research, policy and practice all the more challenging to manage.

Online climate knowledge brokers (CKB) and knowledge brokering platforms[2] can play an important role in managing this gap. Knowledge brokering (KB) is broadly understood as a set of intermediary activities that link knowledge production and use. Within the context of developing climate change policy, the intent of KB is to help decision-makers "acquire, value and consider expertise that they would not otherwise obtain or incorporate into their decision making" (Michaels, 2009, p. 995). The Internet has expanded the range of possibilities for KB, offering greater reach, more access, and new technologies for storing, filtering and translating knowledge into new formats. Indeed, this combination of complexity (of the climate change issue), glut (of relevant information and actors) and progress (in information and communications technologies [ICTs]) has led to a steady growth of online CKBs, both in terms of the number of initiatives launched and the range of services offered. From the Clean Energy Info Portal and the Adaptation Learning Mechanism to Climate Prep and the Latin American Carbon Finance Portal,[3] current CKB platforms cover a large number of climate change and development topics, focusing on different places, scales and sectors. They also exhibit varying levels of ambition and technological sophistication, and implicate a wide range of actors and organizations in terms of how they are funded, managed and targeted for use.

Like many online platforms, however, many of these CKB initiatives can be supply-driven, established and managed by the producers of climate change knowledge products with the assumption that making more knowledge available online will result in evidence-based policy and practice supporting CCD. Platforms are not necessarily designed with a thorough understanding of the range of current and potential users and their respective needs, priorities and preferences. This can result in services that are not fit for their purpose, gaps in information and knowledge provision, unnecessary duplication of efforts and an overall misuse of resources. Moreover, most efforts at addressing the misalignment between knowledge supply and demand tend to focus on adjusting or expanding the supply; existing platforms are revised, more tools are offered and new sites are established. Unless knowledge brokers develop a clear understanding of what constitutes demand, such efforts will fall short of expectations.

This paper examines the current state of alignment between CKB platforms with the information-seeking and knowledge-sharing behaviour of users of online climate change information. It begins by reviewing the case made for KB and how this is put into practice online for climate change and development. The report then summarizes the results of research undertaken to understand how CKB platform users assess, access and apply information and knowledge. Interviews and surveys were used to understand some of the current user preferences and behaviours vis-à-vis online CKB platforms, while in-depth case studies of four platforms—AfricaAdapt, Climate Finance Options, Climate Change Policy & Practice and Eldis Climate Change Resource Guide—provided more focused user profiling and analysis against which managers could review their current strategies.

The paper concludes by highlighting key findings and recommendations regarding user behaviours and preferences, potential areas for innovation in online KB, and the need for taking climate change KB beyond its online functions. These findings should be of interest to those currently working in KB roles in the climate change community; those who are planning, funding or working in partnership with knowledge sharing initiatives; and to KBs in other fields as a basis for comparative analysis.

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[2] By *platform* we mean a technology package that integrates a number of tools available in the marketplace (for purchase or for free) that one can acquire, install or rent, which is then tailored for the use of a targeted user group (Wenger, White & Smith 2009).
[3] For more information on each of these initiatives, visit their home pages: Clean Energy Information Portal: www.reegle.info; Adaptation Learning Mechanims: www.adaptationlearning.net; ClimatePrep: www.climateprep.org; Latin American Carbon Finance Portal: http://finanzascarbono.org.

2.0 Background: Brokering Knowledge on Climate Change and the Promise of Online Platforms

The complex nature of climate change and the challenges it presents to development policy and practice are well documented. A so-called "wicked problem" for decision-makers, climate change is difficult to define and attribute, uncertain and provides unclear solutions (Turnpenny, Lorenzoni & Jones, 2009). These challenges, many authors now argue, require bringing together multiple sources and forms of knowledge to better understand the drivers, impacts and options for responding to climate change. The roles and tools needed to successfully bring together this diverse knowledge in the face of power differentials, cultural and epistemic disconnects and competing interests remain the source of much discussion.

From the policy-making perspective, Dilling and Lemos (2011) suggest that climate change research has failed to do enough to ensure that decision-makers receive information that is useable in applied contexts. The provision of useable information, they argue, is a function of an effective interplay between research "push" (the provision of an information "supply") and demand-side "pull" coming from decision-makers seeking to take more informed action. Dilling and Lemos (2011) argue that a critical factor in the usability of much climate information is "the creation of the conditions and mechanisms that enable *iterativity*, that is, the purposeful and strategic interaction between climate knowledge producers and users so as to increase knowledge usability" (p. 681). This concept of iterativity links well with other theories, which have examined how different types of knowledge and experience come together to strengthen decision-making on climate change. These include social learning (Collins & Ison, 2009), adaptive co-management (Armitage, Marschke & Plummer, 2008) and boundary work (Clark et al., 2011). Together, they point to the need for spaces or processes (either physical or virtual) that can facilitate the bringing together of these diverse actors and knowledge sets. CKB's rise in prominence is a product of this need.

Much of the evidence on KB has come from the health sciences, where it is imperative that new findings from research be quickly translated into outcomes for patients (Meyer, 2010). A growing body of evidence has led some to suggest that knowledge brokers may be a "missing link" between evidence and action, although Ward, House and Hamer (2009) note that "there remains a lack of evidence about how brokering works, the factors that influence it and its effectiveness" (p. 9). There are various ways to understand and frame KB, making it a challenging process to define, and indeed to formalize in professional practice. While some authors see KB as a set of practices carried out specifically at the interface of science and policy (Magnuszewski et al., 2010; Michaels, 2009), others take a broader view. Shaxson et al. (2012), for example, use the term "K*" to describe "the set of functions and processes at the various interfaces between knowledge, practice, and policy [to improve] the ways in which knowledge is shared and applied" (p. 2). For the purposes of this study, we base our analysis on this broader understanding of KB. We see it as encompassing the full spectrum of intermediary and brokering functions depicted in Figure 1 below, and not only the narrower "knowledge broker" function of fostering knowledge co-production the broader definition includes.

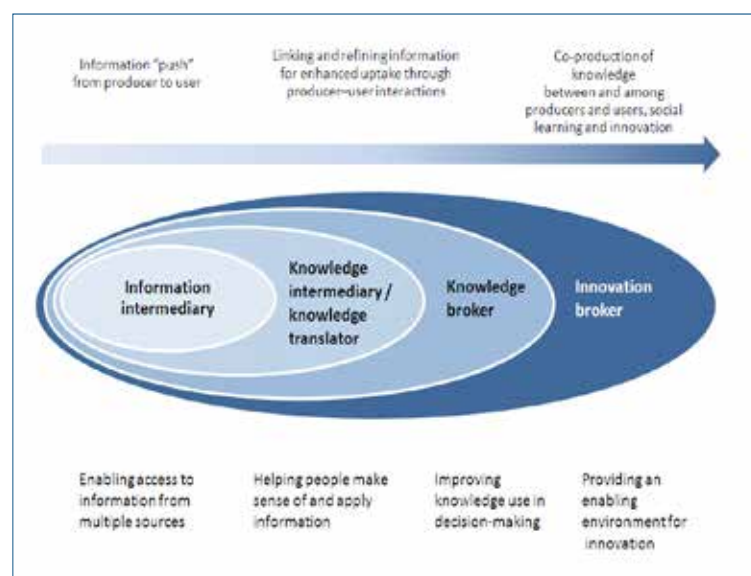Figure 1: A spectrum of intermediary and brokering functions (adapted from Harvey, Lewin & Fisher, 2012; Fisher, 2011)

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It is worth emphasising that KB should be, first and foremost, a *human* undertaking, and is often carried out through face-to-face engagement and facilitation processes. While information and communication technologies are increasingly being used to expand the reach and potential of brokering activities, this human dimension remains an essential component of their success. This view is supported by Sharratt and Usoro (2003), who note that new information systems tend to reinforce existing behavioural norms rather than changing attitudes towards open communication and sharing. They argue that what is required is a combined approach focused on both social and information systems.

