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Building Shared Understanding and Capacity for Action: Insights on Climate Risk Communication from India, Ghana, Malawi, and Mongolia

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The lack of effective communication about climate risk has contributed to improper interpretation of scientific findings pertaining to climate change and to poor mobilization of vulnerable groups for developing appropriate response actions. This article describes communication efforts undertaken in Ghana, India, Malawi, and Mongolia to develop and implement climate risk communication strategies that emphasize collective knowledge generation between researchers and stakeholders. The studies underscored the critical importance of presenting complex information in locally relevant terms to facilitate shared understanding of climate risk issues and that knowledge co-generation and social learning between researchers and communities are key to developing context-appropriate risk communication approaches.

Introduction[1]

Developing credible and relevant approaches for communicating climate risks that are grounded in decision-making processes and priorities of targeted stakeholder groups is essential for better managing risks associated with current climate variability and near-term climate change and for developing pathways for adaptation to longer-term climate change. However, creating effective communication that informs climate risk management and adaptation remains a significant global challenge. Climate information itself often hinders processes of risk communication and decision making in that spatial and temporal scales of climate information can be too large to be of practical importance (such as is the case with global models), and uncertainty can be perceived as an obstacle to the formulation of adaptation responses (Dessai, Hulme, Lempert, & Pielke, 2009 Pidgeon & Fischhoff, 2011; Stainforth, Downing, Washington, Lopez, & New, 2007). Moreover, climate information is often not presented in ways that are relevant to decision-making needs and priorities of policy makers or local communities, nor are these actors often included in knowledge development and sharing processes (Moench & Dixit, 2007; Vogel, Moser, Kasperson, & Dabelko, 2007). This is partly due to the nature of climate information and the high level of uncertainty involved, but also to poor understanding of the local context and knowledge base upon which effective risk communication depends. Poorly developed communication pathways can result in improper interpretation of scientific findings of climate change risks and in missed opportunities to develop local capacities for understanding the larger-scale dimensions of climate change.

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There is a particularly strong need for effective climate risk communication strategies in the developing world, where vulnerability to climate change and variability is extensive and adaptation planning is lagging. In these regions, understanding and awareness of the potential long-term impacts of climate change on livelihoods and development are poor, institutional capacities to generate knowledge and relay information about climate change is low, and vulnerable groups often lack access to reliable information resources that would support more robust risk management and adaptation planning. Adaptation efforts undertaken in these situations are more likely to be of an autonomous rather than planned nature (Christoplos et al., 2009); thus, climate risk communication appropriately targeted to this dynamic will be critically important for motivating adaptation efforts.

The Advancing Capacity to Support Climate Change Adaptation project was designed to enable the development of salient climate risk communication strategies through pilot projects undertaken in Africa and Asia. Key objectives of the project were to develop varied and flexible communication tools and methods to reach different stakeholder groups, use the climate risk communication methods to better understand knowledge needs, and develop recommendations for climate change adaptation. This article describes the processes through which four of the project teams—in India, Ghana, Mongolia, and Malawi—designed climate risk communication strategies and the outcomes of their efforts in terms of the development of communication tools and methods and in the diversity of stakeholders reached. The article then examines these findings in the context of common insights and lessons that emerged from the pilot projects.

Methodology

Climate risk communication strategies were developed and deployed through 19 pilot projects in 17 countries across Africa and Asia. The composition of the pilot action teams varied across countries, but teams generally consisted of a multidisciplinary core of researchers from national universities or research institutes, many of whom acted in partnership with national or local nongovernmental organizations (NGOs) and community leaders.

Development of Risk Communication Strategies

The process of developing appropriate risk communication strategies involved several steps. First, pilot action teams conducted a baseline assessment to understand the state of climate knowledge and the decision-making context of the stakeholder groups engaged in the process. Researchers assessed awareness of current practices for managing climate risks and identified sources of knowledge within communities, knowledge gaps, and perceptions of risk. Knowledge assessments at the community level were mostly conducted using household surveys and participatory group discussions. Policy makers' knowledge about climate risks was elicited through individual meetings and formal workshops. Assessing the local decision-making context for climate risk management and the baseline status of climate-related knowledge helped the pilot action teams to better understand local knowledge sources and information needs to tailor communication strategies.

