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United Nations Development Programme

2010 ADAPTATION KNOWLEDGE NEEDS SURVEY:
A SYNTHESIS REPORT

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BO LIM
(1958-2011)

To Bo for her inspiration and commitment to creating a system within UNDP for assisting countries to adapt to climate change, and for her contribution to the development of the Adaptation Learning Mechanism (ALM) as a global knowledge-sharing platform.

ADAPTATION LEARNING MECHANISM
www.adaptationlearning.net

NEED FOR KNOWLEDGE MANAGEMENT

Adaptation to climate change is a growing priority for development agencies, governments and vulnerable communities, yet capacity, awareness and access to information are often limited for the growing number of projects in this area. The Adaptation Learning Mechanism (ALM) was launched by UNDP in 2007 in order to institute a framework for sharing knowledge on good adaptation practices and operational guidance, and to create a coordinated community of practice and an information database tailored to the needs of practitioners.

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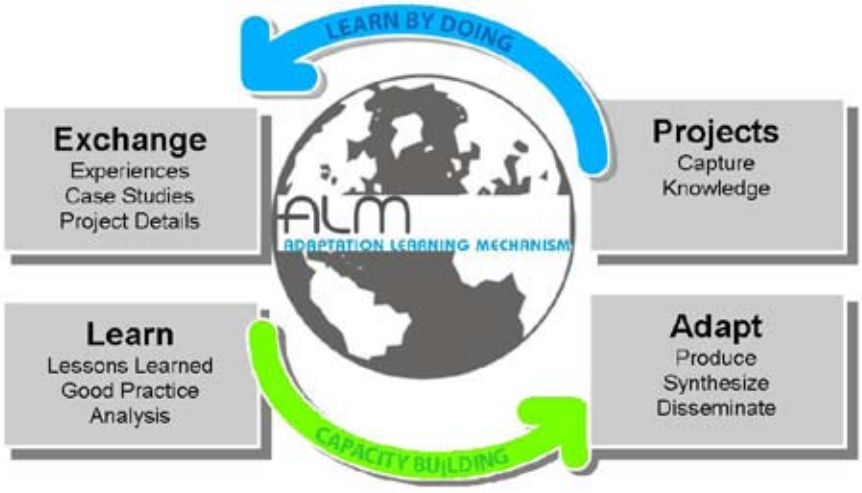
A COLLABORATIVE KNOWLEDGE-SHARING PLATFORM

The United Nations Development Programme's (UNDP) ALM is facilitated in close partnership with the United Nations Framework Convention on Climate Change (UNFCCC), United Nations Environment Programme (UNEP), the World Bank and specialized United Nations agencies including Food and Agriculture Organization of the United Nations (FAO). It represents a collaborative, global learning process, with leadership, facilitation and strong participation by Southern institutions.

The ALM provides a common platform for sharing and learning; it bridges knowledge gaps by bringing relevant knowledge and stakeholders together to exchange information, experiences and expertise. It also complements the wide range of adaptation knowledge networks and initiatives already underway.



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UNDP recognizes the valuable support of team members during the survey development. Naomi Sleeper (Consultant) created the survey, with inputs and feedback from Julia Wolf (German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety [BMU]) and UNDP staff, including Diana Salvemini, Angelica Shamerina, Bo Lim, Jennifer Baumwoll, Yamil Bonduki, Andrea Egan, and Gabriela Walker. Jennifer Frankel-Reed (United States Agency for International Development [USAID]) also provided inputs during this stage. David Angelson (University of Auckland School of Population Health) conducted additional analysis on the report.

The survey was translated by LTS Translations (Spanish) and Prime Productions (French), with additional translation support provided by Bahareh Seyedi (UNDP), Veronique Lozano (UNDP) and Florent Guintrandy (École Supérieure de Commerce de Paris, Europe).

The report was prepared by Andrea Egan (UNDP-ALM Project Manager) under the technical oversight of Pradeep Kurukulasuriya (UNDP/GEF).

ACRONYMS

AAP	Africa Adaptation Programme
ALM	Adaptation Learning Mechanism
CBO	Community-based organization
CCA	Climate change adaptation
CDM	Clean Development Mechanism
CLEAR	Climate Education and Awareness Raising
DRR	Disaster risk reduction
FAO	Food and Agriculture Organization of the United Nations
GEF-SPA	Global Environment Facility – Strategic Priority on Adaptation
HIV	Human immunodeficiency virus
LAC	Latin America and the Caribbean
Green LECRDS	Green, Low-Emission and Climate-Resilient Development Strategies
MDG	Millennium Development Goals
NGO	Non-governmental organization
NRM	Natural resource management
NWP	Nairobi work programme
REDD	Reduced Emissions from Deforestation and Degradation
SIDS	Small Island Developing States
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WASH	Water, Sanitation and Hygiene

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The Adaptation Learning Mechanism (ALM) is a United Nations Development Programme (UNDP) knowledge-sharing platform on climate change adaptation (CCA). Launched in late 2007, initial financing was provided by the Global Environment Facility (GEF), with co-financing from the Swiss Agency for Development and Cooperation and the *Institut de l'Énergie et de l'Environnement de la Francophonie*. Additional in-kind co-financing was provided through the UNEP-UNDP Climate Change Adaptation and Development initiative (CC-DARE).

Through its online presence, the ALM maps good practices, provides information, shares knowledge and builds networks on climate change adaptation (CCA).

Through its online presence, the ALM maps good practices, provides information, shares knowledge and builds networks on CCA. The 2010 Adaptation Knowledge Needs Survey was conducted to assess the current state of knowledge needs for CCA in order to identify knowledge needs and gaps to further the understanding of climate change impacts, vulnerabilities, and innovative adaptation approaches; and to identify key services (e.g. training workshops, seminars, newsletters, etc.) to facilitate knowledge exchange on current adaptation practices and lessons learned. The survey was made available in English, French and Spanish.

The presentation of survey results in this report aims to inform the broad range of stakeholders interested in knowledge needs relevant to CCA, and to provide useful insights on CCA knowledge needs to educate and strengthen UNDP-supported and external adaptation programmes. The findings will also be useful as UNDP expands the ALM's presence at the regional level within and outside of the Pacific and Africa.

Background on Survey Respondents

The survey was sent to a diverse sampling of stakeholders across the globe. Responses were received from 662 participants, with 68 percent from non-Annex I Parties to the United Nations Framework Convention on Climate Change (UNFCCC). The majority of respondents were associated with three main categories of professional affiliation: (1) universities and research institutions (27 percent), (2) United Nations agencies (17 percent), and local or community non-governmental organizations (NGOs) (15 percent). The most common professional role among respondents was researcher and analyst (25 percent), followed by project coordinator (16 percent) and technical adviser (15 percent).

Priority Knowledge Areas

Respondents reported the most interest in obtaining CCA knowledge for Africa and Asia (46 and 35 percent, respectively). A desire was also indicated for information on CCA in the natural resource management sector, as a broad category encompassing and intersecting with other sectors (62 percent), followed by agriculture/food security (54 percent) and water (52 percent).

Feedback on the ALM

Of the 662 respondents, 24 percent had previously used the ALM platform prior to taking the survey. Background information on reported ALM users indicates that the ALM user base is diverse and ranges in sector and professional role, with relatively high United Nations affiliation and particular emphasis on technical adaptation work. Eighty-five percent of ALM users reported that the information available on the ALM is *useful or very useful*. In particular, this was the case for respondents affiliated with local or community NGOs, research institutions or universities, and the private sector.

According to survey responses, ALM users find the platform to be a well-designed, helpful mechanism for identifying and accessing a wide variety of resources, particularly on practical tools and project information. According to respondents, platform users could benefit from enhanced networking capability and more examples of adaptation strategies and best practices.

Survey Response Categories

The following response categories were used for matrix and multiple-choice questions to rate knowledge needs using a five-point scale to allow respondents to indirectly rank multiple response options.

- *Very high need*
- *High need*
- *Some need*
- *Little need*
- *No need/very little need*
- *Other*

Identifying Knowledge Needs

The ALM survey focused on the need among respondents for knowledge resources in the following areas relevant to CCA:

- Project development phases[1]
- Climate change impacts
- Cross-cutting issues
- Barriers to CCA

The results of the survey suggest that knowledge resources on the evaluation and designing/planning phases of adaptation initiatives (reported as *high need* or *very high need* by 85 percent of respondents) are in slightly greater need than materials on implementation, analysis and assessment. Government-affiliated respondents reported a desire for evaluation-related resources, while respondents associated with United Nations agencies showed a greater need for information on the designing/planning phase of adaptation initiatives. Further analysis indicates that research institutions and university affiliates seek knowledge on the analysis and assessment phase of adaptation, while development planners and students want more information on the implementation phase.

With regard to specific climate change impacts, respondents, overall, noted *high need* for knowledge resources on addressing the following climate change impacts: water shortage, loss of livelihoods, decreased food security, and damaged ecosystems. Information gaps in socio-economic, cultural, and psychological impacts of climate change were also reported.

Analysis by professional affiliation shows that the impact of decreased food security is an area of high knowledge need for international NGOs and government, but an area of relatively low knowledge need for research institution/university affiliates. The

[1] *Project development phases include initiation, planning and design, implementation/execution, and monitoring and evaluation.*

private sector showed a need for knowledge relating to urban heat islands and waves, while international NGO affiliates indicated a low knowledge need in this area. Local NGOs indicated a particularly strong interest in resources on forest or ecosystem damage. By contrast, government employees reported a high demand for knowledge on coastal inundation or erosion, but lower knowledge needs relating to loss of livelihood and livestock productivity. Analysis by primary role suggests that field officers require knowledge resources related to loss of livelihoods, and community stakeholders need resources on flood damage and decreased livestock/poultry productivity.

Respondents also reported a significant need for knowledge resources on how to achieve the co-benefits of climate change mitigation and CCA.

Among cross-cutting issues related to adaptation, integration of disaster risk reduction (DRR) and biodiversity conservation into CCA emerged as issues of particularly high knowledge need. Respondents also reported a significant need for knowledge resources on how to achieve the co-benefits of climate change mitigation and CCA. Interest in resources related to CCA education and youth empowerment (e.g. classroom education and training materials on adaptation, as well as guidelines and approaches to CCA youth outreach) was also reported. In addition, the necessity for gender-specific climate change vulnerabilities and opportunities for building adaptive capacity was emphasized, as were approaches to mitigate climate change-related conflict and conflict-sensitive policy-making and planning. In terms of migration, resources of interest included interventions to improve the social and economic effectiveness of climate-related migration, relevant migration mapping, and research on vulnerabilities of climate migrants. Respondents also noted that information on adaptation should emphasize alignment with Millennium Development Goals (MDG) and attention to most vulnerable populations, particularly poor and indigenous people.

A reported *high need* for knowledge resources on how to overcome systemic (financial, policy, institutional and behavioural) and discrete (technological and informational) barriers to adaptation emphasized demand for information on financial and policy barriers. Local and community NGO-affiliated respondents represented the professional group with the greatest need for knowledge on overcoming adaptation barriers, especially financial obstacles. Desired resources on overcoming policy barriers included mainstreaming adaptation practices into development and sectoral policies, and strengthening social policies in the context of climate change. Specific information needs reported for overcoming institutional barriers include knowledge resources on building partnerships across institutional sectors, addressing the absence of appropriate institutional arrangements, building institutional capacity, and enhancing leadership on climate change.

To overcome barriers to behavioural change, respondents reported a need for information on increasing awareness, enhancing organizational structures and procedures, and creating incentives for adaptation. Regarding technological barriers, results suggest interest in resources on accessing, transferring, implementing, modifying and monitoring adaptive technologies. Knowledge resources on generating and incorporating climate/adaptation data were reported in high demand for addressing informational barriers, as was the need for assessment information in management and planning systems.

In addition to the above findings, reported knowledge gaps suggest a demand for increased opportunities to share knowledge across sectors and institutional levels. It was noted that there is a lack of awareness on climate science and local climate change risks, impacts and vulnerabilities among civil society and government. Gaps reportedly exist between scientific knowledge and local level understanding, as well as between institutional knowledge and practitioners' needs. Respondents also commented that adaptation practices should integrate indigenous knowledge and take advantage of existing local adaptation measures.

Knowledge-Sharing Products and Services

Knowledge-Sharing Services

- Services that provide opportunities to share knowledge on climate change adaptation, including training courses, workshops, seminars, newsletters, etc.

In order to identify the best approaches for addressing reported knowledge needs, survey questions targeted respondents' interest in various knowledge-sharing services, specific types of knowledge products disseminated through these services, and obstacles to accessing these resources and tools. Training courses, workshops and seminars, and newsletters were reported as the knowledge-sharing services most likely to be used by respondents. Preferred services suggest a demand for resources that not only build knowledge, but also skills for capacity development. Cross-analysis of services by professional group suggests that local/community NGO affiliates have the highest interest in using and participating in knowledge-sharing services, while respondents affiliated with multilateral banks have the least interest in using these services.

Respondents reported a particularly high need for climate change risk and impact assessments, vulnerability assessments, and adaptation guidance materials and tools. Teaching and training materials, case studies, research and publications were also reported to be in high demand. Relationships identified between specific professional groups and types of knowledge products required point to a high relative need for research and publications by university researchers, guidance and tools by United Nations employees, program and teaching materials by local NGO affiliates, case studies by government, and country reports by multilateral/development banks. In addition, project designers emphasized a desire for climate data, while policy advisers highlighted demands for policy documents.