2.1. The Potential of ICTs in Enabling Climate Change Knowledge Brokering

The massive growth of ICTs has increased our ability to reach ever-larger audiences in more cost-effective ways and with increasingly sophisticated forms of information. This has led to increased innovation in and use of ICTs for translating and disseminating climate change information to a wide range of global audiences. The rise of social media and so-called "Web 2.0" tools that allow for greater user interaction has spurred interest in the potential for facilitating interaction between users of climate information and enabling networked governance in monitoring climate impacts and developing adaptation responses (Ospina & Heeks, 2010). As a result, the potential of ICT-enabled KB, knowledge networks and communities of practice have sparked particular interest in the field of climate change, where experiential knowledge may be embedded in widely dispersed communities or institutions and poorly documented (if at all), yet is essential for planning and action across a range of scales.

Magnuszewski et al. (2010) suggest that access to databases, forums for discussion, distribution of electronic documentation, online training and frequently asked questions are the primary advantages offered to KB practices via the use of ICTs. To this list we would add the growing power with which data (particularly when they are open and linked to other data sets) can be filtered, visualized, mapped and otherwise processed by end-users to respond to their needs or interests (see Davies & Edwards, 2012). Furthermore, beyond improving access to and availability of empirical evidence, ICTs may allow this knowledge to be exchanged in a variety of formats, including non-text-based formats like photos and video, thereby potentially spanning boundaries of language and literacy that remain pervasive in many developing countries. Van Baalen, Bloemhof-Ruwaard and Van Heck (2005) have argued that the emergence of such online networks of practice depends on a shared sense of urgency to tackle a specific challenge and awareness that knowledge of this challenge is fragmented; both of these conditions are widely recognized in the case of climate change.

Despite the promise that web-based technologies may offer for KB on climate change, challenges remain. Perhaps most obvious among them is the continued disparity in access to online information between developed countries and countries in Asia and Africa that are often most vulnerable to climate change (the so-called digital divide). Recent International Telecommunication Union (ITU) statistics (2013), for example, reveal that Internet access at the household level in Africa sits at 7 per cent, while two thirds of households in the Asia-Pacific region still lack access. As such, reliance on ICTs for KB may exacerbate the information/knowledge divide between stakeholders, putting further pressure on the power and social dynamics that exist, particularly in developing countries. Furthermore, investments into deploying ICTs to support KB may divert valuable resources away from other KB activities and from other offline activities that are necessary to facilitate the transition between information availability and action (Ospina, personal communication, May 30, 2013). Other challenges or risks related to the use of ICTs for climate KB may include a lack of capacity or resources to interpret the knowledge made available through these platforms or to put new knowledge into action, as well as the context-specific nature of particular adaptation responses, all of which might lead successful adaptations in one context to fail or ultimately be maladaptive in another.

Figures on Internet connectivity tell an incomplete story of the potential for ICTs for knowledge sharing in developing countries. Other platforms, particularly mobile telephony and radio, have far greater availability and are beginning to be used in innovative ways to address climate change and development (Harvey et al., 2012). Mobile

phone subscription rates have now reached 89 per cent in developing countries more broadly and 63 per cent in Africa, though Internet access via mobile phone remains prohibitively expensive for many (over 38 per cent of per capita gross national income in Africa) (ITU, 2013). Radio, long the platform of choice for reaching rural audiences, remains the dominant mass medium in Africa and in many other parts of the developing world (Myers, 2008). Of particular relevance for KB is the increasing convergence of radio with other ICTs, particularly mobile phones and the Internet, creating exciting new programming formats and opportunities for interactivity (ITU, 2013). With this said, most CKBs have yet to take full advantage of the opportunities presented by extending their reach beyond web-based communities and technologies.

Despite these concerns, there has been a recent emergence of a wide range of online platforms aimed at harnessing the power of ICTs for sharing resources and lessons learned, and facilitating interaction among those working on climate change. In the context of climate change and international development, these platforms have frequently been initiated and hosted by international agencies such as the United Nations Development Programme (UNDP); research institutes such as the International Institute for Sustainable Development (IISD) and the Institute of Development Studies (IDS); and non-governmental organizations (NGOs) and funded by bilateral or multilateral donor agencies including the United Kingdom's Department for International Development (DFID), the European Commission and the International Development Research Centre (IDRC).

The fact that the vast majority of these platforms are hosted and funded by agencies that are also major contributors to the climate change knowledge base, and are largely based in the global North, has led to some concerns that they may be shaped by the availability of research or evidence more so than by a clear understanding of user needs. This concern is echoed in other fields, such as health care, where much engagement in developing country contexts remains driven by "push"-style approaches led by research, evidence or technology (Pakenham-Walsh, 2012). A more desirable alternative, Pakenham-Walsh argues (2012), is a needs-led approach—"an approach where the information is based on research, informed by evidence, enabled by technology, and organized by subject (where appropriate)—but fundamentally led by needs" (p. 10).

If we agree that adopting a needs-led approach is a more appropriate starting point for the design of online platforms for KB on climate change, one obvious question that follows is: "How well do we understand the needs of those who use these platforms, and to what extent are the platforms meeting their needs?" We explore this question below in our analysis of the survey on information-seeking and knowledge-sharing behaviour of users of online climate change information, and through case studies of four CKB platforms.

3.0 Research Methodology: User-Oriented Analysis of CKB Platforms

The research discussed in this paper was conducted between December 2011 and January 2013. It consisted of three main strategies: 1) regular consultations with members of the CCD and CKB community to help frame the research questions and overall analysis, 2) a broad user's survey to understand the demographics, preferences and behaviours of self-identified online CKB platform users (or potential users), and 3) four in-depth case studies of existing CKB platforms, where both platform managers and a small group of users were interviewed or surveyed about intended and actual use of platform resources.

3.1 Consultation and Research Framing

A peer consultation was convened on the margins of the United Nations Framework Convention on Climate Change's (UNFCCC) climate negotiations in December 2011. Representatives from several online CKB platforms, as well as organizations active in development communication and KB, shared insights on the issues and helped frame the research questions, identifying survey approaches, assumptions and biases, as well as some key issues

to track during the project. Overall, the participants agreed that there was an observed and potentially growing misalignment between intended and actual use of online CKB platforms, and therefore trying to unpack user needs and behaviours would be an important contribution to KB for climate change action. Participants suggested that research targeting actual users of CKB platforms could lead to recommendations on how to satisfy existing user needs rather than how to increase the number of users and broaden the reach of CKB platforms.

3.2 Broad User Survey

Building on this consultation and on ongoing literature review, the authors drafted a user survey designed to better understand who is using CKB platforms, what users are looking for and what they are willing to share. The survey was piloted at a face-to-face meeting with knowledge brokers and users of climate information in May 2012 and further revised and structured, as summarized in Box 1.

BOX 1: BROAD CKB USER SURVEY

a. **Who are you**? Nine short questions about respondents' age, sex, job profile, language preferences and geographic location aimed at getting a sense of the general demographic and professional profile of self-identified online CKB platform users.

b. **What is the role of the Internet in your life?** Three questions to understand the importance of online resources and services to respondents, and their level of comfort in using ICTs.

c. **What kind of information do you seek online for your work and how?** Six questions on the types of professional tasks undertaken by users, the kind of information needed to complete these tasks, where they go online to find it and challenges they may encounter in doing so.

d. **Do you share knowledge online?** Five questions about respondents' level of engagement in knowledge-sharing and factors influencing willingness to share knowledge online.