Subsequently, a climate risk communication strategy was developed with the involvement of key stakeholder groups. Several teams used dialogues and focus group discussions to elicit stakeholder input throughout the process of developing climate risk communication tools and methods. This strategy provided the basis for the development and testing of a range of climate risk communication tools and methods, which included the use of traditional songs and drama, video and electronic media, and participatory group discussion. The pilot projects primarily targeted rural communities and the institutions that interact with those communities, such as municipal governments, local and national NGOs, district-level decision makers, and, in some cases, national governmental agencies. The definition of stakeholder group was thus fairly broad, in some projects encapsulating multiple levels of governance.

The main focus of the communication efforts concerned risks to rural livelihoods (e.g., crop production, livestock and pastoralism, and fisheries) and human health from climate-related hazards. These hazards were identified in terms of potential changes in the climate and hydrological systems, manifested through greater severity and frequency of floods and drought, more high-intensity precipitation events and increasingly erratic rainfall, and temperature rise. Strategies that could help vulnerable communities adapt to these increased risks were framed in the context of current risks resulting from climate variability and extreme events. Climate change was presented in terms of the possibility that shifts in weather patterns and mean climate parameters could amplify existing climate stresses and interact with nonclimate stresses to exacerbate vulnerability.

Findings from Four Case Studies

This section describes four pilot projects in India, Ghana, Malawi, and Mongolia to illustrate: (1) the diversity of socioenvironmental systems and climate risks encountered; (2) the process of developing effective communication strategies about climate risk and the tools and methods deployed for communication; (3) the lessons generated through the process that occurred between the project teams and stakeholder groups in developing climate risk communication strategies; and (4) the potential adaptation options that were identified and the actions that could support efforts toward replication or upscaling of the risk communication strategies.

Mongolia: Policy Framework for Adaptation Strategies of the Mongolian Rangelands to Climate Change

Traditional pastoral networks in Mongolia have evolved over thousands of years in this arid and semiarid land. Pastoralist communities in these environments have traditionally relied on large, interconnected landscapes to mitigate livelihood risks from extreme events resulting from summer drought and *zud* (i.e., cold, snowy winters causing widespread starvation of animal herds). These landscapes became fragmented during the Soviet and post-Soviet periods, resulting in a diminished ability of pastoralists to cope effectively with climate variability and to develop capacity to adapt to climate change (Ojima & Chuluun, 2008).

According to the records of 48 meteorological stations in Mongolia, the annual mean temperature has increased by 2.14º C during the last 70 years (Ministry of Nature, Environment and Tourism, 2009);

other long-term climate monitoring of the Mongolian Plateau indicates rapid rates of warming (0.23º C per decade) over the past half century (Chen et al., 2009). Despite the warming trend, the frequency of *zud* has increased. In some cases, *zud* has resulted from an increase in unusual or unseasonal weather conditions. For example, wind storms have become more common in the winter months, causing large snow drifts and rapid thawing and refreezing cycles (Batima, Natsadorj, & Batnasan, 2008). In addition, the spring season has become generally drier, causing decreased plant biomass production (Ojima, Chuluun, Bolortsetseg, Tucker, & Hicke, 2004) and later plant onset in some parts of Mongolia (Ellis et al., 2002).

An important objective of the project in Mongolia was to foster interaction between herders, scientists, and policy makers through the development of climate risk communication strategies. The main target groups were pastoralists (two groups in the buffer zone of the forest steppe–dominated Hustai Nuruu National Park and four other groups each along a transect from forest steppe to mountain steppe to steppe to desert steppe). In addition to pastoralists, local government officers, young scientists and students, officials from the Ministry of Construction and Urban Development, the Ministry for Nature and Environment, and the Ministry of Food and Agriculture were also viewed as stakeholders in the communication effort.