Limited means to travel was the most significant obstacle to accessing knowledge-sharing services, suggesting the benefit of online tools instead of in-person services for most respondents. Limited time, abundance of impractical and improperly vetted information, and lack of access to certain resource databases were also noted as key challenges to obtaining adaptation knowledge. The ALM has a key role to play in addressing these obstacles and meeting the adaptation communities' knowledge needs.

Recommendations

Based on the survey findings, the ALM and other adaptation knowledge management platforms can help to meet the adaptation communities' knowledge needs through specific actions.

- **Provide up-to-date case studies on projects** that highlight best and worst practices based on repeated successes and failures.
- **Create and display a vulnerability map** highlighting climate change vulnerabilities by region, country, and community to spotlight relevant climate change risk assessment results.
- **Provide access to region-specific web-based portals** (particularly for Africa and Asia) that highlight climate change impacts and vulnerabilities and further contextualize this information.
- **Create sub-pages (e.g. portals) on cross-cutting issue** (particularly DRR, biodiversity, and climate change mitigation) to help emphasize linkages between CCA and these cross-practice areas, as well as practical integration of relevant approaches.
- **Put in place enhanced tools for online user interaction (social networking capacity) and engagement** with resources (e.g. via improved comment features and creation of ALM user groups) to facilitate shared, interactive learning.
- **Disseminate a quarterly newsletter** to raise awareness and increase access to practical, high-quality resources.
- **Disseminate training materials and tools in local languages**, and project information and lessons in non-technical language to promote accessibility to a wider variety of stakeholders.
- **Conduct active community outreach and engagement** through country focal points (e.g. UNDP country offices) and community-based partners to ensure that local/indigenous knowledge reaches and is featured on the ALM or other knowledge management platforms, and that scientific knowledge is relevant and applicable to action on the ground.

Create sub-pages (e.g. portals) on cross-cutting issue (particularly DRR, biodiversity, and climate change mitigation) to help emphasize linkages between CCA and these cross-practice areas, as well as practical integration of relevant approaches.

The implementation of these actions will enhance existing platforms and help to address the knowledge needs identified by respondents through the 2010 ALM Knowledge Needs Survey.

Context

The Adaptation Learning Mechanism (ALM) is a United Nations Development Programme knowledge-sharing platform on climate change adaptation (CCA). Initial funding for the ALM came from the Global Environment Facility – Strategic Priority on Adaptation (GEF-SPA). The platform is operated in partnership with the United Nations Framework Convention on Climate Change (UNFCCC) and its Nairobi work programme (NWP), the United Nations Environment Programme (UNEP), the Food and Agriculture Organization of the United Nations (FAO) and the World Bank.

The ALM aims to capture the state of knowledge on climate change adaptation for integration into development planning, policies, programmes and projects, and to accelerate learning, by sharing lessons and operational guidance on good adaptation practices via a collaborative, inter-agency adaptation network. In 2007, UNDP conducted a survey to identify adaptation-related areas of interest of community-based organizations (CBOs), United Nations agencies, non-governmental organizations (NGOs), research institutions, universities and private sector entities. The results of the 2007 survey (UNDP, 2007) informed the content, focus and organization of the ALM as a newly emerging knowledge base. Following up to the 2007 survey, a 2010 Adaptation Knowledge Needs Survey was carried out to assess the state of knowledge, identify needs and gaps to fill, further meet UNDP's ALM mandate, and inform the future evolution of the ALM. This report presents the results of the 2010 survey.

Rationale

Knowledge sharing is fundamental for institutional learning and for informing national, regional and local decision-making on adaptation policies and programmes.

In the context of adaptation as a necessary component of national development planning, knowledge sharing is fundamental for institutional learning and for informing national, regional and local decision-making on adaptation policies and programmes. Identifying needed information and gaps in the understanding of climate change impacts and related vulnerabilities, and effective adaptation approaches is a crucial step in this knowledge-sharing process. The 2010 Adaptation Knowledge Needs Survey (UNDP, 2010) was designed to contribute to this process by identifying knowledge needs and gaps among a broad target group in the field of climate change adaptation.

As UNDP strengthens its outreach and knowledge-management support to UNDP country offices and government representatives, it seeks to broaden the ALM's services to include new interactive knowledge-exchange approaches, and to expand ALM content to emphasize important cross-cutting themes related to climate change adaptation. In particular, UNDP is looking to build the ALM's content and services to promote adaptation approaches characterized by green, low-emission and climate-resilient development strategies (Green LECRDS) to support the organization's assistance to developing countries to strengthen national-level decision-making and catalyse green, low-emission and climate-resilient investment in the face of climate change (Glemarec and others, 2010; Siegel, 2010). The 2010 survey aimed to further investigate the knowledge needs of the ALM's established community of practice

and potential users by exploring these and other additional topics, including phases of development,[2] specific climate change impacts,[3] cross-cutting issues,[4] barriers to adaptation,[5] and alternative interactive knowledge-sharing services.

The knowledge needs survey also constituted an action pledge to the UNFCCC NWP in support of its efforts to improve understanding of climate change impacts vulnerabilities and enhance informed decision-making related to adaptation. In addition to further tailoring the content and services of the ALM, the results of the survey are expected to inform the ALM user community, core partners, and others in the adaptation field about knowledge needs, and to guide UNDP's knowledge management efforts for building climate resilience in developing countries.

Survey Objectives

The primary objectives of the 2010 Adaptation Knowledge Needs Survey were to (1) identify knowledge needs and gaps to further the understanding of climate change impacts, vulnerabilities, and innovative adaptation approaches and (2) to identify tools and services that would be most useful to facilitate knowledge exchange on current adaptation practices and lessons learned.

Target Audience of Survey

In order to meet the above objectives, the survey targeted a broad range of actors in the field of climate change adaptation, including existing and potential members of the ALM in United Nations agencies, NGOs, community-based organizations (CBOs), research institutions, universities, private sector entities, parties of the NWP, technical and policy advisers, and staff in UNDP country offices.[6]

Structure and Content of the Report

This report is organized into three main sections. First, the report presents the methodology for administering the 2010 Adaptation Knowledge Needs Survey and background for its content. Next, the results and analysis section is structured to follow the organization of the survey's four main parts: (1) background of the survey sample, (2) feedback on the ALM, (3) content of knowledge needs, and (4) preferred knowledge products and services for addressing these needs. Background of the survey sample includes respondents' professional affiliation and role relevant to adaptation, as well as regions and sectors of interest. Content of knowledge needs focuses on development phases, climate change impacts, cross-cutting issues and barriers to

[2] The list of stages of adaptation presented in the 2010 ALM Survey was based on development phases discussed in Lim and Spanger-Siegfried (2005).

[3] The list of climate change impacts that appeared in the 2010 ALM Survey originate from impacts enumerated on the UNFCCC's Local Coping Strategies Database available from http://maindb.unfccc.int/public/adaptation.

[4] The cross-cutting issues addressed in the 2010 survey stem from UNDP's cross-practice areas, priorities of ALM partnerships, and literature on knowledge gaps citing a need for research and linkages between CCA and DRR (ISET, 2008), biodiversity (Satoyama Initiative, 2010), gender (Gender CC, 2010), education (UNICEF, n.d.), migration and conflict.

[5] The barriers to adaptation outlined in this report are defined in UNDP 2011. These barriers include institutional barriers, policy barriers, barriers to behavioural change, financial barriers, technological barriers, and informational barriers (See Annex 3).

[6] Channels for dissemination included ALM partnerships and shared list-serves with other knowledge-sharing platforms (e.g. Forum on Food Security and Nutrition).

adaptation. The final results-and-analysis section presents survey responses on preferred knowledge-sharing services and types of knowledge resources, as well as obstacles for accessing these services and tools. Finally, the report concludes with a summary of trends in adaptation-related interests, identified knowledge gaps and needs, and desired and useful services for meeting these needs. The conclusion also includes recommendations for the ALM and other knowledge management initiatives that are working to accelerate the process of learning and dissemination in order to enhance Green LECRDS.

Survey Format and Structure

The survey was administered online via SurveyMonkey (www.surveymonkey.com) and used 'skip logic' to allow the presentation of follow-up questions to targeted respondents based on their response to previous items.[7] Questions included multiple choice (multiple and single response), matrix, and open-ended questions. Matrix and multiple-choice questions that asked respondents to rate their need for more knowledge resources on a particular topic used a five-point scale in order to allow respondents to indirectly rank multiple response options if desired.

- Very high need
- High need
- Some need
- Little need
- No need/very little need

This type of rating was used over direct ranking so that respondents did not necessarily have to compare response options against each other. Most multiple- choice questions provided an option of *Other* and space to comment with greater specificity.

The language used in the survey questions ('need for more knowledge') aimed to identify what information was both of interest and lacking or inaccessible to respondents. While the term 'knowledge gaps,' which suggests an assumption about what knowledge is necessary or important, was reserved for open-ended questions; the term 'knowledge needs' was used throughout most of the survey to indicate that necessity or importance of knowledge considered was included as part of the inquiry and left up to the respondent to determine. The term 'knowledge needs' is thus primarily used throughout this report to reflect this lack of assumption. The 2010 ALM Survey questions (UNDP, 2010) are available from *http://www.adaptationlearning.net*.

Language

The survey was translated from English into French and Spanish. Links to the three language versions of the survey were provided in all survey dissemination announcements. Reported results are based on responses from all three language versions.

Sample, Dissemination and Timing

The survey was conducted from 25 October to 14 November 2010 and disseminated through various internal and external channels, including Climate-L, e-mail list of ALM registered users, partners of UNDP's ALM, United Nations colleagues (UNEP, UNDP, FAO, UNECE, UNICEF, etc.),[8] participants from various conferences, NGOs, government officials, and various other practitioners and stakeholders with an interest in adaptation. For further details on survey dissemination, see Annex 1.

[7] *For example, questions on ALM feedback were presented only to those who indicated that they had previously used the ALM. Follow-up questions on the need for resources on certain topics were posed only to those who expressed at least some need for resources on that topic. See 2010 ALM Survey questions (UNDP, 2010) available from http://www.adaptationlearning.net.*

[8] *United Nations Economic Commission for Europe (UNECE) and United Nations Children's Fund (UNICEF)*

This chapter presents the results and analysis for each of the four main parts of the 2010 Adaptation Knowledge Needs Survey: (1) Background of Survey Sample, (2) Feedback on the ALM, (3) Identifying Knowledge Gaps and Needs and (4) Preferred Knowledge-Sharing Services.

1. Background of Survey Sample

Survey results are based on responses provided by 662 participants, with 68 percent from non-Annex I Parties to the UNFCCC.

Of the total respondents, 555 participated in the English version of the survey, 56 in the Spanish version and 51 in the French version of the survey, with a total completion rate of over 80 percent.[9] Participation came from at least 104 countries,[10] including 83 non-Annex I Parties to the UNFCCC (see Figure 1.1 and Annex 2).

1.1 Professional Affiliation

The largest professional affiliations represented in the survey sample were universities and research institutions, followed by United Nations agencies and local or community NGOs.

Of the total respondents, 555 participated in the English version of the survey, 56 in the Spanish version and 51 in the French version of the survey, with a total completion rate of over 80 percent. Participation came from at least 104 countries, including 83 non-Annex I Parties to the UNFCCC.

Over one-quarter of respondents (27 percent) specified affiliation with a university or research institution; 17 percent identified themselves with a United Nations agency; and 15 percent claimed affiliation with a local or community NGO (see Figure 1.2). Government and national/international NGOs each represented about 12 percent of survey respondents. Multilateral banks were least represented (1 percent) within the survey sample. Affiliations specified under Other included independent consultants and volunteers, other development institutions, donor agencies and adaptation-related networks, and national organizations.

1.2 Professional Role Relevant to Adaptation

For professional role relevant to CCA, the highest percentage of respondents classified themselves as a researcher or analyst.

Consistent with results of professional affiliation, 25 percent of respondents classified their primary professional role as researcher or analyst (see Figure 1.3). Project coordinators and field officers (16 percent) and technical advisers (15 percent) also comprised a relatively high percentage of the survey sample. The category *Other*, accounting for 3 percent of respondents, included independent consultants, knowledge management and communications experts, project managers and technical coordinators.

[9] *All responses, regardless of survey completion, are included in reported data.*

[10] *Eighty-seven percent of respondents indicated their base country. This data is based on these responses. See Annex 2 for the list of respondents' base countries.*

1.3 Regions of Interest

Similar to the 2007 survey results, the highest region of interest relevant to 2010 respondents' climate change adaptation work was reported to be Africa, followed by Asia.

Over 45 percent of respondents stated that Africa was the region of most relevance to their CCA work, while 37 percent of respondents noted that Asia was a primary interest (see Figure 1.4). About 25 percent of respondents, including those who specified Central America, the Caribbean and Mexico under *Other*, indicated interest in Latin America and the Caribbean (LAC). Additional responses in the *Other* category included Small Island Developing States (SIDS), Australia, and the Middle East.

1.4 Sectors of Interest

Respondents reported natural resource management (NRM), agriculture and food security, and water resources as areas of highest interest.

Natural resource management (NRM), as a broad category encompassing and intersecting with other sectors, was an area of interest most relevant to over 60 percent of respondents' CCA work (see Figure 1.5). Both agriculture/food security and water resources were areas of interest to over 50 percent of the survey sample. To more clearly delineate the distinction between the thematic sectors, respondents specified that interests in natural resource management included forest-based adaptation and conservation of productive forest resources, as well as sustainable wetland management and mountain ecosystems. Interest in water resources, as defined by respondents, included water management and trans-boundary water concerns. Public health concerns included the human immunodeficiency virus (HIV) and other infectious diseases, and Water Sanitation and Hygiene (WASH).