The web-based survey, conducted in English, Spanish and French, was distributed to the research team's professional networks, on the Climate-L listserv and at relevant meetings, with a total of 163 respondents .

3.3 Four In-Depth Case Studies

The broad online user survey was complemented by in-depth case studies that were carried out from October to December 2012. Four CKB platforms were selected for closer examination, whereby intended and actual user experiences were compared in detail. The platforms selected, AfricaAdapt, Climate Finance Options, Climate Change Policy & Practice, and the Eldis Climate Change Resource Guide, are outlined in section 4.2.

The case studies were selected to sample a breadth of content, geographic focus, intended audience, and forms of interaction with and between users. Case study research consisted of a preliminary mapping exercise and semi-structured interview with CKB platform managers, followed by semi-structured interviews and in-depth surveys with identified platform users via Skype, telephone and online surveys. A total of 43 platform users responded. Preliminary results were then shared with platform managers to discuss initial impressions and answer any questions.

3.4 Biases and Limitations of the Methodology

The research methodology introduced a number of potential biases that may have affected results. The broad user survey was advertised via email and conducted using online software (Survey Monkey), meaning that respondents were self-selecting and were likely to be active users of online resources and services. This was anticipated from the outset. For the in-depth case studies, the reliance on platform managers for the names of interviewees may

have yielded more positive responses than a fully randomized sampling, though managers were asked to identify both regular users and a random sampling of users. Moreover, the relatively small sample size of platform users did not provide a basis for extrapolating demographic or professional profiles and linking them to expressed views. Finally, the four particular case studies selected for this study do not represent the full complement of online CKB platforms available, nor the full range of online technologies and services that are currently being used in CKB. Functions like data visualization tools, geo-tagging, wikis and social networking may be more heavily emphasized on other CKB platforms and expand the scope of analysis when comparing supply and demand.

4.0 Research Findings

4.1 Broad User Survey

4.1.1 Demographic and Professional Profile: Research-Oriented Users from Developed and Developing Countries

Of the 163 respondents, 133 completed the survey in English, 10 in French and 20 in Spanish. About half of the respondents identified themselves as being located in the global South (Africa, Asia-Pacific, Central and South America) and 46 per cent were female. Almost three quarters (74 per cent) of all respondents were between the ages of 26 and 45, and 63 per cent used English regularly on their job. The number of years respondents had been working on climate change issues was almost equally distributed among the four categories, with over half (58 per cent) falling in the middle range of two to ten years.
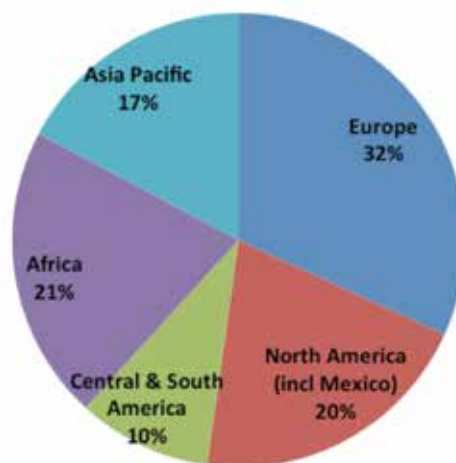

Figure 2: Geographic location of respondents to broad user's survey

The top three organization types represented in survey responses were international NGOs or civil society organizations (CSOs) (27 per cent), academic (15 per cent) and consultancy (15 per cent). National or local NGOs or CSOs (11 per cent) and national/local government (10 per cent) were not far behind. This predominance on research organizations and job profiles does not appear to align with the emphasis on policy-makers among many online CKB platforms. Moreover, there were almost no respondents (i.e., less than 1 per cent) who identified themselves as working for the media, in health care, library or information services or for a political party. The absence of media representation suggests that these online CKB platforms may not be reaching this important community of intermediaries, although other factors could also influence this finding, particularly the outlets through which the survey was distributed.

4.1.2 Internet Proficiency, Level of Comfort with ICTs: The Centrality of the Internet and the Rise of Smartphones

In terms of Internet proficiency, 91 per cent of respondents stated that the Internet was central to their daily personal and professional activities, with only 1 per cent saying it was not important. This underscores the extent to which, even in developing country contexts, Internet proficiency and dependency is increasing, meaning that the potential value of online CKB platforms is only growing. Almost 90 per cent of respondents identified themselves as

having laptops for accessing the Internet, while 55 per cent had desktop computers, 51 per cent had smartphones and 19 per cent had tablet devices. The high number of smartphone users, in line with other studies, suggests the increasing uptake of these devices in both developed and developing countries (Batchelor, 2012). As one blogger has noted about smartphone penetration in Africa, the anticipated smartphone revolution in the developing world will be a simultaneous computer and Internet revolution (Evans, 2012). Should online CKB platform managers targeting users in the global South be taking note and thinking about whether resources and services are easily accessible and operable through handheld devices?

4.1.3 Information-Seeking Behaviour: Looking for Documents to Prepare Documents and Starting the Search at Google

The survey revealed that 88 per cent of respondents seek information online to accomplish professional tasks. When asked to describe a specific task they undertake where they look for information related to climate change, responses were varied in the level of detail they provided. The following categories were most common:

- Preparation of a research document or report, such as article, dissertation/thesis, brief, etc.
- Inputs for training activities and educational curricula
- Project/program development, including developing proposals and looking for funding sources and potential partnerships

When seeking information to complete such tasks, online CKB platforms are rarely the first port-of-call. Only 7 per cent of respondents noted using them as a starting point for seeking out work-related information, while generic search engines such as Google represented 51 per cent of responses, and specific institutional websites, such as UNFCCC's, represented 34 per cent.

In terms of the content that users seek out, the survey revealed that user preferences have not necessarily kept pace with the availability of new technologies for visualizing data, posting multimedia content such as videos or stimulating user interaction through social media. The top three reported content types that users seek out are all typically paper-based documents, namely research reports, policy documents and journal articles. This data raises the question of whether the focus of online platforms should be aligned with these more basic information needs. If they are, will users gradually come to place a higher value on some of these more technologically sophisticated tools, or are other issues such as capacity or platform design at play? It also suggests that more reflection is needed on the advocacy and innovation roles that CKB platforms might play with regard to the use of climate change information.

Finally, when discussing the challenges of seeking out information, there was no overwhelming consensus. The biggest challenge, according to respondents, was the lack of sufficiently localized information (e.g. about the city/country in which they are working), while some noted that the language of online content was a challenge.