One of the methods used to communicate climate change risks involved the production of a documentary that was filmed during field visits linked to participatory workshops. The film captured adaptive rangeland and water management practices at the *sum* (district) level, such as fencing of vulnerable riparian ecosystems and water sources, hay making, and setting up legal communities. The video also documented ecological and pastoral land use problems as well as social learning activities through participatory community workshops. In addition, a brochure titled "Policy on Adaptation of Pastoral Systems to Climate Change" was developed for stakeholders in national workshops, and Al Gore's movie *An Inconvenient Truth* was shown in Mongolian, the country's official language.

Risk communication activities developed through the Mongolia pilot project enhanced a process of social learning between researchers and pastoralists and between researchers and policy makers. Social learning occurred through participatory research at the community level, active involvement of pastoralists in identifying appropriate climate change adaptation strategies at the community level, and co-development of recommendations on climate change adaptation policies for pastoral systems at regional and country levels. The local adaptation strategies involved restoring cultural landscapes through the development of integrated plans for community-based natural resource use and conservation, protection of water sources, proposal of a structure for agreement between neighboring *sums* for communal use of *otor* (lands used by nomads) and reserve pastures, and the enlargement of administrative-territorial units—for instance, by combining several *sums* into one unit to restore cultural landscapes, as was earlier reported by Chuluun (2008). Adaptation strategies also include livelihood diversification with milk, meat, wool, and handicraft production.

The project leaders noted a critical need for building awareness and capacity of community leaders and others in authority positions to integrate traditional local knowledge into new opportunities; in the Mongolian case, four out of the six community leaders were elderly (elder herders with traditional

knowledge and experience often serve as informal community leaders). The project leaders also observed that a strong connection between community leaders and local government officials can be used to help foster sustainable land management practices that have the potential to enhance social-ecological resilience.

Malawi: Audiovisual Tools for Community-Based Adaptation

Malawi's predominantly smallholder farming population is exposed to significant risks from high seasonal and annual climate variability and frequent flooding and drought. In the focus area of this project, communities in the Salima District of central-eastern Malawi, the main climate risks are prolonged dry spells and seasonal droughts. The area lies along the Linthipe River and is frequently affected by riverine and flash floods. Due to poor land management, the river course is steadily shifting toward villages, hence subjecting them to annual flooding. Recurrent losses from extreme events have contributed to an adaptation deficit among vulnerable populations, a situation that will be aggravated by climate change in the future.

The main objective of the Malawi project was to communicate climate risks in rural areas (particularly among smallholder farmers) through the development, testing, and sharing of audiovisual tools. A partnership was created between the Malawi Red Cross, the Malawi Meteorological Services (MMS), the Malawi Institute of Management's Audiovisual Unit, and the International Institute of Applied Systems Analysis to involve five local communities and Red Cross volunteers in the production of a participatory video that incorporated local perspectives on communication of climate risks. Training in risk communication and facilitation of participatory processes at the community level were offered to the project team implementing the program. Historical climate data (i.e., on precipitation and temperature) from MMS were used to analyze recent climate trends and link with flood and drought occurrences in the study area. Early warning was of concern to the community, so a link was developed to communicate weather warnings from MMS to communities with the help of Red Cross volunteers.

Three main activities were undertaken at the village level: (1) training in film production in one village, (2) film screening in four other villages located 40 kilometers apart on average, and (3) evaluation of the effect of the film on the audience (participants answered a questionnaire before and after the screening to recognize what they had learned from the video). The film was produced with the aim of promoting climate change adaptation and participatory processes. The purpose was to describe in local languages the basics of climate change and its implications, explain scientific climate information in simple terms, and promote locally appropriate adaptation and disaster management strategies.

Local-scale adaptation strategies to current climate variability and extremes were identified through a process of several dialogues with the video-making community. While the community had concrete ideas for adaptation, they lacked sufficient resources and commitment to seriously address adaptation needs. This may be due partly to the persistence of misunderstanding about the long-term and significant toll that climate change could bring.