[11] *The regional categories represented in Figure 1.4 reflect the broadest breakdown of regions as presented on the ALM platform.*

Figure 1.1 Percentage of Respondents Based in Non-Annex I Party Countries versus Annex I Party Countries

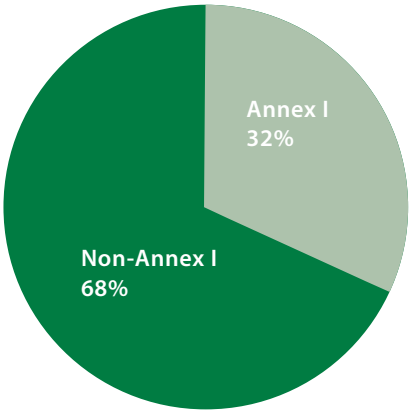


Figure 1.2 Professional Affiliation of Respondent

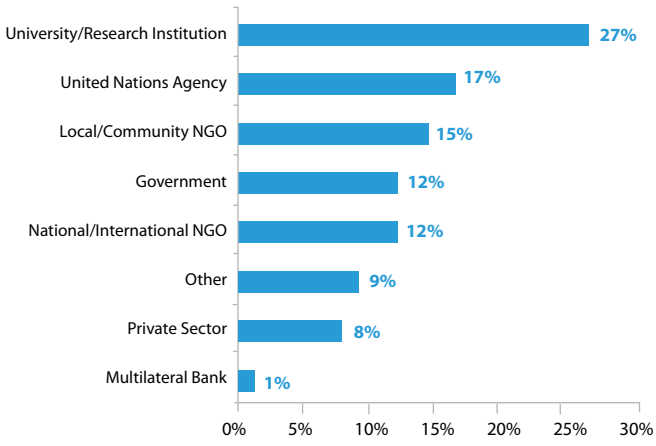


Figure 1.3 Primary Professional Role Relevant to Climate Change Adaptation Work

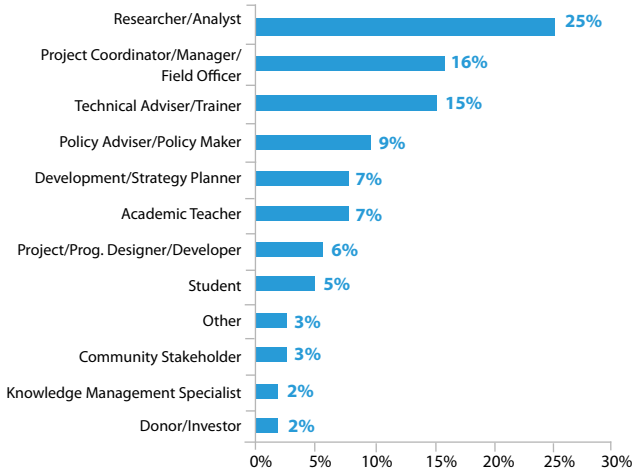


Figure 1.4 Regions of Interest to Respondents

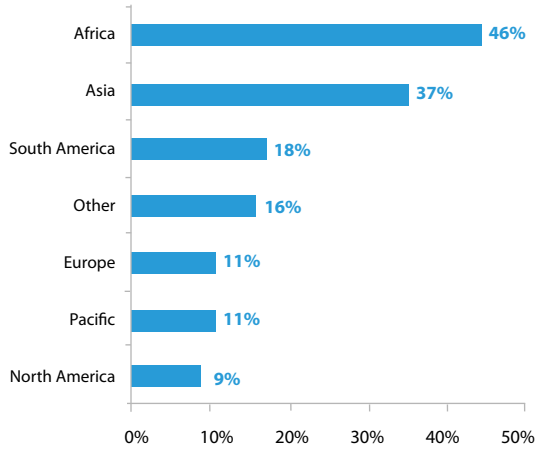
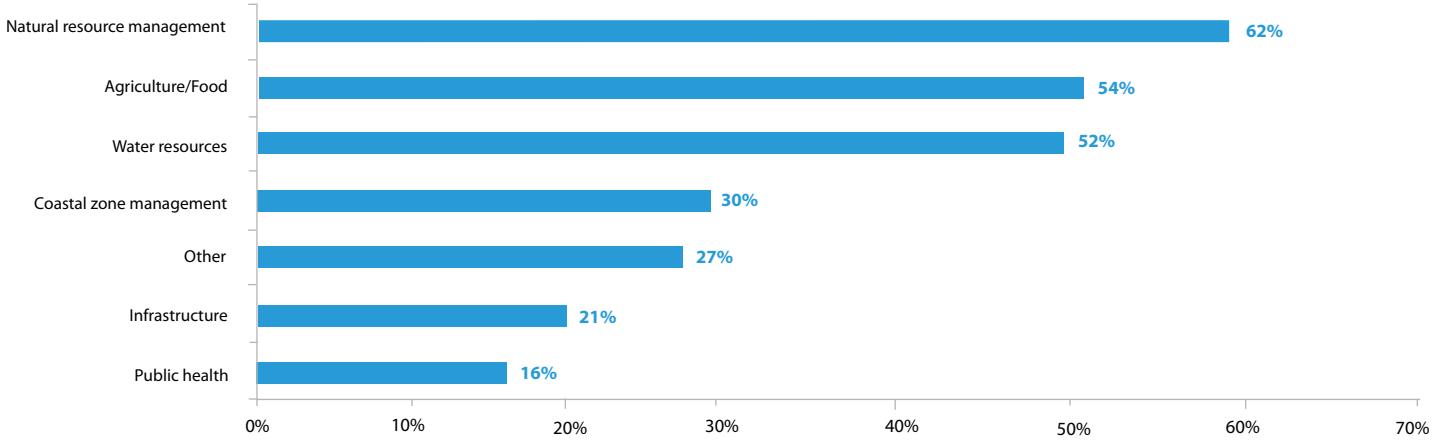


Figure 1.5 Sector of Interest to Respondents



2. Feedback on the ALM

Of the 662 respondents, 24 percent had previously used the ALM website prior to taking the survey. Background information on reported ALM users indicated a broad and diverse ALM user base, ranging in sector and professional role, with relatively high United Nations affiliation and particular emphasis on technical adaptation work.

Proportionally, there was not a large variance between the percentages of English, French and Spanish respondents and reported ALM users. The breakdown of respondents' ALM usage by language version of the survey (see Figure 2.1) indicates that ALM's English language base (with Google translate function on each page) does not appear to deter French and Spanish speakers from using the ALM.

Among reported ALM users, 27 percent indicated working for a United Nations agency, while 17 percent reported an affiliation with a national or international NGO and 14 percent with a research institution (see Figure 2.2). Professional affiliation of the remaining 40 percent of reported users was divided about equally among local/community NGOs, government, private sector and other. Among ALM users' primary role relevant to CCA work, technical adviser/trainer was reported by the highest percentage (22 percent) (see Figure 2.3) of respondents. About 20 percent of reported ALM users identified themselves as either project managers/coordinators or project/program designers/developers, and 15 percent as researchers or analysts.

Of the 159 participants presented with the question on the usefulness of information on the ALM, 86 percent of respondents attested that the ALM was useful or very useful.

2.1 Usefulness of the ALM

The majority of respondents find the ALM to be useful.

Of the 159 participants presented with the question on the usefulness of information on the ALM, 86 percent of respondents attested that the ALM was *useful* or *very useful*; zero respondents indicated that the ALM was *not at all useful* (see Figure 2.4). Local NGO, research institution/university, and private sector employees reported high utility of the ALM.

2.2 Most Favorable Aspects of the ALM Platform

The ALM is valued by respondents for being user-friendly and having a wide variety of easily searchable tools and project information.

In response to an open-ended question asking what ALM users liked about the ALM platform, 78 respondents provided written feedback, reflecting on both positive characteristics of the ALM platform (e.g. user-friendly/easy navigation and interactivity) and specific resources and services available on the site (e.g. country profiles and best practices). Responses were clustered into the categories shown in Figure 2.5.[12]

[12] *Some respondents specified more than one characteristic, accounting for the 91 total responses.*

Respondents highlighted the ALM's user-friendly interface and layout and its **'Explore'** function that allows users to search by region, country, sector, resource type, leading or funding organization, and keyword. According to eight respondents, the ALM is also highly valued for providing useful, practical and applicable tools that helped to build capacity of practitioners and stakeholders at multiple (global, regional, national, local) levels of adaptation. Several respondents also emphasized the breadth and quantity of resources on the ALM and specifically highlighted the ALM's up-to-date resources on projects and adaptation strategies. Among information types featured on the ALM, respondents appreciated country profiles and case studies. Several participants made note of best practices (particularly, local-level/community-driven practices and lessons learned) featured on the ALM, the accessibility of information available (e.g., ALM as a 'one-stop shop'), and its value as an open forum for information sharing. Other aspects mentioned included detail of information provided, publications, focus on learning, and emphasis on mainstreaming adaptation into policy and planning.

2.3 Areas for Improvement on the ALM Platform

According to reported ALM users, increased networking capability as well as practical examples of adaptation strategies and best practices would help to improve the ALM.

ALM is also highly valued for providing useful, practical and applicable tools that helped to build capacity of practitioners and stakeholders at multiple (global, regional, national, local) levels of adaptation.

Of the respondents who reported prior use of the ALM, 65 provided feedback on how the ALM could be improved. These written responses are summarized in Figure 2.6. Results show that respondents would greatly benefit from enhanced networking capability on the ALM to allow users to more easily identify, communicate with and exchange ideas among each other about topics of interest and posted resources. In addition to improved user search and identification, discussion and commenting capability, a feature allowing users to express interest in a specific resource (e.g. a 'like' feature) was suggested. Respondents also recommended an ALM newsletter or email updates with new information.

Overall, more data on specific examples of adaptation strategies and best practices, as well as policy examples and guidance, would help to meet the needs of ALM users. Survey participants also noted that enhanced monitoring and updating of information (e.g. project status) would improve the quality and usefulness of resources on the ALM.

Comments showed that refinement of the platform's presentation, layout, navigation and tagging would also help to improve the ALM experience for its users. For example, the scope of the ALM (focus on non-Annex I Parties) could be made clearer on the front page, and information could be more streamlined on each subsequent page. In addition, improved tagging of resources and links to other platforms would help to better highlight top resources. Identification of knowledge gaps and needs will provide further insight into recommended next steps for improving the ALM and other knowledge management initiatives.

Figure 2.1 Respondents' Use of the ALM Platform

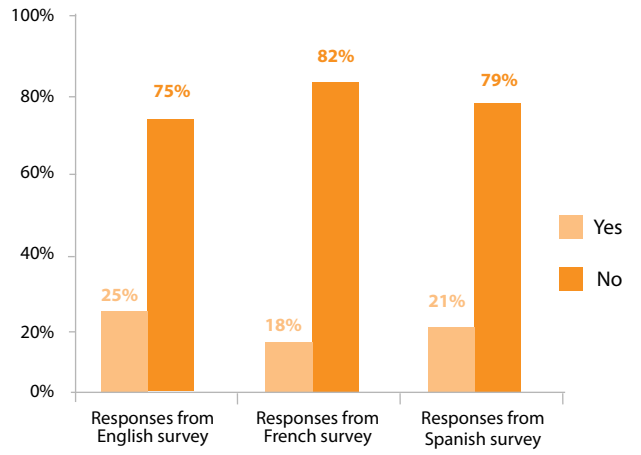


Figure 2.2 Professional Affiliation of ALM Users Only

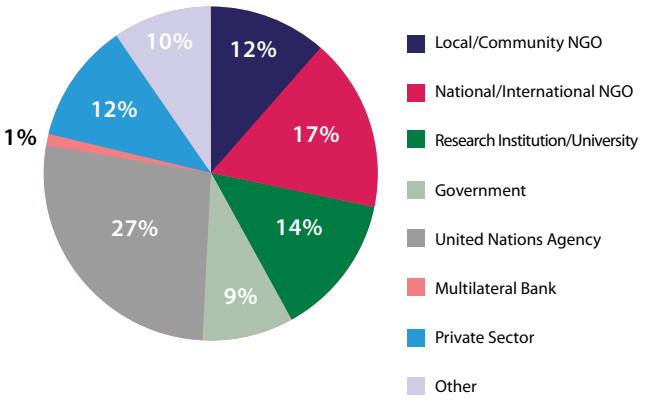


Figure 2.3 Primary Role Relevant to CCA Work of ALM Users Only

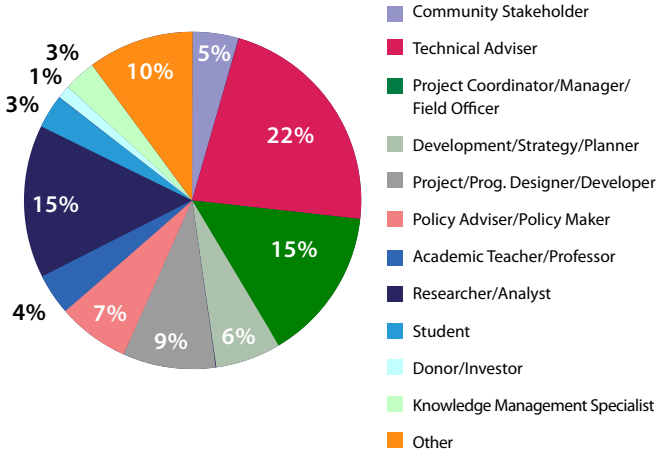


Figure 2.4 Usefulness of Resources Found on the ALM

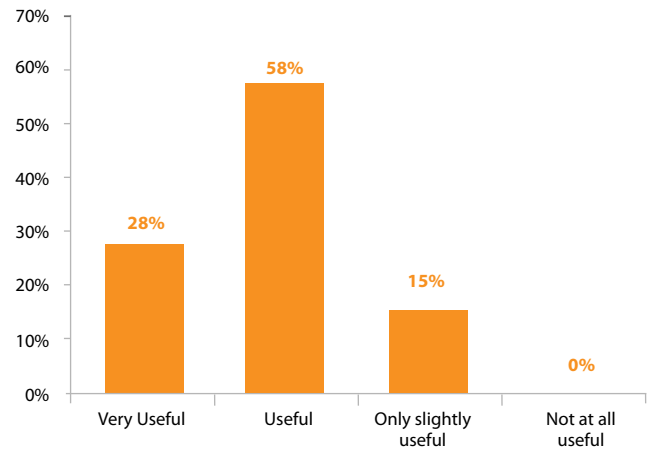


Figure 2.5 What Respondents Like about the ALM, Summary of Select Written Responses