4.1.4 Knowledge-Sharing Behaviour: A Preference for Receiving Information but also a Willingness to Share

Survey respondents generally characterized themselves as being sharers of information (both personal and professional) online, though the extent of their engagement is limited. While none saw themselves as disengaged from knowledge sharing, 66 per cent were minimally or occasionally active. The 13 per cent identified as highly active sharers may represent a high response rate attributable to the sample of respondents.
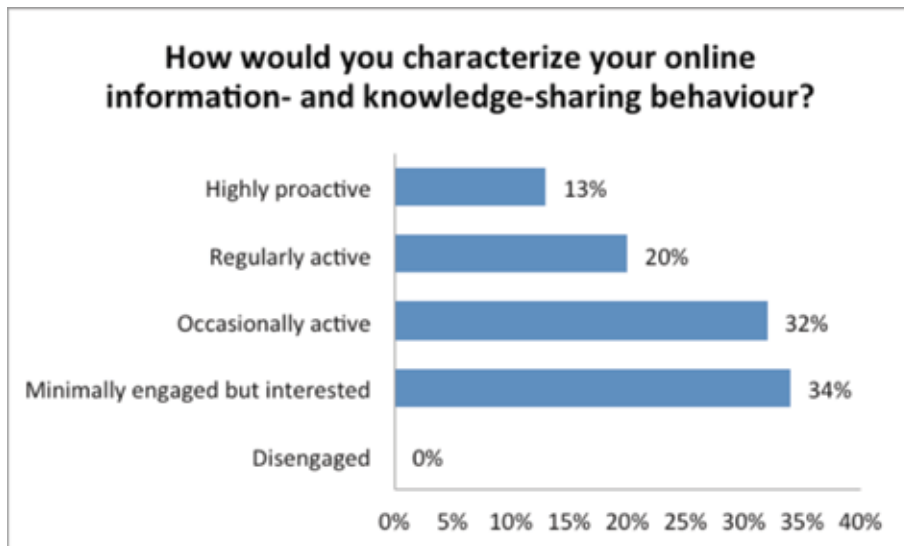
Figure 3: Online information- and knowledge-sharing behaviour of survey respondents

Finally, while the consultation and research framing activities conducted at the outset of this study suggested that the credibility and reputation of a given online space for sharing is the primary concern for those who chose to share, survey responses did not seem to support this view. Instead, existing membership with a platform and the platform's match (in terms of thematic focus or orientation) with the results they seek to share were noted as the most important factors, though we acknowledge that credibility may play a role in the initial selection and perception of popularity of a service.
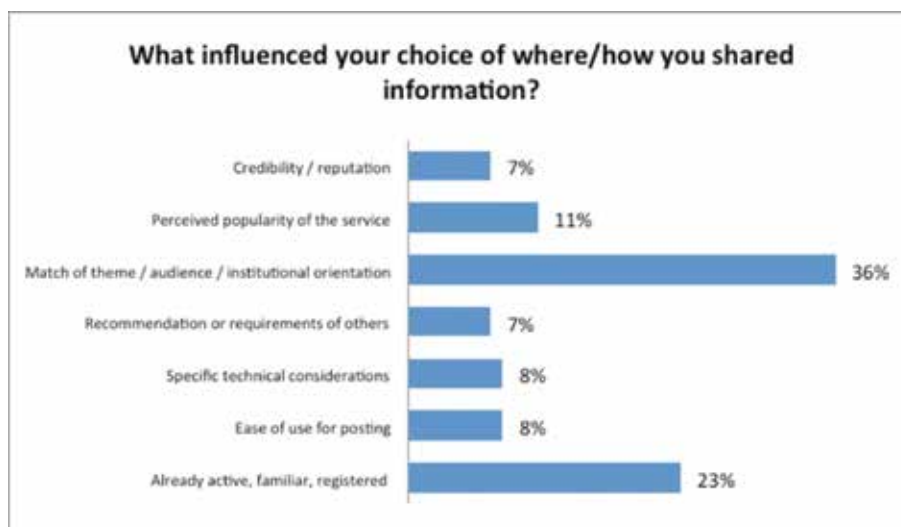
Figure 4: Factors influencing choice of where/how survey respondents share information

Nonetheless, these observations highlight the value of regularly engaging members (even if only to remind them that they are members of a given community) and communicating the core values, focus or uniqueness of a given platform. It also appears to sit in tension with initiatives positioning themselves as "one stop shops" that cater to all needs and interests.

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4.2. Case studies

The four selected case studies allowed for a contextualized analysis of user needs relative to online CKB platform resources and services. As noted above, the case studies differed in terms of their institutional affiliation, subject focus, intended audience, content type and engagement with users. The four case study CKB platforms are summarized in Table 1.

TABLE 1: OVERVIEW OF ONLINE CKB PLATFORMS SELECTED FOR CASE STUDY ANALYSIS

Platform	AfricaAdapt	Climate Change Policy & Practice	Climate Finance Options	Eldis Climate Change Resource Guide
Manager(s)	ENDA-TM, FARA, ICPAC	IISD	UNDP, World Bank	IDS
Funder(s)	DFID, IDRC	SDC (Switzerland)	UNDP, World Bank	CDKN
History	Est. 2008 as part of DFID/ IDRC Climate Change Adaptation in Africa research program	Est. 2008 in response to mandate of UN Chief Executive Board to promote coordination of UN bodies on climate change	Est. 2010 in response to an identified gap in the provision of comprehensive and understandable climate finance information	Est. 2009
Purpose	Facilitate the flow of climate change adaptation knowledge across Africa	Facilitate the exchange of news and information on climate change-related activities of UN bodies and intergovernmental organizations, including international negotiations	Increase developing country access to information on all aspects of climate finance to support more low-carbon and climate-resilient investments	To keep researchers, practitioners and policy advisors up-to-date with the latest in climate change and development research
Unique selling point	Focus on climate-vulnerable communities; focus in Africa; complemented by offline activities like radio programs and face-to-face meetings	Combination of internal writing by content experts and outreach; online newsletter highlighting recent posts that also brings users to the site	Centralized information source on climate finance; information verified by reliable sources (i.e., UN and World Bank)—"authoritative stamp"	Editorially selected, summarized, and freely downloadable research documents; highlighting research from smaller, Southern organizations
Target audience	Researchers, practitioners, policy-makers, media groups, civil society and, ultimately, vulnerable communities	Governments, international development agencies, practitioners, civil society	Policy-makers and project planners in both public and private sectors	Practitioners, government decision-makers, international development agencies, researchers, civil society
# unique visitors/mo*	700	16,230	3,512	2,163
Subject focus	Climate change adaptation in Africa	Climate change activities in UN system; international negotiations	Climate finance for developing countries	Climate change adaptation, mitigation and development
Geographic focus	Africa	Global	Developing countries	Developing countries
Content type	News and events; project descriptions; thematic info; community "voices" (interviews); documents; presentations; photos; videos; links to resources	News and events; guest articles; policy updates; jobs; calendar of events; links to other IISD knowledgebases (e.g. Land, Biodiversity)—all online (i.e. no downloads)	News; profiles of funding sources; successful cases in accessing and blending funds; glossary; documents; links to relevant decision-support tools, initiatives, organizations, and experts	News on latest research; quick introductory guides, in collaboration with specialists, to emerging issues; downloadable documents; links to relevant organizations; country profiles with lists of related documents
Tools, services, features	Bilingual (English/French); discussion forum; RSS feed; searchable archive	RSS feed; link to Facebook page; iCalendar feed; searchable archive (by issue, date, region)	Google Translate; link to Twitter feed; searchable database; discussion forums for communities of practice (for registered users)	Google Translate; searchable document library; document list RSS feed; subscription for email updates; bookmarking and sharing; access to content via the Eldis open API; link to Eldis Communities where users can interact with each other
Editorial approach	A combination of user-generated content and curated content posted by the editorial team.	Website posts written by internal experts or external featured guests. Users can contact manager re: info they wanted posted online or to submit feedback.	Website content selected and edited by platform manager(s). Users encouraged to submit content and provide feedback.	Website content manually sourced weekly from multiple publishers and managed by editor. Users encouraged to submit content.
Mode of interaction	Start with "we inform, they act" to build trust towards intended goal of co-production of knowledge	"We inform, they act"–emphasis on improving availability and accessibility of existing information	"We inform, they act," but moving towards building communities of practice for co-producing content	"We inform, they act," but linked to Eldis Communities, which is a virtual space with tools for online information and knowledge sharing

*Average number of unique visitors to the platforms between September 1, 2012 and February 28, 2013.
** The numbers for the Eldis Climate Change Resource Guide include estimated number of unique visitors to the country pages.*

All four platforms were established in the last five years (representative of when the majority of platforms have been established), are managed by well-known organizations in the field of climate change, and are funded through bilateral and/or multilateral funding mechanisms. In terms of overall purpose, all four seek to facilitate access to and exchange of timely information on climate change. It is understood that access is facilitated through: the concentration of relevant information and knowledge resources in one virtual space (i.e., portal or clearinghouse), the organization of these resources in this space and the usability of these resources (i.e., the translation of selected information and knowledge into different products and formats). Two initiatives also rely on additional activities to enhance the value of their platforms (offline user engagement with AfricaAdapt and mailing lists with Climate Change Policy & Practice). Engagement with users on these platforms ranges from unidirectional or "push"-style communication between the platforms and users to more interactive user-to-user and user-to-platform manager engagement. Three of the four platforms aim to move toward a more interactive model of engagement through the establishment of online communities. When it comes to users, each platform emphasizes different primary users, with two focusing on researchers and two focusing on decision-makers, but they all try to reach the same range of users when secondary audiences are taken into account.