Through a participatory process, the strategies were refined into adaptation messages that were included in the short film. The adaptation messages concerned diversification of crops, expansion of areas under treadle pump irrigation, switching from chickens to ducks in flood-prone areas, development of a drainage system in combination with elephant grass to reduce runoff, improving food storage, and the creation of a local early warning system for flash flooding.

The video was then shown to the other four villages. Pre- and post-surveys and discussions conducted with the audiences in these villages indicate that most of the messages were understood, particularly because the film was very specific to their context and developed by villagers living in similar conditions. The audiovisual tools supported community-based adaptation by facilitating the transfer of local adaptation experiences and knowledge between vulnerable communities and by increasing interaction between the scientific community and communities of practice.

India: Promoting Integration of Adaptation Strategies Into Developmental Policies

Agriculture is the main source of livelihood in the Bundelkhand region straddling Uttar Pradesh and Madhya Pradesh, in central India. This region faces a number of climatic constraints related to prolonged drought, floods, hailstorms, and erratic rainfall, including a trend toward fewer but more intense rainfall events (Goswami et al., 2006). These unfavorable conditions compound the negative effects of low soil fertility, soil erosion, limited irrigation facilities, and degraded forests, which adversely affect food production and rural livelihoods within the region. The expected increase in the variability of the Indian monsoon with climate change, combined with temperature rise, is likely to aggravate these conditions. Persistent drought and subsequent outmigration to cities were found to be key concerns in the study area.

The aim of the project was to improve understanding of all concerned stakeholders on scientific, social, and policy issues governing climate change adaptation processes at a district level in India. The project focused on the Bundelkhand region of India and targeted district-level planning agencies, rural communities, and local research institutions. The development of the projects covered three main components:

- Vulnerability assessment of the agricultural and water sectors to current and potential climate change in the region.
- Development, testing, and validation of risk communication tools and methods through a multidisciplinary stakeholder engagement process.
- Identification and prioritization of pragmatic adaptation strategies through consultative methods.

The project developed a number of risk communication tools and methods. Brochures were produced in both English and Hindi, primarily for decision makers, to communicate the potential impacts of climate change in the area and how adaptation responses can make a difference. In addition, the risk communication strategy included a community gathering to discuss current and future climate risks and possible adaptation options. A poster was presented at this gathering to initiate discussion about climate

risks. The gathering also included folk music with lyrics pertaining to climate change and an interactive local theater production that promoted a two-way dialogue between the artists and the audience about issues related to climate change in the region, the challenges ahead, and the need to work together. At the end of the play, the narrator engaged the community audience in discussing solutions with experts and the village leaders. Community Radio sent reporters to the community gathering to convert the public discussions on climate adaptation into radio programs for broadcast to local communities.

Ghana: Capacity Development and Adaptation to Climate Change for Human Health Risks

Guinea worm and malaria are two of the most important climate-sensitive health risks in Sub-Saharan Africa. Drought conditions concentrate water resources, thus increasing human exposure to guinea worm, and standing water combined with high temperatures create suitable conditions for breeding of *Anopheles* mosquitoes, which transmit malaria. Higher temperatures and a likely increase in the frequency and intensity of droughts and flooding are likely to magnify risks from these and other climate-sensitive diseases in the region.

The focus of this project was to build awareness of climate change impacts on human health in north-central Ghana, where risks from malaria and guinea worm are high. A participatory community-based approach was developed that sought to educate the public on preventative measures and build the capacity of health practitioners in early detection and treatment. Trained personnel informed community members and disseminated relevant information on the climate dimensions of guinea worm infestation.

In addition to the target communities, stakeholders in this project included the Ghana Health Service and health-related programs, the Ministry of Health, the Ministry of Environment, Science and Technology, the Environmental Protection Agency of Ghana, representatives from the National Disaster Management Organization, the Ministry of Food and Agriculture, district chief executives, the Ministry of Education, the Ministry of Local Government and Rural Development, regional ministries, the Community Water and Sanitation Agency, and environmental organizations.