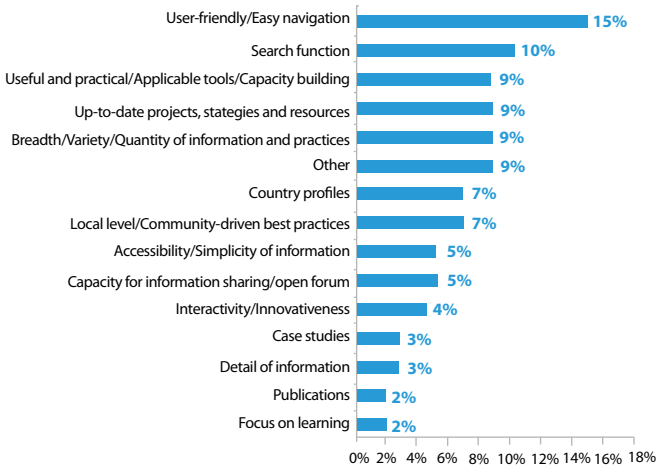
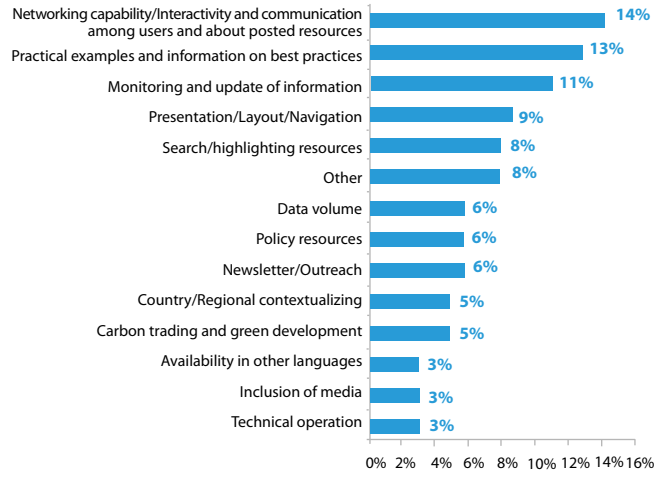


Figure 2.6 What Users Think Could Be Improved About the ALM, Summary of Select Written Responses



3. Identifying Knowledge Gaps and Needs

The survey focused on knowledge gaps and needs in the following areas relevant to CCA: different phases of development, climate change impacts, cross-cutting issues, and barriers to climate change adaptation.

3.1 Development Phases

Respondents reported a slightly higher demand for knowledge resources on the evaluation and designing/planning phases of adaptation than for materials on implementation and analysis/assessment.

Demand for resources on evaluation by government-affiliated respondents, and high need for information on designing and planning phase of adaptation by respondents working for the United Nations.

Over 85 percent of respondents indicated at least *high need* for resources on evaluation (e.g. effectiveness, success and challenges of strategies, and lessons learned) of adaptation projects, programs or policies. About the same percentage of respondents (84 percent) specified *high* or *very high need* for resources on the designing and planning stage (e.g. methods, approaches, short-term vs. long-term planning) of adaptation initiatives (see Figure 3.1). While still in high demand, knowledge resources on implementation (e.g. process, due diligence, application and modification) and analysis/assessment (e.g. understanding the problem) were reported as *high need* by fewer respondents, 78 and 72 percent, respectively. Given that most adaptation projects have only recently begun implementation and have yet to undergo evaluation, the slightly higher need for evaluation-related knowledge resources reported is not surprising.

Cross-analysis of responses by professional affiliation showed great demand for resources on evaluation by government-affiliated respondents, and *high need* for information on designing and planning phase of adaptation by respondents working for the United Nations. Further analysis shows a relationship between respondents affiliated with a research institution and the analysis and assessment phase. Analysis by primary role suggests that students have a need for resources on the implementation phase and technical advisers have a need for information on the analysis/assessment phase.

3.2 Climate Change Impacts

Respondents indicated a high need for knowledge resources on addressing water shortage, loss of livelihoods, decreased food security and damaged ecosystems. Reported information gaps also included psychological and socio-economic impacts of climate change.

Respondents were asked to rate their need for more knowledge resources on addressing specific climate change impacts. Responses summarized in Figure 3.2 show that among the climate change impacts listed, knowledge resources for water shortage (indicated as at least *high need* by 75 percent of respondents), loss of livelihoods (74 percent), decreased food security (69 percent) and damaged ecosystems (68 percent) are in greatest demand. A lower percentage of respondents reported *high need* or *very high need* for more information on urban heat waves (42 percent), productivity of livestock (49 percent) and fisheries (50 percent) and landslides (53 percent). Respondents

also specified a need for knowledge on addressing biodiversity loss and increased coral bleaching, land-use change, worsened waste management, changes to resource distribution, and reduction of infrastructure use (e.g. transportation).[13]

Analysis of knowledge needs for different climate change impacts by professional affiliation shows that the impact of decreased food security is an area of high knowledge need for international NGOs and government, and relatively low knowledge need for affiliates of research institutions/universities and local NGOs. Results also suggest that local NGOs have a low need for knowledge on coastal inundation, but high interest in resources on forest or ecosystem damage. In contrast, government affiliates reported high knowledge need on erosion, but lower need relating to loss of livelihood and livestock productivity.

According to analysis by primary role, field officers have a great need for resources on loss of livelihoods. Community stakeholders reported a desire for knowledge particularly on flood damage and decreased livestock/poultry productivity, while researchers expressed a low need for the latter climate change impact. Results further revealed a negative relationship between technical advisers and knowledge needs on urban heat islands.

Respondents reported gaps in socio-economic impacts of climate change, including decreased school attendance, employment changes, loss of human capital, increased loss of human life, displacement and migration, increased corruption, gender discrimination, disruption of value chains, cultural impacts, and other societal changes (e.g. sense of community and solidarity, social networks, human and power relations).[14] Potential opportunities of socio-economic impacts included cultural benefits of re-engaging with historical examples of overcoming challenges, increase in spiritual and ethical leadership, and market opportunities that resulted from needs to address climate change impacts.

3.3 Cross-cutting Issues[15]

Respondents reported a particularly high need for CCA knowledge resources on DRR and biodiversity, as well as climate change mitigation.

Presented with seven key cross-cutting issues[16]—biodiversity, climate change mitigation, DRR, conflict resolution, migration, gender, and youth education—respondents indicated interest in information on all of the presented cross-practice issues, with especially high knowledge needs on the linkages between adaptation and both DRR and biodiversity (specified as at least *high need* by 70 percent respondents for both issues) (see Figure 3.3). Results also suggest a *high need* for knowledge on the relationship between climate change adaptation and mitigation (64 percent). Responses presented in Figures 3.4-3.10 in the following subparts provide more detail about the specific knowledge needs on each of these cross-cutting issues.

[13] *Respondents who answered Other to these questions, and the questions that follow, were prompted to specify their response. The response clarifications were recorded under Other in these instances.*

[14] *Some of the impacts indicated in this list (e.g. migration, gender discrimination, biodiversity loss) are addressed in more detail in the part on cross-cutting issues (see Part 3.3).*

[15] *As a follow-up to expressed need for more resources on each of these cross-cutting issues, these questions were presented to respondents who indicated at least some need for more information on each issue. The response percentages provided in the following subparts relate to the number of respondents who were given this question and not to the total number of survey respondents.*

[16] *Adaptation Learning Mechanism partnerships and UNDP's cross-practice areas around adaptation inspired the selection of cross-practice issues emphasized in the survey (The 2010 ALM Survey questions are available from http://www.adaptationlearning.net).*

1 Disaster Risk Reduction

Integrating DRR into CCA emerged as a priority knowledge need.

The need for knowledge resources on DRR stresses approaches for integrating DRR and CCA (indicated by over 85 percent of respondents who expressed a knowledge need relevant to DRR) (see Figure 3.4).[17] Respondents emphasized specific interest in best practices and lessons learned for such integration; guidance on including DRR and CCA in national and district development policies and plans (particularly in land-use planning), financing options and public investment; and case studies on country programs that illustrate similarities in the implementation of DRR and CCA initiatives. In addition, the demand for literature on the distinction between DRR and CCA (by over 60 percent of respondents) suggests a knowledge gap in this area. The need for information on probabilistic risk modeling (57 percent) included evaluation of scenarios (e.g. sea level rise) for medium- and long-term impact; assessment of risks for applying no-regret adaptation and disaster mitigation and prevention interventions; and guidance and tools for conducting these risk assessments. Respondents also specified a need for knowledge assessments on trade-offs between DRR and CCA, and information on drought and flood early warning systems.[18]

2 Biodiversity

Biodiversity-related knowledge needs emphasize resources on ecosystem-based adaptation and integration of biodiversity conservation into CCA.

Over 80 percent of respondents who showed interest in biodiversity specified a need for approaches to integrating biodiversity conservation into adaptation practices and ecosystem-based adaptation (see Figure 3.5). Information needs on these approaches were reported to include traditional knowledge on biodiversity as it relates to ecological health and food security (e.g. crop biodiversity), conceptualization of biodiversity conservation as 'ecosystem survival,' and economic valuation and financial mechanisms as incentives for biodiversity-conservation-adaptation practices. Specific to ecosystem-based adaptation, survey participants detailed the need for information on replanting mangroves and strategies for creating ecological corridors.

Over 80 percent of respondents who showed interest in biodiversity specified a need for approaches to integrating biodiversity conservation into adaptation practices and ecosystem-based adaptation.

Expressed interest in literature on linkages between biodiversity and adaptation (indicated by 74 percent of respondents) included information on impacts of tourism on biodiversity; policy briefs based on evidence of linking biodiversity, ecosystem services and adaptation; and recommendations for integrating DRR and ecosystem services. In addition, respondents also reported a need for the following types of biodiversity-relevant resources: biodiversity survey tools, financing needs assessments for biodiversity conservation, and information on climate change impacts on invasive species.

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[17] *These results are based on responses from the 528 survey participants who specified types of information needed on DRR in a cross-cutting issue follow-up question.*

[18] *These comments were written under Other in addition to the response options provided in the question. In the following parts, this is the case for details and comments that are not represented in the results graph or question (The 2010 ALM Survey questions are available from: http://www.adaptationlearning.net).*

3 Climate Change Mitigation

Results suggest a high need for knowledge resources on how to achieve co-benefits of climate change mitigation and CCA.

Approaches to achieving co-benefits of adaptation and mitigation emerged as a priority knowledge need for 87 percent of respondents who answered the question on climate change mitigation and CCA (see Figure 3.6). Resource needs indicated in this area include information on mechanisms such as Reduced Emissions from Deforestation and Degradation (REDD), the Clean Development Mechanism (CDM), and guidance for identifying synergies between adaptation and mitigation (e.g. contribution of adaptation to mitigation) beyond carbon mechanisms. Survey results also suggest interest in resources about opportunities for and benefits from low-emission economic development scenarios in planning and budgeting cycles that focus on energy mix, energy efficiency, renewable energy, cleaner production mechanisms and policy choices; integration of DRR with climate change mitigation; and green building. Over 60 percent of respondents also expressed interest in guidance for accessing and transferring low-emission technologies and adaptation measures, as well as assessment of carbon emissions resulting from adaptation practices. In addition, respondents noted the need for knowledge to identify mitigation actions that could potentially result in maladaptation and gendered impacts of low-emission development, as well as materials that analyze trade-offs in financing adaptation versus mitigation at global and national scales (e.g. how priorities are established by major donors).

4 Youth Education

Need for resources on CCA education and youth empowerment emphasized teaching and training materials on adaptation, and guidelines and approaches for CCA outreach.

Education and CCA concern primary, secondary and university curricula and outreach in the area of adaptation. Results of the breakdown of the types of resources needed by respondents relevant to youth education and CCA showed the highest demand (from about 70 percent of respondents who answered this question) for both classroom education and training materials on adaptation, and guidelines and approaches to youth outreach for CCA. About 66 percent of respondents also reported interest in workshops to promote education, youth empowerment, and information about scholarship opportunities for youth to pursue studies in climate change adaptation (see Figure 3.7).

Respondents also expressed need for information on costs and benefits of youth education programs for capacity building and adaptation, as well as methods for involving youth in adaptation-related decision-making. Data on the impact of climate change, disasters and migration on school attendance (see earlier part on socio-economic impacts of climate change) was also reported as a relevant need.

5 Gender

Gender-specific climate change vulnerabilities and opportunities for building adaptive capacity were emphasized by respondents as areas of need for resources on education and CCA.

The focus on gender and adaptation was primarily concerned with identifying, avoiding and reducing the causes of gender-specific vulnerabilities to climate change (by 80 percent of respondents who received the follow-up question on this issue). Building adaptive capacity of women (e.g. by engaging women in adaptation training)—as well as of men, as noted by respondents—was also a high priority (77 percent) (see Figure 3.8).