Climate Change Policy & Practice has by far the greatest number of users, with an average of 16,230 unique visitors a month between September 2012 and February 2013 (see Figure 5). This is five to ten times more visitors than the other case study platforms, although it is probably a reflection of the breadth of Climate Change Policy & Practice's subject focus and its function as a news source, as well as its use of the Climate-L listserv to advertise its content on a daily basis.
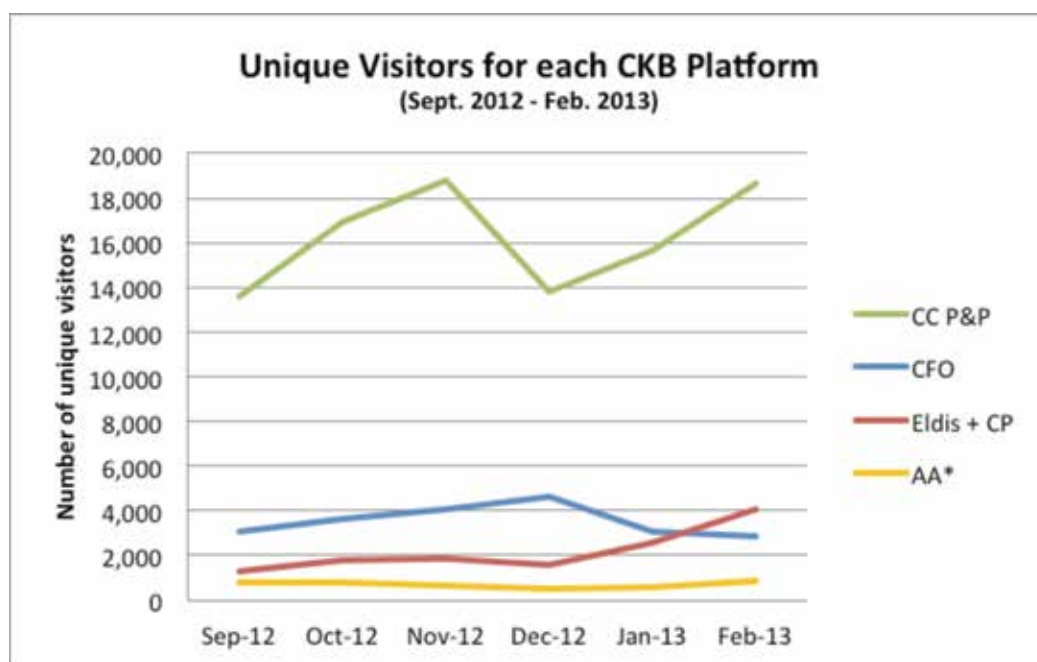

Figure 5: Number of unique visitors between September 2012 and February 2013
*Estimate based upon 6-month total.

A quick look at the unique visitor numbers also shows that all platforms experienced increased activity in November, coinciding with the UNFCCC international climate negotiations.

4.2.1 AfricaAdapt

AfricaAdapt (AA) is dedicated to improving information access and knowledge-sharing in Africa, particularly for researchers, practitioners and members of civil society. Its focus is on highlighting research and case studies on climate change adaptation, with a special focus on indigenous knowledge. According to its managers, AA works offline and online to link different African communities and stakeholders to participate in the production, use and sharing of knowledge.

AA's management team highlighted three areas that shape the unique nature of the network, namely its strong focus on communities that are vulnerable to climate change, the fact that it is "for Africa, and by Africans," and the way it links online and offline activities for knowledge-

Figure 6: Homepage for AfricaAdapt

sharing. In terms of interaction with network members, the team aims to see members take a proactive role in shaping the activities and priorities of the network, not just in consuming the content. However, there is acknowledgement that they are not yet as far as they'd like to be in this area. On this point, the network coordinator suggested that there is a need to start with a more linear model of influencing/informing people at the early stages of the network to get the user interest and buy-in, then move into more co-productive models. The number one priority at this stage of the network's development is therefore the co-production of knowledge with the platform playing a KB role.

User Perspectives

The majority of AA's 11 survey respondents identified themselves as either project managers or program officers/coordinators, covering a range of organizational affiliations, levels of experience and ages (though no respondents were over 55). All respondents identified English as the language regularly used in their professional life, though eight of the 11 also identified French as a second language on the job. In keeping with the target audience of the network, only one respondent was based outside of Africa. This set the AA case study apart from the others.

AA respondents displayed a similar degree of reliance on the Internet as general survey respondents, though far fewer (2 of 11) were using smart phones. While a majority of respondents initiate searches for climate change information from search engines and institutional websites, online portals such as AA were the next most popular starting point. This statistic differs from our general survey but may be related to the sample of respondents. Notably, none of the respondents selected social media sites as a starting point, while three mentioned offline networks as a starting point.

Despite the limited number of mentions of access to or quality of ICTs and Internet resources in the general survey, this proved to be one of the key challenges faced by five respondents (almost all of whom are based in Africa). Linked to this point, four of the 11 respondents (including all but one francophone respondent) had discovered the network through face-to-face meetings, supporting the value of this activity to establishing the network's membership, in part to overcome connectivity challenges.

The content sought on AA by those surveyed differs somewhat from our more general respondents, notably with a far greater focus on local testimonials, though project profiles were the dominant area of interest. In assessing the trustworthiness of content, AA was the platform that saw the strongest consensus with nine of 11 respondents

characterizing it as being "very/always trustworthy." What interviewees sought was authenticity and information that "matched" the realities they could witness on the ground as practitioners, rather than a focus on peer review or other approval from outside bodies. This was an interesting distinction from other networks. One respondent stated: "101 per cent trustworthy. [I have] been working on this for some time so I know. [I] have tried implementing some of this information I found. It has worked out for me." This was supported by other responses, with nearly all users feeling the content was "always or very trustworthy." For some of the interviewees, the fact that AA is an *African* website makes it more relevant to their practice, and it also means that the issues and techniques put forward on the portal are more likely to be applied in their own contexts, a view aligned with the expectations of the platform's managers. This may point to a more complex perception of validity and trustworthiness among users of climate change information than is often assumed.

Finally, a common theme in most interviews was the desire for AA to focus more on *action.* As stated by one respondent, "there is a lot of research out there, but little coordination between research and action." This raises the questions of what boundaries CKB platforms should maintain between brokering knowledge and taking direct action on climate change, and whether this should vary depending on context. And given AA's ultimate aim of fostering the co-production of knowledge among platform users, there may be more scope for this type of role.

4.2.2 Climate Change Policy & Practice

Climate Change Policy & Practice (CCP&P) is one of 13 thematic online knowledgebases managed by IISD's Reporting Services and acts as a repository and searchable archive of information related to climate change activities in the UN system and international climate negotiations. Its content largely consists of news posts and events with the occasional featured guest article. The aim is to give users a reliable and up-to-date snapshot (and archive) of what is happening on climate change within the multilateral, intergovernmental system at a given time, in order to facilitate coordination and collaboration.

According to CCP&P platform managers, the high priority users for the platform are government decision-makers, while those working in international development agencies, civil society or as practitioners were ranked slightly lower. Given the purpose and orientation of the platform, its content reflects a wide range of climate change issues and its tone is decidedly neutral with no editorial position advocating for a particular change.

The platform's unique selling point is described as the combination of in-house writing with outreach. Specifically, all of the posts are written by internal CCP&P content experts who follow specific organizations and issues and can follow-up with press officers to prepare an article for the website. The platform itself does not host a wide range of tools, as the function of CCP&P is relatively narrow and well-defined—its purpose is to organize, store and render accessible news stories. However, putting these stories on the website is only part of strategy in reaching intended users. An email notification of new posts, called Climate Change Daily Feed, is sent out to approximately 27,000 subscribers of the Climate-L listserv, one of the most established community

Figure 7: Homepage for Climate Change Policy & Practice

announcement lists on climate change. The email notifications allow readers to skim the headlines of new CCP&P stories and link them back to the website to read the original feed and search the site's other content. This ability to leverage Climate-L, whose subscribership has been built up over 20 years, as a key information-sharing vehicle has been important to the success of CCP&P, although perhaps more in terms of branding and trust than user traffic. A survey conducted in August 2011 found that 20 per cent of platforms users accessed the website through referral traffic, that is to say, links from other sources, such as the Climate Change Daily Feed. This figure is compared to 40 per cent of users who arrived at CCP&P through search engines and 30 per cent who were directly accessing the website (i.e., directly entering the URL).

User Perspectives

Nine platform users were surveyed about their specific experience in using CCP&P. The majority identified themselves as communications professionals, while the rest ranged from technical experts to NGO managers and directors. This represents a departure from the marked absence of media and communications professionals in our broader survey.

Almost all of the CCP&P users consulted said the Internet was central to their daily activities, and all were somewhat or very comfortable with ICTs. In general, users looked for information to update website content or write research or policy papers. When looking for information, the majority started by using search engines, with specific institutional websites coming in second. When it came to climate change-related information, "project information," "news, jobs and events," "expert commentary/opinion" and "research reports" were almost tied in terms of what users sought.

Contrary to the results of an August 2011 CCP&P users' survey, most (6/9) of those consulted said they had discovered CCP&P through word of mouth. One respondent noted that the first thing a co-worker told him to do upon starting his job was sign up for CCP&P's email list. The remaining three respondents had come to know CCP&P through Internet searches and most were prompted to return to the site through the Climate Change Daily Feed email. The timeliness (e.g., meeting announcements, negotiations updates) and access (i.e., links to other knowledgebases) of CCP&Ps content were most appreciated by surveyed users. In terms of trustworthiness, all users felt CCP&P content was mostly or highly trustworthy. One user stated that this perception was reconfirmed during a CCP&P side event organized at a UNFCCC meeting. Some users did note, however, some suggestions for improvement. Having a thematic focus, for example, might help structure and tailor the content, which, another user remarked, can be difficult to filter through in order to find what is most relevant to their needs.

In terms of knowledge-sharing behaviour, the users were relatively evenly distributed in levels of proactivity. For those who had not shared information or knowledge with CCP&P, two provided reasons for not doing so: a) lack of self-perceived expertise or qualification to provide inputs and b) no prompt for doing so—that is to say, no explicit requests or advertised opportunity.

Overall, the CCP&P user experience appeared to be consistent with its intended purpose of keeping users updated and informed of the latest developments around climate change-related activities of UN bodies and intergovernmental organizations. Its relatively well-defined purpose, audience and services, coupled with its reliance on an established, well-known and trusted email listserv, are likely the most important reasons for this alignment of supply and demand. It should be noted that CCP&P leans comfortably towards the information intermediary side of the KB spectrum presented in Figure 1, where the emphasis is on enabling access to and helping users make sense of information. However, it should be noted that the currency of platform—its announcements, news stories and updates—is completely reliant on the activities of knowledge intermediaries who translate information from a wide range of sources into more simplified, succinct and neutral formats.

4.2.3 Climate Finance Options

UNDP and the World Bank established Climate Finance Options (CFO) in an effort to fill a gap in the availability of comprehensive climate finance information. The content consists of a searchable database of climate-funding sources, case study descriptions demonstrating different uses of climate financing, a knowledge centre that provides a glossary, links to different decision-support tools and relevant publications. More recently, CFO has started encouraging the establishment of user-driven, virtual communities of practice on climate finance subtopics, sectors and actors by offering webpages for registered users to access targeted information and resources, as well as engage in real-time discussions.

The priority users for CFO are practitioners who may not necessarily be residing in developing countries but the majority of what they do concerns climate finance in developing

Figure 8: Homepage for Climate Finance Options

countries. Scientists and researchers, private sector actors and civil society were identified as the second most important users. Recognizing that the majority of users are currently UN and other multilateral practitioners, the CFO manager noted that the aim was to move beyond this usership and push information out to "folks in trade organizations or at the village level." Climate finance is obviously the primary substantive focus area of the platform, with a secondary focus on climate adaptation, mitigation/low-carbon growth, reducing emissions from deforestation and forest degradation and disaster risk management (as they relate to finance). Overall, information on the website is presented in easily accessible language, where complex financial concepts and jargon are clearly explained.

According to its managers, the platform's unique selling point is twofold: 1) it offers a comprehensive range of up-to-date climate finance information in a centralized virtual space and 2) it does so with the UN and World Bank seal of approval, which gives users quality assurance. CFO's envisioned pattern of usage consists of people arriving at the site primarily through search engines, secondly through other institutional sites such as those of UNDP and the World Bank and thirdly through word of mouth. Users would be accessing this information for two main purposes: 1) to stay up-to-date on the latest developments in climate finance and 2) to use the information for a specific purpose, such as developing a project. The model of interaction between the platform and users is very much "we inform, they act," although the move towards establishing and nurturing communities of practice is placing a greater emphasis on the co-production of content.

User Perspectives

Twelve users were consulted for this research, most of whom were technical specialists or project managers and active in the NGO sector. The majority of respondents were regular Internet users with a high degree of comfort with ICTs, and with a range of devices for getting online. All users had laptops, seven had smartphones and five used tablets.

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Information-seeking patterns of CFO users closely reflected the patterns found in the general survey. Most started at specific institutional websites, followed by online search engines and climate information portals. Nobody identified social media websites as their starting point. Research reports and policy documents were the most commonly sought type of climate change-related information. In terms of challenges related to finding the climate change information needed, responses ranged from reliability (three) and regional relevance (two) to lack of open access, language, browser compatibility and managing the sheer volume of information available.

In line with expectations, most users (8/11) had discovered CFO through an Internet search, while the rest visited the website upon learning about it through word of mouth, a workshop or event. Most users said they visited the website a few times a month or year and the main prompt for user return to the website was generic Internet searches, although several users indicated that they deliberately come back to the site when performing certain professional tasks. Project reports, project information and policy documents were the most sought-after types of information on CFO. All users felt that the information on CFO was mostly or always trustworthy. Identified shortcomings or gaps included: information being "too general" rather than tailored; lack of clear advice for CSOs on how to best access climate finance; lack of direct contact with climate finance administrators and community of practice.