While gendered assessments and sex-disaggregated data were reported to be in less demand, they were still a priority to some respondents, who emphasized the need for this data both as part of gendered assessments and for analysing linkages between other focus areas (e.g. biodiversity, energy) and adaptation. Additionally, respondents noted the need for tools to mainstream gender in CCA strategies, policies and programs, as well as to bridge the gap between gender equality in international human rights commitments and in CCA.

6 Conflict Resolution

Reported priority resources related to conflict include information on approaches to mitigate climate change-related conflict and conflict-sensitive policy and planning.

Relative to other issues, conflict emerged as an adaptation cross-cutting issue of lower interest to respondents (see Figure 3.3). Over 75 percent of the respondents who provided follow-up information on knowledge needs on this issue expressed interest in learning about approaches to mitigating conflict resulting from climate-change impacts and integrating these approaches into adaptation programs (see Figure 3.9). Respondents cited particular interest in these topics with regard to conflict related to land-use, property-protection and trans-boundary water.

Over 60 percent indicated interest in conflict vulnerability mapping. Respondents also communicated a need for knowledge about conflict as a result of CCA and disasters; assessment of the feasibility of adaptation in areas of political conflict and instability; and guidance and tools on integrating climate resilience into conflict prevention work (e.g. conflict mitigation through participatory sustainable natural resource management).

7 Migration

Climate change adaptation resources needed on migration include information on interventions to improve social and economic effectiveness of climate-related migration, relevant migration mapping, and research on vulnerabilities of climate migrants.

Figure 3.3 suggests the lowest need for knowledge resources on migration as a CCA cross-cutting issue. Almost 10 percent of respondents who answered the follow-up

question on migration reported not knowing what type of information they needed, despite having indicated a need for knowledge resources on this topic (see Figure 3.10).

Information on interventions to improve social and economic effectiveness of migration (e.g. adaptive relocation) as an option for CCA was reported as the highest migration-related knowledge need (by 68 percent of respondents). About 65 percent of respondents also reported interest in migration mapping and research on vulnerabilities of migrants. In addition to the results in Figure 3.10, respondents stated their need for knowledge in the general global, regional and national migration trends related to CCA, as well as for multidisciplinary analysis of the multiple drivers of migration. Respondents also reported knowledge gaps in the socio-economic and environmental impact of climate-related migration, including the potential to promote conflict, affect labor (e.g. migration of skilled work force), and contribute to urban growth (e.g. 'megacities').

Other Cross-cutting Issues

Reported information needs on adaptation emphasize alignment with MDG and attention to most vulnerable populations.

In addition to the MDG included within the previous discussion on sectors and cross-cutting issues, poverty—particularly poverty as a complex adaptive system and alignment between adaptation and poverty alleviation approaches—was highlighted as a key adaptation-related topic. Responses also highlighted the need for information resources to focus on indigenous people, including how adaptation affects this vulnerable population and how to transfer their traditional knowledge. Other topics emphasized included sustainable livelihood approaches and human rights-based approaches to CCA; population dynamics (beyond migration); governance; land tenure, land-use and urban planning; tourism; and payments for environmental services.

3.4 Barriers to Adaptation

Overall, there is high demand for knowledge resources on how to overcome systemic and discrete barriers to adaptation, particularly financial and policy barriers. Cross-analysis of adaptation barriers with professional affiliation indicates that respondents affiliated with local and community NGOs reported the highest need for information on overcoming barriers to adaptation.

Adaptation barriers present challenges to various stakeholders in adapting to climate change and succeeding in relevant initiatives. These obstacles can exist at the systemic level, such as institutional, policy, behavioural and financial barriers, or at the discrete level, such as technological and informational barriers. Processes that address both systemic and discrete barriers to adaptation help to direct UNDP's adaptation programming.[19]

In order to gauge knowledge needs on the processes for managing these obstacles, respondents were asked to indicate their need for resources for addressing each of the barriers indicated in Figure 3.11 (and explained in Annex 3), as well as for specific information for overcoming each barrier in follow-up questions (see ensuing subparts).

Results showed *high need* (by over 60 percent of respondents) for knowledge to overcome all six listed barriers to adaptation (see Figure 3.11). Over 75 percent of respondents indicated *high* or *very high need* for resources on financial barriers (76 percent) and policy obstacles (75 percent).

Adaptation barriers present challenges to various stakeholders in adapting to climate change and succeeding in relevant initiatives. These obstacles can exist at the systemic level, such as institutional, policy, behavioural and financial barriers, or at the discrete level, such as technological and informational barriers.

Respondents from local and community NGOs reported the greatest knowledge needs on barriers to adaptation, specifically regarding financial and technical obstacles (see Figure 3.12). Respondents from the government sector reported the second overall highest need for resources on adaptation barriers, with the highest reported need for resources on policy barriers. Respondents from United Nations agencies also reported their greatest needs as information on policy barriers, as well as institutional and financial barriers. Responses from national and international NGOs indicated that their highest need was for information regarding financial barriers and institutional barriers. Institutional barriers was also the highest need reported by universities and research institutions.

Respondents who indicated at least *some need* for more knowledge resources to overcome each of the barriers in Figure 3.12 were presented with a list of processes relevant to each barrier on which they were asked to indicate their need for more information. Resulting details on knowledge needs about each adaptation barrier are presented in the following subparts.

[19] *These barriers, outlined in Adapting to Climate Change: UNDP-GEF Initiatives Financed by the Least Developed Countries Fund, Special Climate Change Fund and Strategic Priority on Adaptation (UNDP, 2011) are defined in Annex 3.*

1 Financial Barriers

Respondents reported a high interest in resources on how to increase sustainability of financing.

Financial barriers present a significant challenge to adaptation and a need for more knowledge resources by the greatest percentage of respondents. Processes for addressing obstacles in obtaining funding for adaptation initiatives were presented in order to gain insight on the specific knowledge needs for overcoming financial barriers. Figure 3.13 shows respondent responses to relevant to processes for overcoming financial barriers.

Of the 511 respondents who provided follow-up information to their expressed need for knowledge resources related to financial barriers, over 80 percent indicated a need for knowledge about increasing the sustainability of financing that supports long-term adaptation. Respondents specifically reported demand for information about sustainable financing mechanisms and integrated financial strategies.

Over 70 percent of respondents indicated a need for knowledge resources on identifying and improving access to innovative financial and risk transfer options, and creating regulatory and financial incentives to promote low-emission development. Respondents reported specific knowledge needs for these areas as categorized below.

- **Strategies for promoting payments for environmental services (PES) schemes at the local level**
- **Guidance on creating community or grassroots-based incentives to promote self-initiatives towards climate change risk reduction**
- **Case studies on insurance schemes at the community level**
- **Information on how to access internationally available funds from multinational and bilateral donor agencies**

Over 70 percent of respondents also indicated a need for resources to implement national and sectoral budgets and systems that incorporate climate change risk reduction. In addition to knowledge on coordinating different streams of finance at the national level (64 percent), respondents also expressed a need for guidance on how to work sub-national level with local and regional governments and stakeholders.

2 Policy Barriers

Respondents reported a need for more knowledge on mainstreaming adaptation practices into development and sectoral policies, and on strengthening social policies in the context of climate change.

A high percentage of respondents answering the follow-up question on policy barriers (88 percent) reported a need for more knowledge about mainstreaming adaptation practices into development and sectoral policies (e.g. revising or formulating

policy to incorporate climate risks and opportunities). About 75 percent of respondents indicated an interest in information about designing or strengthening social policies to reduce poverty in the face of climate change. This result further supports the demand for resources that link adaptation with poverty, as indicated in the part on cross-cutting issues. About 70 percent of respondents reported a need for knowledge tools to enhance flexibility in policies for risk-based decision-making and adaptability to any unforeseen impacts of climate change. Figure 3.14 illustrates which methods respondents feel would be most effective is overcoming policy barriers.

Respondents showed an interest in developing policies that better support climate change adaptation. In support of this, they stated the need for information on approaches to increase transparency and local stakeholder participation in government policy making. They also requested examples of strategies for improving democratic processes to increase political will, tools for developing advocacy groups, and platforms for enabling policy makers to enact legislation that enhances climate change adaptation.

3 Institutional Barriers

Respondents reported need for knowledge resources on building partnerships across institutional sectors, addressing the absence of appropriate institutional arrangements, building institutional capacity, and enhancing leadership on climate change.

About 75 percent of respondents indicated an interest in information about designing or strengthening social policies to reduce poverty in the face of climate change. This result further supports the demand for resources that link adaptation with poverty, as indicated in the part on cross-cutting issues.

A high percentage of respondents answering the question on institutional barriers (81 percent) reported a need for more knowledge resources on building and coordinating partnerships across institutions, agencies and sectors (e.g. public-private partnerships; coordination between environment and public works ministries; and fostering of regional partnerships across agencies and sectors, particularly where there is no existing governance structure for initiating projects). Written commentary (under response option *Other*) also highlighted the necessity of tools to enhance communication between sectors and stakeholders, such as ways for practitioners to communicate with scientists and meteorological centers.

Seventy-five to eighty percent of respondents also indicated a need for information on the following processes listed in the survey question:

- **Addressing the absence of appropriate institutional arrangements and governance, and lack of identification of roles, responsibilities and mandates (79 percent)**
- **Engaging local stakeholders, particularly at early stages of adaptation (78 percent)**
- **Building technical and managerial capacity of staff in key institutions (76 percent)**
- **Enhancing political and institutional leadership on climate change (75 percent)**

The requirement for guidance and tools to collaborate with partners and develop consensus in all of these processes was also noted. Figure 3.15 illustrates these responses.

4 Barriers to Behavioural Change

Respondents reported a need for knowledge resources on increasing awareness, enhancing organizational structures and procedures, and creating incentives for adaptation.

About 80 percent of respondents who commented on processes relevant to behavioural change barriers indicated a need to increase awareness and understanding, as well as the capacity of individuals and communities. The creation of networks and clusters to support change and establish information-sharing mechanisms among grassroots organization was noted as an important part of the barrier-removal and knowledge-building process. Knowledge-sharing platforms, like UNDP's ALM, have the potential to contribute to these efforts by broadening the dissemination of adaptation information.

The majority (80 percent) of respondents expressed the need for knowledge on enhancing organizational structures and procedures and on creating incentives at the individual and community level for behavioural change. About 70 percent of respondents expressed a need for information on strengthening compliance measures and accountability with regard to CCA.

Supplementing the processes listed in the survey question, respondents indicated a need for the following types of knowledge resources as tools for encouraging behavioural change for CCA: assessment of communities' perception of risk, guidance on the use of advertising principles to cultivate demand, and assessments of successful first-step approaches to behavioural change. It was also noted that there is a need to recognize and understand the linkages between behavioural change, institutional change, and programme and policy change in order to overcome obstacles to these types of changes. See Figure 3.16 for percentage distribution of responses.

5 Technological Barriers

Respondents need knowledge resources on accessing, transferring, implementing, modifying and monitoring adaptive technologies.

Between 70 and 80 percent of respondents indicated the need for more information about the processes listed in the question about overcoming technological barriers to adaptation. The majority of respondents indicated the necessity for information or guidance on demonstrating climate-resilient soft and hard technologies and community-based adaptation measures (e.g. efficient irrigation systems, drought-resilient seeds, and other low-tech adaptive technologies) (78 percent), as well as capacity to access and transfer innovative technologies for adaptation (e.g. clean adaptive technologies to support low-emission, climate-resilient development) (75 percent). Respondents also noted the need for knowledge that will assist with building scientific and technical

capacity to coordinate, manage and monitor adaptive technologies post-implementation and modify technologies and measures for local site conditions, replication and upscaling. In addition to presented response options, respondents emphasized the need to build local capacity to develop technologies and pilot measures based on existing local and indigenous knowledge. These results are depicted in Figure 3.17.

6 Informational Barriers

Knowledge resources on generating and incorporating climate/adaptation data and assessment information in management and planning systems were reported as a priority need for addressing informational barriers.

Respondents emphasized the need to build local capacity to develop technologies and pilot measures based on existing local and indigenous knowledge.

Approximately 80 percent of respondents concerned with informational barriers reported the need for enhanced technical capacity to generate and incorporate climate/adaptation data and assessment information in management and planning systems (e.g. mainstreaming adaptation). Over 70 percent of respondents indicated insufficient understanding of the complex landscape of climate change actors, agencies and programmes. Respondents also noted the need for ensuring timely interpretation of project or programme results and dissemination of this information from researchers to stakeholders and policymakers. See Figure 3.18 for response results.

Obstacles to accessing specific knowledge-sharing services can also present informational barriers to adaptation. These challenges are discussed in the part on identifying how to knowledge needs (see Part 4).

3.5 Additional Comments on Knowledge Gaps and Needs

In addition to the information on knowledge needs already presented in the survey results, the following points summarize frequently repeated insights that emerged among 286 open-ended responses on 'primary knowledge gaps and needs:'

- **There is a lack of awareness among civil society and government on climate science and local climate change risks, impacts and vulnerabilities**. This knowledge is necessary to stimulate behavioural change to create a strong constituency in support of CCA and motivate political action by policy makers. Increased access to scientific climate data, assessment of impacts, and understanding among individuals, organizations and governments of how climate change relates to them is necessary to stimulate decision-making and action on CCA.

- **There is a gap between scientific knowledge and local level understanding, as well as between institutional knowledge and practitioners' needs**. Scientific information needs to be localized and downscaled to translate to local-level action on the ground. Conversely, piloted adaptation practices need to be upscaled to change development practices more broadly.