CFO users' knowledge-sharing behaviour was also in line with the general survey, with most users identifying themselves as occasionally or regularly active and nobody identifying themselves as disengaged. Respondents cited internal professional networks (intranets), partner websites, LinkedIn, webinars and Twitter among the spaces where they shared professionally and personally, though only one user noted that they shared information with CFO. For those who had not shared information with CFO, explanations included: not seeing the value of knowledge-sharing (i.e., not wanting to share "for the sake of sharing," not taking it seriously); quality of information falling short of a standard that would incite sharing (i.e., information would have to "resonate in order to send it along to peers and friends"); the lack of resources, skills, expertise, time, capacity or confidence; and lack of awareness that it was possible to share information with CFO. This last point was expressed in different ways, with one user referring to perceived conditions for sharing (i.e., thought they could only share information if they had received financing as a result of using CFO) as well as practicalities (i.e., had not found the space within the website to share information and knowledge).

CFO user experiences appear to be consistent with the intended purpose of facilitating access to a broad range of resources on climate finance. As climate finance is a relatively specialized and emerging area of expertise, it faces both pros and cons of attracting users—that is to say, there is less competition but also a smaller pool of potential users, respectively. The plan to introduce functionalities that enable greater user interaction and the provision of tailored content appears to be aligned with user demand, as users consulted for this research indicated a desire to have more access to people and filtered information. However, based on the responses of users to the knowledge-sharing questions, providing a virtual space will not be enough to move users from information and knowledge consumers to sharers to co-producers; these spaces will have to be moderated to, above all, demonstrate the value of online knowledge-sharing, provide guidance on how it can be done, and leave it open enough so that people of all backgrounds and levels of expertise feel encouraged to participate.

4.2.4 Eldis Climate Change Resource Guide

The Eldis Climate Change Resource Guide (ECCRG) is one of 10 thematic guides that form part of the broader Eldis website. It consists of an open access database of summarized research resources. According to its managers, the priority audience for the ECCRG is practitioners, followed by government decision-makers, international development agencies, scientists and researchers, and civil society actors. One manger felt that government decision-makers and international development agencies should be given increased priority as end users, though there was recognition that, when considering actual audience rather than desired users, greatest usership would be by researchers, academics and intermediaries, rather than these targeted groups.

Features that the managers felt were unique to ECCRG and/or resulted in service users returning to the site fell broadly into three categories: 1) the uniqueness of the information available due to the work invested in sourcing and selecting relevant and sometimes difficult-to-find resources; 2) the quality of the information available, owing to the value added by translating and editorializing the content for a non-expert audience; and 3) the accessibility of that information, insofar as the platform provides summaries of and links to academic publications from a diverse range of research producers that might otherwise only be found on their own institutional websites. By including this research on ECCRG, it is not only more visible to platform users but also its overall visibility via the Application Programming Interface (API) and search engine searches (as a result of those search engines indexing ECCRG).

Figure 9: Homepage for the Eldis Climate Change Resource Guide

Managers identified web searches and word of mouth as the primary methods by which users initially access the site, with the majority of return visits prompted by the email newsletter sent out regularly by the service. Google marketing campaigns via Google Ad-Words (i.e., advertising within Google search results) were viewed as effective methods to attract new users, particularly from countries where the existing user base and ability to engage with audiences was low. There was a perception that people are moving away from email newsletters to social media and that ECCRG need to be aware of and respond to this. As most targeted users already know about the issues presented on the platform and are accessing it to be kept up-to-date, updates via email newsletter or some other service such as Twitter will always be the main way in which people access the site.

Interaction between ECCRG and users is primarily unidirectional. The managers report that while some users do contribute their own documents to the service and they sometimes receive feedback on the Key Issues guides, the extent to which users inform ECCRG, outside of user surveys, is limited. Some co-production has taken place where ECCRG has worked with particular partners to co-produce content, but this has not focused specifically on users; though it should be noted that there is a separate social networking platform named Eldis Communities that convenes practitioners on similar issues. There do not seem to be consistent links between Eldis Communities and the ECCRG, however.

User Perspectives

Of the 11 ECCRG users surveyed, nearly half were in more academic roles as researchers, lecturers or students, with the remainder working in national/local NGOs or CSOs, national/local governments or for bilateral agencies. All but one were from Southern countries. Respondent demographics were therefore consistent with both the ECCRG managers' expectations and, to a certain degree, consistent with their envisioned usership.

Internet and ICT usage patterns were largely consistent with our broader survey, though the presence of job listings on ECCRG was noteworthy for users, and ECCRG users indicated being slightly less comfortable with the technologies than was found elsewhere. Five users identified as "somewhat comfortable" with ICTs and the Internet, and these were primarily users over the age of 45. Interestingly, only one respondent used a smartphone

and none used tablets. Hence, while the ECCCRG managers perceived a move away from using email newsletters towards social media such as Twitter to account for new technologies, the small number of respondents surveyed did not support this view.

Once again, the tasks requiring outside information, the starting points for seeking information and the formats of information sought aligned closely with the broad survey and other case studies. With regard to challenges to finding information online, however, issues of accessibility dominated, with only one participant reporting a lack of information about a specific subject. Lack of access to online journals, lack of credit cards or e-banking to pay fees, or simply poor connectivity and the high-cost Internet services were identified. Another issue was the wealth of information on climate change available, making it difficult to identify what is most relevant.

Consistent with ECCRG managers' perceptions, over half the respondents reported having first discovered ECCRG via Internet search, with others having been referred to ECCRG through a colleague or co-worker and another through a workshop or event. Also consistent with managers' expectations, following links received in email updates from ECCRG was the most commonly reported prompt for respondents to return to ECCRG although some respondents identified searching for specific information related to their work as the prompt for returning to ECCRG.

Knowledge-sharing behaviour was also in line with the trends described elsewhere in this study. Descriptions of sharing behaviour between occasionally and regularly active respondents were very similar, with reports of regular contribution to particular sites, sometimes commenting on other people's work and sending links to colleagues when they felt an article would be of interest. Two of the 11 respondents reported sharing information or outputs from their own work with ECCRG, one who shares with ECCRG rarely, and another who shares information online but not consistently. Common reasons for not contributing to ECCRG were linked to an insufficient understanding of the contribution process and to not having the necessary intellectual property rights.

5 Discussion and Conclusions

Drawing on calls for a more needs-led approach to linking knowledge and practice, we have examined the profiles and stated needs, as well as information-seeking and knowledge-sharing behaviours of users of online climate change information. Through our four case studies, we have also tried to ascertain the current alignment between these needs and what is currently being provided by CKB platforms. In total, more than 200 users of online climate information were consulted, yielding a series of observations and conclusions that we will now explore.

CKB platforms are not changing the way users initiate searches for information.

The vast majority of research participants started their searches for climate change-related information at search engines or specific institutional websites; this was also the expectation of platform managers interviewed for the four case studies. Today's online search engines offer users a high level of control over their information-seeking, allowing them to engage in a more iterative process where they can tailor their searches as they learn more about what is available. Availability itself is being enhanced through tools such as semantic tagging, linked open data and signposting, leading users to a broader array of information and knowledge than could ever be hosted on a single platform. Investing in search engine optimization may therefore make more sense than designing platforms as one-stop-shops that attempt to respond to a plethora of needs. This will also help to convey a clearer focus for the platform in question and, as a result, may encourage users to share more via the platform. Climate knowledge brokers may also gain greater value from building on their social (rather than technical) roles, extending their reach beyond the online world by linking to face-to-face convening activities or other technologies such as radio or mobile phone, depending on the audiences they are targeting.

Users still prioritize accessing information and knowledge in "traditional" (written) formats

Despite the growing popularity of social media and Web 2.0 technologies, users are still primarily accessing CKB platforms to download research reports, policy documents and journal articles. Whether this is a function of the particular usership of CKB platforms, the platforms themselves or the availability of alternative websites such as LinkedIn that fill the social networking niche, the demand for printable products is striking. This reinforces the point that platforms should not be detracted from the more basic knowledge management and infomediary roles of capturing and curating information; helping people access relevant resources and find their way through a glut of information using tools like searchable databases, archives and bookmarking is important.

...but wouldn't mind accessing people.

Despite the strong preference for accessing documents, the case studies (particularly AA, CFO and ECCRG) did reveal a desire among some users to be linked to other people and/or personal experiences. Addressing this demand will require more and different investments from existing CKB platforms. Platforms that start out as primarily online document repositories and want to move towards the sharing of "soft knowledge" or hosting communities of practice may have a tendency to offer technology-driven solutions to make the leap, such as online rosters of experts and virtual spaces for discussion groups. However, institutions must be willing to invest resources in dedicated and consistent facilitation of these services and spaces, in order for this approach to work. However, if done well, platforms may be effective ways of linking people and building social relationships. Even so, evidence suggests that these online interactions would be greatly facilitated by offline and face-to-face interactions, as discussed below.

CKB platform users still prefer to receive information than share knowledge online.

Most survey and case study respondents identified themselves as occasionally active when sharing information and knowledge online. People appear to be aware of the range of outlets for sharing information and knowledge but simply do not do so frequently. Given this, further research could investigate the boundaries and differences, if any, between personal knowledge-sharing and what users share on CKB platforms to gain a better understanding of barriers and incentives for sharing. Several case study respondents referred to a perceived lack of adequate expertise or not wanting to burden colleagues as deterrents for knowledge-sharing. The relationships and stakes can be different in professional online spaces, possibly even more so when they are dedicated to an emerging and transdisciplinary area of research, policy and practice like CCD. Moreover, the role of so-called "lurkers" on CKB platforms—those who access platform content but do not contribute—should also be explored, as they are increasingly recognized as important knowledge brokers who span online-offline boundaries, acting as online followers and offline leaders (Cranefield, Yoong & Huff, 2011).

Platforms may be aligned with most user expectations (which remain modest), but out of sync with other expectations.

Our case study research suggests that, generally speaking, online platforms are doing a good job of addressing stated user needs and preferences. These have, with some exceptions, focused on providing easy access to relevant information translated or presented in formats that suit their needs. Further, email remains a key channel for how users learn about what's new, with social media and Web 2.0-type interactivity remaining marginal models of information-seeking behaviour. As such, user expectations remain predominantly modest, focused primarily on the more linear information- and knowledge-intermediary functions outlined in Figure 1 of this paper.

At the same time, user expectations are not the only driver of CKB platform behaviours. Those developing the tools and approaches may be keen to integrate more sophisticated brokering and innovation functions and technical

features. Also, importantly, the agencies funding these platforms are increasingly expecting to see outcomes that go beyond users simply accessing knowledge resources. Evidence on putting research into use confirms that ensuring these outcomes are achieved and are attributable to the CKB platforms is much harder if they are restricted to solely selecting, translating and disseminating resources.

Should platforms drive or respond to demand for online KB?

Linked to the previous point, we question whether demand for relatively basic information- and knowledge-management services is due to a more limited set of perceived needs in this field, whether needs for more co-constructive engagement are being met elsewhere or whether users might simply not be aware of the range of possibilities that exist were CKB platforms to function differently. Moreover, because user needs are for the most part being met by CKB platforms, this is likely keeping most platforms within the information intermediary oval of the KB spectrum. If we want CKBs to support more meaningful KB and innovation, platforms will have to expand the tools, services, features and overall type of engagement with their users; but this may outpace identified needs. This raises the question of whether there is a need to stimulate certain demands among users, how we might do so and indeed, whether it is in fact possible (see Sharatt & Usoro 2003; Van Baalen, Bloemhof-Ruwaard & Van Heck, 2005).

Platforms should recognize the value of blending online and offline functions.

The role of offline interactions in reinforcing online KB functions was a recurring theme, particularly in the case studies. These interactions served a number of purposes, such as simply advertising the existence of platforms, building user confidence and trust in its content ("knowledge-based trust"; see Ardichvilli, Page & Wentling, 2003) or facilitating the co-production of knowledge that would be hosted on a website. Referring back to the KB spectrum depicted in Figure 1, the more an online CKB platform strives to expand from performing information intermediary functions to include linking, tailoring and (re)interpreting this information to suit different decision-making contexts and foster change, the more important the role of facilitated human interaction. Indeed, the value of face-to-face, offline interactions can sometimes be overshadowed by the promise of online functionalities, as noted by Connelly (2010):

> We spend millions on IT systems to capture, store and disseminate 'stuff'. We endlessly attempt to codify "what we know" into different forms of media for those who might benefit from it, so they can completely ignore it. We set up communities of practice to connect the unconnected and link our structural silos. We endlessly promote the virtues of Web 2.0 and social media as the panacea of all our knowledge ills. We do all sorts of things in the name of [knowledge management] it seems – except tackle potentially the most productive and lowest hanging of all our fruits, our meetings.

The intention is not to pit online and offline interactions against each other, but to recognize the value and complementarity of each in KB for CCD decision-making, and see how it can be best reflected on a platform's structure and management.

Get to know your users! Despite their many commonalities, usership across CKB platforms is not homogenous.

While this study has revealed a high degree of consistency among the responses from the general survey and the four case studies, in both information-seeking and knowledge-sharing behaviours, there were some important differences that should not be overlooked. While technological and information access barriers appeared virtually non-existent in the general survey, respondents from AA and ECCRG (almost all based in the global South) reminded us that they continue to present a challenge. Similarly, respondents from these two platforms had far less access to handheld devices (smartphones and tablets) for Internet access than found elsewhere. There were also differences in users' expectations of the platform (for example, that AA's users called for greater engagement in action on climate change was unique) and differences in interpretations of trustworthiness. For CFO, trust came from the content's link to a recognized and respected set of global institutions, while for some AA members, content was trustworthy because it resonated with their lived experience.

The point here is that there remains no substitute for understanding the specificities of a platform's usership by engaging directly with them and regularly tracking how that usership is evolving. In all four case studies, we found that this was happening (albeit to different degrees), which is a positive indicator for CKB platforms.

Remember that CKB platforms are used by a small subset of CCD actors.

Finally, both the survey and case studies demonstrated that online CKB platforms are largely used by research-oriented users in developed and developing countries for preparing reports, educational materials and proposals. For the most part, policy-makers, media representatives and local-level actors are not actively engaging with CKB platforms. There is also a wider issue of Internet access, including the global digital divide as well as disparities within developing countries. Only 31 per cent of the developing world is online, compared to 77 per cent of the developed world (ITU, 2013). Since the cost of getting online remains prohibitively expensive in some developing countries, those who do get online are often from more privileged backgrounds (Chen & Wellman, 2004; Furuholt & Kristiansen, 2007). Thus, those actors and regions that stand to lose the most in the face of climate change and play an important role in crafting appropriate responses to the challenge are not well represented via CKB platforms. While most platforms do not primarily target these so-called "frontline actors," some refer to them in their plans to expand ("...reach the folks at the village level") or when describing the eventual beneficiaries of their services ("...ultimately, vulnerable communities"). If CKB platforms genuinely want to engage with such actors, they will need to go further and to integrate other tools and services such as radio, mobile phones and offline interactions into their work. Otherwise, CKB platforms are essentially online spaces established and managed by researchers for researchers in relatively privileged settings.

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