- **Adaptation practices need to integrate indigenous knowledge and take advantage of existing local adaptation measures**. Likewise, transferred technologies and approaches need to be modified to suit local needs, contexts and capacities.

These comments suggest demand **for opportunities to share knowledge across sectors and institutional levels.** The following part explores how this knowledge can be best communicated to reach relevant stakeholders.

Figure 3.1 Knowledge Needs for Different Project Development Phases

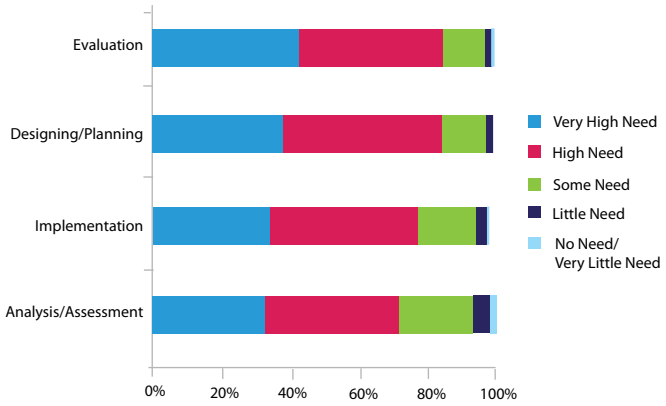


Figure 3.2 Need for Knowledge Resources on Different Climate Change Impacts

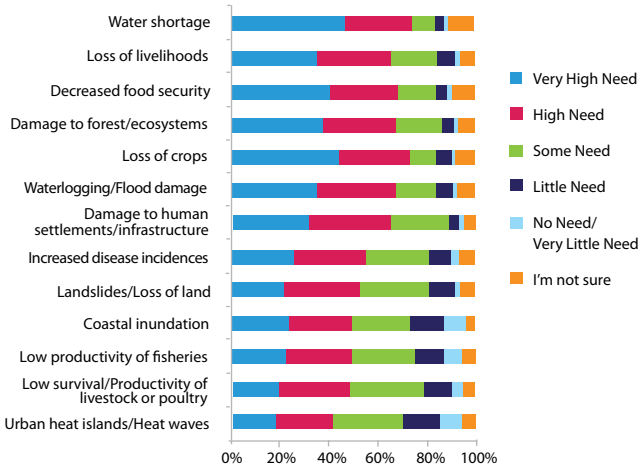


Figure 3.3 Knowledge Needs on Climate Change Adaptation Cross-cutting Issues

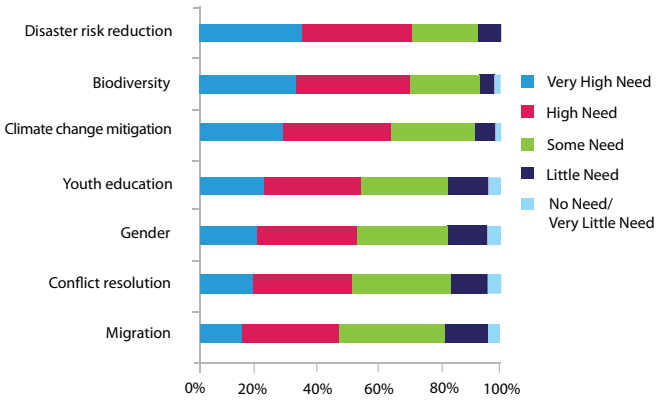
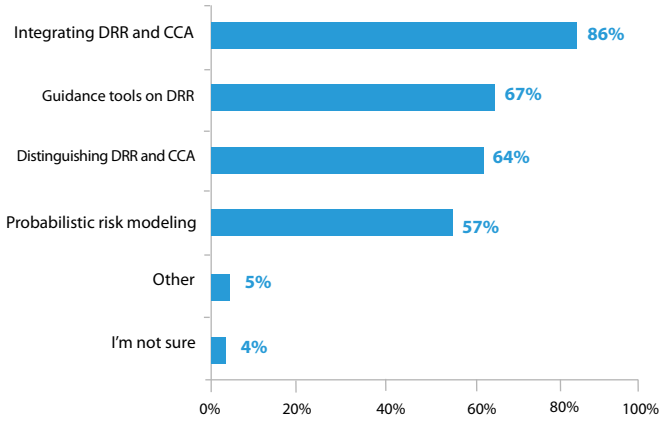
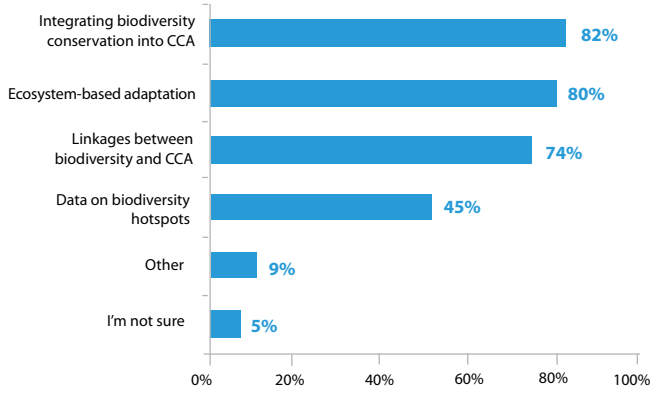


Figure 3.4 Knowledge Needs on Disaster Relief Reduction and Climate Change Adaptation



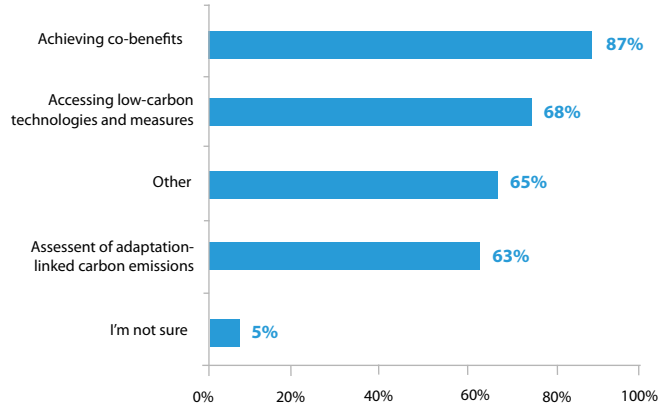
Cross-Cutting Issues

Figure 3.5 Knowledge Needs on Biodiversity and Climate Change Adaptation



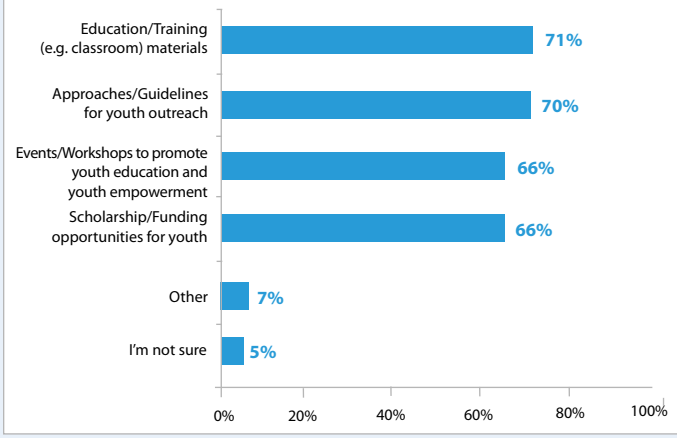
Cross-Cutting Issues

Figure 3.6 Knowledge Needs on Climate Change Mitigation and Climate Change Adaptation



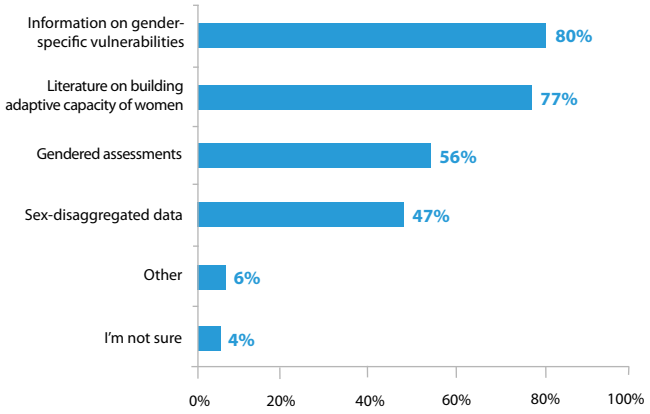
Cross-Cutting Issues

Figure 3.7 Knowledge Needs on Youth Education and Climate Change Adaptation



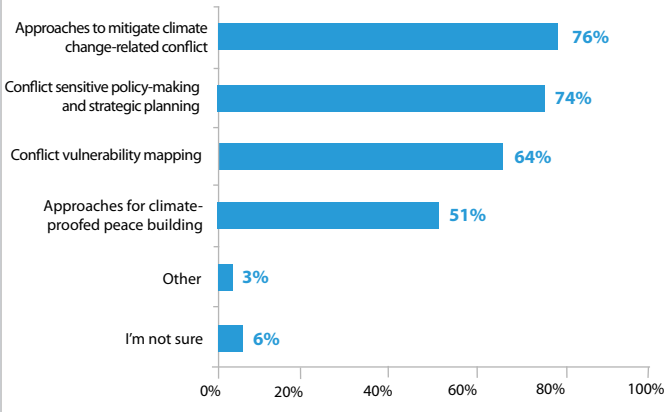
Cross-Cutting Issues

Figure 3.8 Knowledge Needs on Gender and Climate Change Adaptation



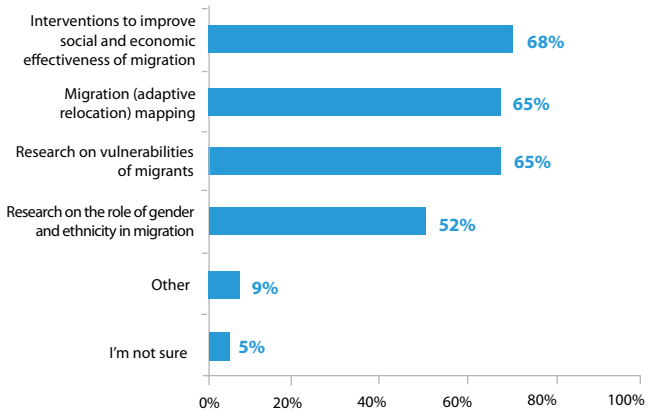
Cross-Cutting Issues

Figure 3.9 Knowledge Needs on Conflict and Climate Change Adaptation



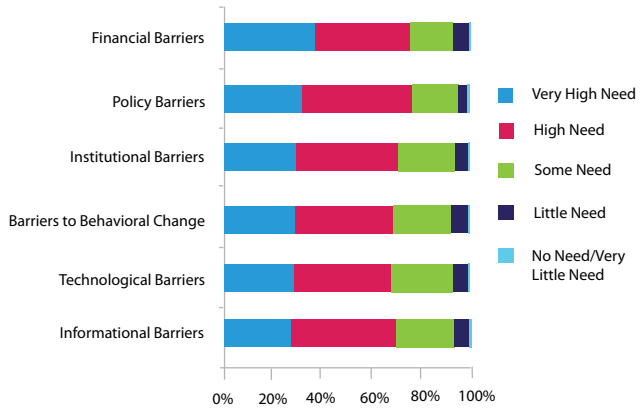
Cross-Cutting Issues

Figure 3.10 Knowledge Needs on Migration and Climate Change Adaptation



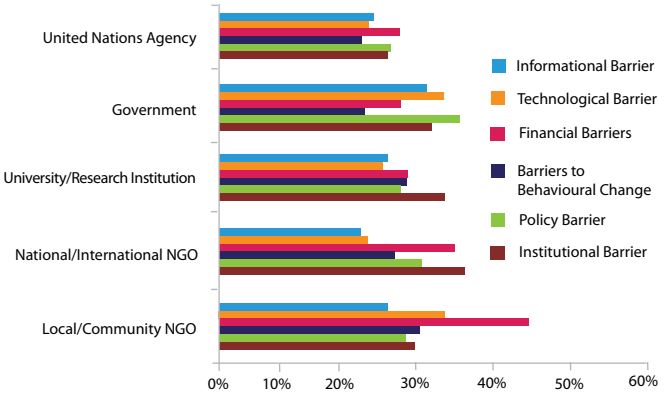
Barriers to Adaptation

Figure 3.11 Knowledge Needs for Overcoming Barriers to Adaptation



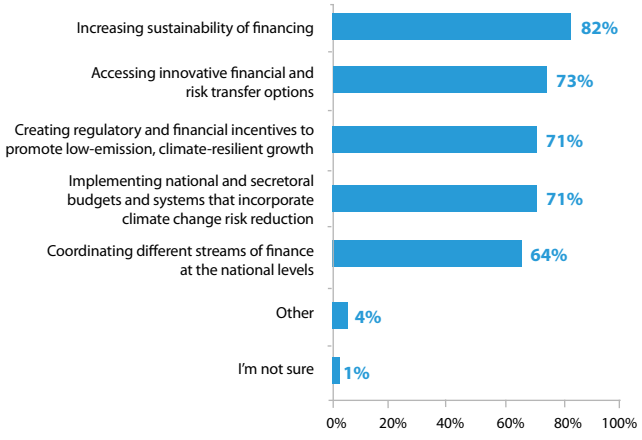
Barriers to Adaptation

Figure 3.12 Percentage of Respondents in Each Professional Affiliation Reporting *Very High Need* for Each Adaptation Barrier



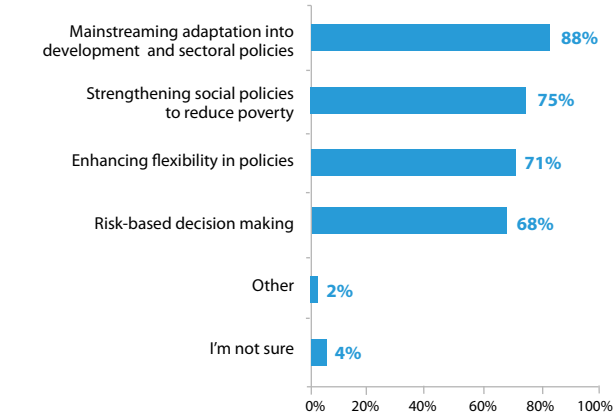
Barriers to Adaptation

Figure 3.13 Knowledge Needs Regarding Relevant Processes for Overcoming Financial Barriers



Barriers to Adaptation

Figure 3.14 Knowledge Needs Regarding Relevant Processes for Overcoming Policy Barriers

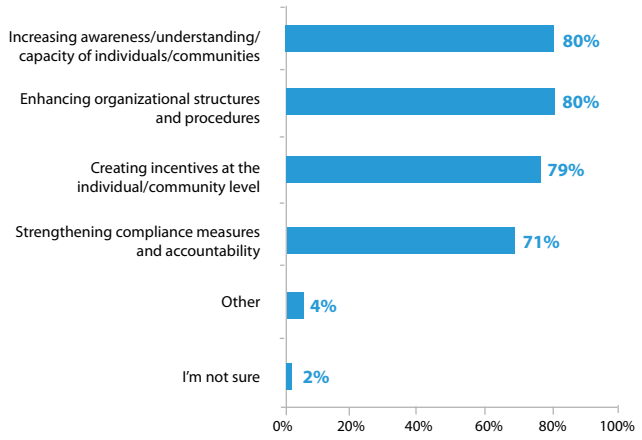


Barriers to Adaptation

Figure 3.15 Knowledge Needs Regarding Relevant Processes for Overcoming Institutional Barriers

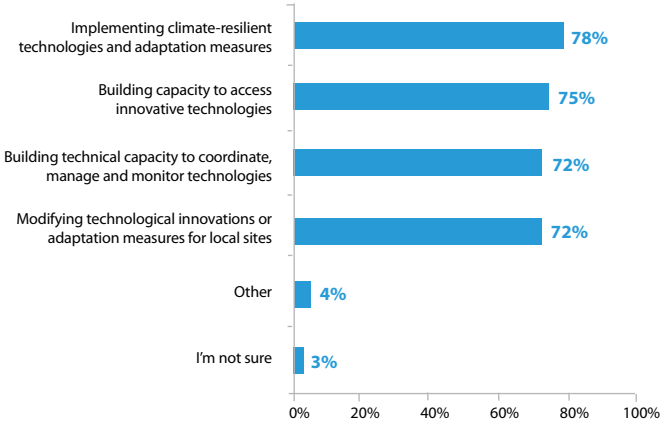
Barriers to Adaptation

Figure 3.16 Knowledge Needs Regarding Relevant Processes for Overcoming Barriers to Behavioural Change



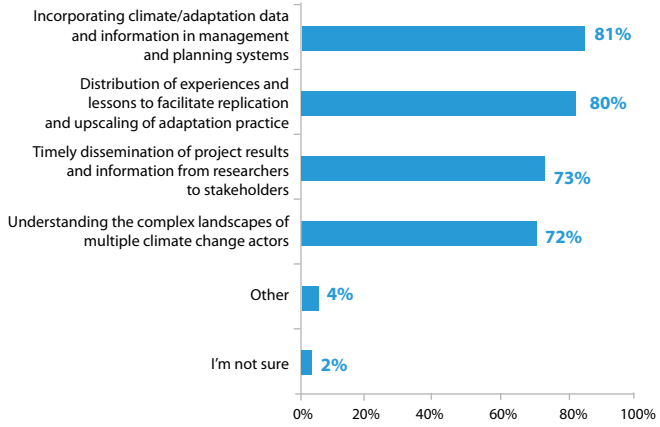
Barriers to Adaptation

Figure 3.17 Knowledge Needs Regarding Relevant Processes for Overcoming Technological Barriers



Barriers to Adaptation

Figure 3.18 Knowledge Needs Regarding Relevant Processes for Overcoming Information Barriers



4. Preferred Knowledge-Sharing Products and Services

In order to identify what products and services would best help the adaptation learning community gain knowledge, respondents were asked to indicate whether they would use or participate in various knowledge-sharing services, rate their need for specific types of knowledge products that could be made available through some of these services, and report what obstacles they face in accessing these resources and tools.

4.1 Knowledge-Sharing Services

Capacity-building resources, such as training courses, workshops and seminars, as well as newsletters would be widely used among respondents. Cross-analysis of services by professional group indicates that respondents affiliated with local/community NGOs reported the most interest in using and participating in knowledge-sharing services overall, while respondents affiliated with multilateral banks reported the least interest in using these services.

Roughly 70 percent of respondents indicated that they would utilize training courses, workshops and seminars, and newsletters.

Given the knowledge-sharing services listed in Figure 4.1, roughly 70 percent of respondents indicated that they would utilize training courses, workshops and seminars, and newsletters. Over 60 percent of respondents also stated that they would use an online knowledge-sharing platform, such as the ALM platform, for sharing and accessing resources and for networking with others in the adaptation field via platform member groups and searchable profiles. Technical backstopping (e.g. expert support) for adaptation, potentially via online messaging, was also a favorable service for over 60 percent of respondents. These results suggest demand for resources that not only build knowledge, but also skills for capacity development.

In written commentary, respondents specified an interest in seminars that focus on technical knowledge for non-experts, webinars on regional responsiveness, and sessions for raising community awareness, e.g. Climate Education and Awareness Raising (CLEAR) programs. It was noted that networking platforms should emphasize peer-to-peer learning, interactive blogging, experience sharing and peer support for practitioners. Some written responses also noted the importance of moving beyond training toward self-organized learning, which could take place through social networking-based discussion and experience sharing.

Training courses and workshops/seminars were reported to be the knowledge-sharing services of highest interest by the private sector (77 percent and 73 percent of this professional group indicated that they would use or participate in each of these services, respectively), United Nations agencies (80 percent, 76 percent), national or international NGOs (73 percent, 70 percent), and local and community NGOs (87 percent for both services) (see Figure 4.2). Within the professional affiliation of multilateral banks, the highest percentage of respondents reported interest in participating in workshops/seminars (76 percent) and an open-source database/platform (67 percent). Government respondents also indicated a slightly higher interest in open-source database/platform (65 percent). A newsletter was the tool of highest interest to respondents affiliated with research institutions (73 percent).

Video discussions were reported to be the service in which respondents from United Nations agencies (43 percent), research institutions (46 percent), national or international NGOs (42 percent) and local/community NGOs (50 percent) were least likely to participate; however, compared to other professional groups, government reported the highest interest (63 percent) in this knowledge-sharing tool. User discussions were reported to be the service of least interest (among listed services) by multilateral banks (33 percent) and the private sector (50 percent); however, among professional groups, local/community NGOs (59 percent) indicated the most interest in this service. Compared to other professional groups, local/community NGOs reported the highest percentage of respondents' interest in networking platforms and tools (74 percent).

4.2 Types of Knowledge Resources

Respondents indicated the greatest need, among different types of knowledge products,[20] for climate change risk and impact assessments, vulnerability assessments, and guidance and tools. Results suggest that teaching and training materials, case studies and research and publications are also in high demand. Identified knowledge product needs varied by professional affiliation.

Employees of local or community NGOs reported relatively high demand for program and teaching materials. Government employees reported needs for case studies, while multilateral/development bank employees reported interest in country reports.

Climate change risk or impact assessments were reported as *high need* or *very high need* by 86 percent of respondents. A high percentage of respondents also indicated at least *high need* for vulnerability assessments (83 percent) and guidance and tools (79 percent) (see Figure 4.3). Over three-quarters of respondents also stated that they had a *high* or *very high need* for teaching and training materials (75 percent) and case studies (79 percent). It was noted that internet-accessible video stories (in target local languages) that highlighted successes via interviews and testimonials would be a helpful format for case studies. There was less need shown for materials on specific programs, projects and workshops/conferences than for other knowledge resources.

Consideration of these findings in the context of information on knowledge gaps and needs presented in previous parts of this report provide further insight on the demand for these different types of knowledge resources. For example, while a high percentage of respondents indicated a *very high need* for climate change impact and vulnerability assessments (~45 percent), a lower percentage of respondents (33 percent) indicated a *very high need* for more information on the analysis and assessment phase of development (see Figure 3.1). This suggests that for many respondents, the results of impact and vulnerability assessment would likely be of greater interest. In addition, these results on types of knowledge products support conclusions from feedback on the ALM that case studies presenting lessons learned and best practices based on experiences in adaptation, as well as specific guidance on how to implement these strategies and repeat successes, are needed.

University researchers reported the highest relative need for research and publications. United Nations employees indicated the lowest relative need for this type of resource, but expressed a high relative need for guidance and tools. Employees of local or community NGOs reported relatively high demand for program and teaching materials.

[20] *The list of types of knowledge products presented in this question (see Figure 2.5) was adapted from the categories of 'content types' on the ALM platform.*

Government employees reported needs for case studies, while multilateral/development bank employees reported interest in country reports.

The reported needs for knowledge products varied significantly depending on the respondent's primary professional role. Researchers expressed the highest relative need for research and publications, and the lowest relative need for policy documents. In turn, technical advisers reported the lowest relative interest in research and publications. Project designers reported higher relative demand for climate data, while policy advisers reported higher relative needs for policy documents. Professors reported their highest relative needs for research and publications. Teaching materials were specified as the highest relative need for elected representatives.

4.3 Obstacles to Accessing Knowledge-Sharing Tools and Services

Respondents' limited access to travel suggests the benefit of online knowledge-sharing services.

Challenges in accessing existing knowledge resources, services and tools shed light on how to best make the knowledge-sharing services listed above accessible to the CCA community. Over 60 percent of respondents indicated limited access to travel for in-person meetings, workshops, seminars or trainings, while only about 18 percent of respondents stated limited computer or internet access, including low bandwidth and/or limited computer literacy (see Figure 4.4). Cross-analysis by professional group indicates that limited access to travel was the obstacle reported by the highest percentage of respondents for all professional affiliations, except multilateral banks. This suggests that trainings and seminars would best be delivered in an online format, for example via e-learning tools (e.g. online toolkits) and webinars. In order to be accessible to low bandwidth users, these online resources should be developed with simple functions and few necessary downloads.

Over 60 percent of respondents indicated limited access to travel for in-person meetings, workshops, seminars or trainings, while only about 18 percent of respondents stated limited computer or internet access, including low bandwidth and/or limited computer literacy.

Only 18 percent of respondents stated that language is a barrier to the accessibility of knowledge resources. Written commentary from respondents suggests that overcoming this obstacle requires the availability of user-friendly materials in non-technical, local languages accessible to a variety of stakeholders and non-experts.

Figure 4.1 Anticipated Use of Knowledge-Sharing Services

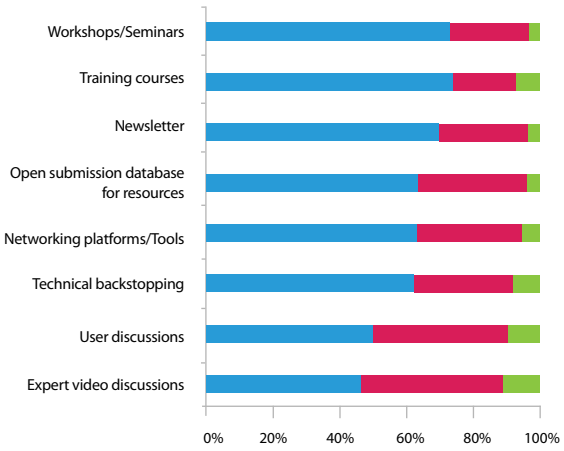
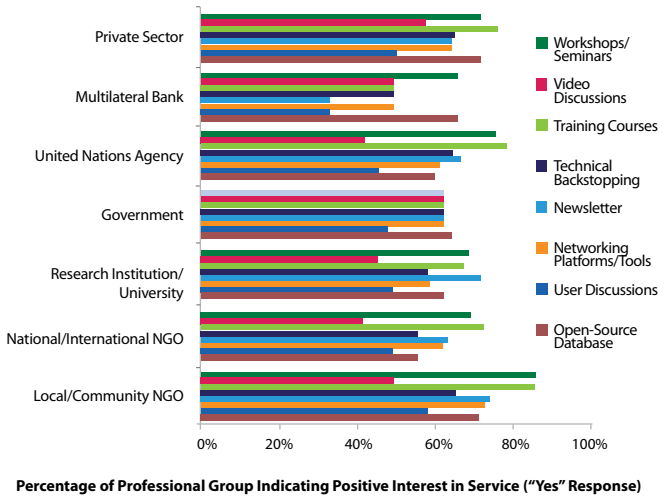


Figure 4.2 Indicated Interest in Use of Knowledge-Sharing Services by Professional Affiliation



Percentage of Professional Group Indicating Positive Interest in Service ("Yes" Response)

Figure 4.3 Types of Knowledge Products Rated by Need in Response to Question

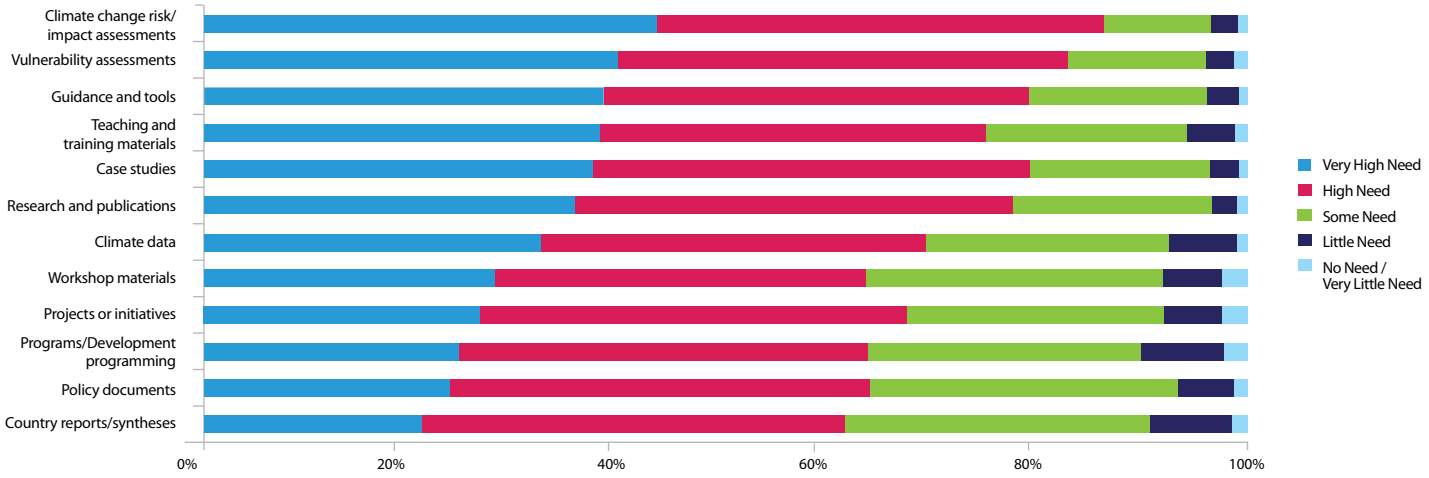
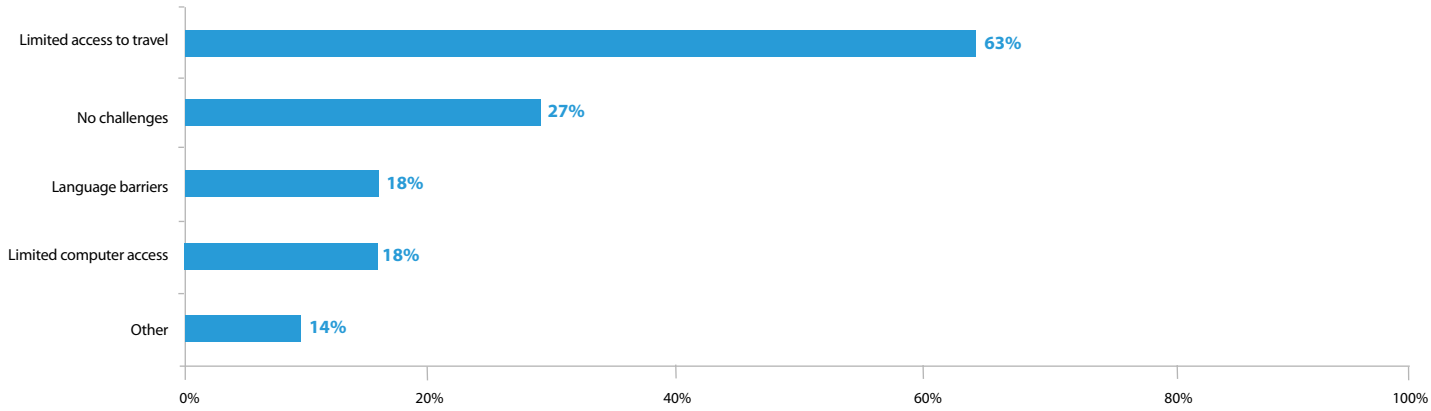


Figure 4.4 Challenges Accessing Existing Knowledge Resources, Services and Tools



Results of the 2010 Adaptation Knowledge Needs Survey indicate a high need for knowledge resources and tools that help build capacity on climate change adaptation. Communication of climate change impacts and vulnerabilities is key to enhancing individual, community, and institutional awareness; and sharing practical examples of adaptation strategies is essential in order to demonstrate how to turn research into action on the ground. Lessons learned and analysis of transferable factors for replication need to inform shared experiences and case studies. These lessons should be based on repeated examples of both best and worst practices, including candid attention to challenges.

Trainings and workshops, in addition to databases of information resources and case studies, are necessary to develop capacity across sectors and institutional levels. Shared learning needs include the exchange of scientific and indigenous knowledge between local and institutional actors. Inter-sectoral and inter-institutional sharing of knowledge should emphasize the localizing of scientific knowledge and scaling up of local and indigenous knowledge and practices.

The knowledge needs reported by respondents do not indicate that the desired information is nonexistent, but rather that it is inaccessible to the survey sample. Enhancing knowledge-sharing tools to make this information more accessible could help to address knowledge needs.

Knowledge on approaches for adapting to climate change impacts—such as including water shortage, livelihood loss, decreased food security and damaged ecosystems—should be developed in the context of MDG (e.g. poverty alleviation) and key cross-cutting issues, including DRR, biodiversity, and climate change mitigation. Gaps in knowledge about socio-economic and psychological impacts should also be addressed in conjunction with knowledge needs regarding physical climate change impacts that necessitate adaptation. In addition, the existence of barriers to adaptation, particularly financial and policy challenges, demands relevant knowledge resources for enhancing capacity to overcome these obstacles.

The knowledge needs reported by respondents do not indicate that the desired information is nonexistent, but rather that it is inaccessible to the survey sample. Enhancing knowledge-sharing tools to make this information more accessible could help to address knowledge needs. The needs that were reported as low may indicate an organic lack of need for the specific knowledge, or it could mean that the need in question is already being satisfied by the ALM or a different (or additional) resource and platform.

In many cases where cross-analysis with professional group was conducted, reports of lower relative needs for a specific resource by one user group were balanced by reports of higher relative needs for the same resource by different user groups. While the results of analysis by professional group could help focus specific knowledge resources by target group, the overall breadth of responses makes a case for the dissemination of a wide variety of resources through knowledge-sharing tools and platforms like the ALM.

Developments of Knowledge Needs Since 2007

Looking back at the 2007 Knowledge Needs Survey Report, several consistencies in the 2010 survey results were identified. Despite a larger sample size, regional and sectoral focus of respondents has remained the same. Similar to 2007, respondents showed the highest interest in Africa, followed by Asia and LAC; and for interest by sector, respondents to both surveys identified the highest interest in natural resource management, agriculture and food security, water resources, and DRR (presented as a cross-cutting issue in the 2010 survey). Results from the 2010 survey, however, have built on this information by providing details on knowledge needs relevant to DRR and other key cross-cutting areas such as biodiversity and climate change mitigation.

As reported in 2007, there is still demand for good practices and lessons learned, training and capacity building materials, and case studies and experiences. In addition, the 2010 survey results reveal an interest in learning from failures and challenges, in addition to successes and best practices; a high need for information on climate change impacts and site-specific vulnerabilities; and an emphasis on self-directed interactive learning and communication via online social networking tools.

Recommendations

Given these observations, survey results both on ALM feedback and general knowledge needs and knowledge-sharing services suggest the following recommended next steps for UNDP's ALM and other adaptation knowledge management initiatives.

Moving forward, these platforms should **provide additional up-to-date case studies** on projects that highlight successes and conclusions on best and worst practices based on repeated successes and failures. The creation of **a vulnerability map highlighting climate change vulnerabilities** by region, country and community would help to spotlight relevant climate change risk assessment results. The establishment of **region-specific web-based portals** (particularly for Africa and Asia) that highlight these impacts and vulnerabilities would help to further contextualize this information. Further, **the creation of subpages** (e.g. portals) **on cross-cutting issues** (particularly DRR, biodiversity and climate change mitigation) would help to emphasize linkages between CCA and these cross-practice areas, as well as practical integration of relevant approaches.

In addition to further populating the ALM platform with resources, the ALM would greatly benefit its users by focusing attention on **building its social networking capacity. Engaging users in the interactive exchange of ideas** through commentary on ALM content, participation in discussion forums, as well as direct identification of and interaction with other users, will allow the ALM to further facilitate adaptation learning and knowledge sharing. Through **enhanced outreach to community organizations** and **improved communication to ALM users** (e.g. an e-newsletter), the ALM can further promote and enhance the platform's interactivity. Disseminating training and tools in local languages, as well as project information and lessons in non-technical language, could also help to make available knowledge more accessible to a wider variety of stakeholders.

Finally, **the development of a communication scheme** through country focal points (e.g. UNDP country offices) and community-based partners would help to ensure that local/indigenous knowledge would reach and be featured on the ALM or other knowledge management platforms and that scientific knowledge is relevant and applicable to action on the ground.

ALM Dissemination

Email to ALM registered users
Link on ALM front page
Twitter/Facebook announcements

UNDP Internal Networks

Africa Adaptation Programme (AAP)
Environment and Energy Group staff network (EEnet)
Equator Initiative
Human Development Reports Network (HDR-Net)
Regional Technical Advisers
Community-based Adaptation (CBA) network
National Communications network
Small Grants Programme (SGP) network
TeamWorks (posted on relevant group pages)

UNDP ALM Core Partner Networks

FAO
UNEP
UNFCCC
World Bank

External Networks

Adapt Net
AfricaAdapt Innovation Fund
Af-Asia Drought Network
Climate-1 Stop
Climate Change Adaptation and Development Initiative (CCDARE)
Climate-L
Center for Research on Environmental Decisions (CRED)
Columbia University Earth Institute
International Resource Institute for Climate and Society (IRI)
DevPrac
DG Foundation
Food Security and Nutrition (FSN) Forum
Global Environment Facility (GEF)
InfoSpring
International Institute for Sustainable Development (IISD)
International Waters Learning Exchange and Resource Network (IW:LEARN)
Latin America and Caribbean (LAC) network
Nairobi work programme (NWP)
Organisation for Economic Co-operation and Development (OECD)
Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA)
UNICEF
United States Agency for International Development (USAID)
Participants from various conferences on climate change adaptation

TABLE A2. **1 BASE OF COUNTRIES OF RESPONDENTS***

Algeria	Croatia	Japan	Republic of Korea
Angola	Cuba	Kazakhstan	Rwanda
Argentina	Democratic Republic of the Congo	Kenya	Samoa
Australia	Denmark	Kyrgyzstan	Senegal
Bahrain	Dominican Republic	Lao People's Democratic Republic	Singapore
Bangladesh	Ecuador	Lebanon	Slovakia
Barbados	Egypt	Liberia	Somalia
Belarus	El Salvador	Malawi	South Africa
Belgium	Eritrea	Malaysia	Spain
Benin	Ethiopia	Malta	Sweden
Bhutan	Fiji	Mauritius	Switzerland
Bolivia	Finland	Mexico	Syrian Arab Republic
Bosnia & Herzegovina	France	Morocco	Tanzania
Botswana	Georgia	Mozambique	Thailand
Brazil	Germany	Namibia	Timor-Leste
Burkina Faso	Ghana	Nepal	Togo
Cambodia	Guatemala	Netherlands	Tunisia
Cameroon	Guinea	New Zealand	United Arab Emirates
Canada	Guinea-Bissau	Nicaragua	Uganda
Chad	Haiti	Niger	United Kingdom
Chile	Honduras	Nigeria	Uruguay
China**	India	Pakistan	United States++
Colombia	Indonesia	Panama	Vanuatu
Cook Islands	Israel+	Papua New Guinea	Viet Nam
Costa Rica	Italy	Peru	Yemen
Côte d'Ivoire	Jamaica	Philippines	Zambia

** As reported by 87 percent of respondents*

*** Includes Hong Kong*

+ Includes Palestine

++ Includes Puerto Rico

ANNEX 3: DEFINITION OF BARRIERS TO ADAPTATION

UNDP (2011) defines systemic and discrete barriers to adaptation in the following ways.

Systemic barriers

Institutional barriers typically involve the absence of appropriate institutional arrangements; governance structures; mandates; technical and managerial capacity of staff in key institutions; and coordination and partnerships across various institutions, agencies, and civil society needed to create or contribute to an improved enabling environment for managing the uncertainties of climate change.

Policy barriers typically concern national, sub-national and local regulations, policies, directives and other formal and informal declarations for managing key sectors and/or regions to support both planned and autonomous management of the uncertainties of dynamic climate change risks and opportunities.

Barriers to behavioural change include lack of awareness, understanding, capacity and incentives at the individual and community level that hinders uptake of adaptive practices. Systemic behavioural adjustments are also concerned with compliance measures, accountability, organizational structures and procedures.

Financial barriers typically involve the allocation of resources within national and sectoral budgeting mechanisms and systems to incorporate climate change risk reduction; regulatory and fiscal structures to promote low-emission, climate-resilient growth; access to innovative financial and risk transfer mechanisms; and sustainability of the financing sources that support long-term adaptation.

Discrete barriers

Technological barriers include the absence or failure to use climate-resilient soft and hard technologies and practices such as efficient irrigation systems, drought resilient seeds and improved livestock management techniques. Lack of scientific and technical capacity also hinders access to and promotion of climate-resilient technologies and practices.

Informational barriers involve the lack of access to the information necessary for the planning and management of climate change uncertainty, including climate scenarios; results of integrated (science, biophysical and economic) modeling; vulnerabilities; and risks. This includes barriers in technical capacity to generate and incorporate this information and in management and planning systems.

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