Climate risks were disseminated through radio bulletins, posters, and leaflets targeted at local leaders, schoolteachers, and district assemblies. The use of drama, role-playing, and traditional drums enhanced sharing of climate change risk information with local communities. The project team worked with local artists to present a drama about seasonal weather changes depicting the health status of two families—one conscious of environmental cleanliness and hygiene, including the importance of using insecticide-treated bed nets, and the other living in an untidy environment where stagnant water and the lack of treated bed nets increased their risk of contracting water-borne diseases and malaria. Spreading awareness of climate risks also required a committed program to train the trainers, which the project accomplished through workshops targeted at Ghana Health Service personnel, staff of guinea worm eradication programs, and influential local community leaders.

Insights from the Climate Risk Communication Efforts

Drawing on the work conducted across the Mongolia, Malawi, India, and Ghana projects, several lessons emerged that can inform approaches to developing climate risk communication with vulnerable groups in low-income countries. Insights are described in the following sections.

Assessment of Baseline Knowledge Is a Critical Foundation to Developing Relevant Climate Risk Communication Strategies

The baseline knowledge assessments carried out at the beginning of the pilot projects revealed both substantial depth and significant limitations of local knowledge about climate change. Although increased climate variability, through changes in local weather patterns, was widely observed by the target communities, there was no substantive local understanding of climate change as a global and enduring phenomenon, nor of the risks to livelihoods of long-term climate change. For example, the project team in India noted that vulnerable communities are experiencing some changes in weather patterns but are not aware of climate change. Moreover, the concept of climate does not exist there, only weather and seasons. The India team found that community members largely believed the observed change to be a temporary phenomenon and that there was no real need to change current behaviors and strategies since conditions would eventually return to previous states.

This short-term perspective was reflected in the types of climate information that local communities found relevant to their decision-making priorities. Communities expressed a need for information that was relevant only in the short-term—such as weekly to seasonal forecasts rather than climate projections—and they gave priority to information regarding the onset and quality of the rainy season and trends on heavy storm events. The short-term nature of these information needs underscores the fact that while communities may come to recognize the importance of long-term changes in climatic trends, coping with short-term fluctuations is their primary concern. Providing information that is solution based—that guides and helps develop appropriate adaptation responses—rather than orienting communication only around risks can be an important motivating factor for locals to take a longer-term approach (Grothmann & Patt, 2005).

Knowledge Co-generation and Social Learning Between Researchers and Communities Is Important for the Development of Context-Appropriate Risk Communication Approaches

Determining locally appropriate climate risk communication tools and methods evolved through a process of shared learning between the pilot action teams and local communities. Accounting for local knowledge in this process was essential, because it empowered communities and engaged them in a learning process necessary to collectively generate knowledge for building adaptive capacity. Moreover, the impressive store of local knowledge of change in these systems integrated with meteorological records and climate impact models resulted in a more robust assessment of climate change analysis at local levels. For example, in Mongolia the pilot action team reported:

> Social learning from local people regarding traditional knowledge and observations of climate change impacts on natural resources and ecosystems were important outcomes of the project. The local communities observed changes of plant species composition, movement of some plant species from desert steppe to steppe zone, drying up many springs in the mountain-steppe zone, delayed snowfall, early snow melting, permafrost melting, and delayed plant onset trends in the desert steppe and steppe boundary areas. We have learned from herders that the duration of the dry and windy spring season is becoming longer because of delayed plant onset.

The multiple interactions and knowledge-sharing processes also provided a better understanding of how culture can shape perception and belief. For example, in Ghana communities had difficulty making the connection between anthropogenic actions and climate change and were of the opinion that climate change, being an act of God, is unavoidable. And in Malawi, the local word for *climate* is the same as the word for *time*, so *climate change* was understood as *time change*. These examples reinforce a central argument put forth by Wynne (1996) about the value of considering multiple knowledge streams—both scientific and local-traditional—and the perils of solely relying on "official" scientific descriptions of risk and change.

Presenting Complex Information in Locally Relevant Terms Is Key to Facilitating Shared Understanding Around Climate Risk Issues

Several teams experienced difficulty in relaying technical and scientific information in an easy-to-understand manner because of the complexities of the subject and the tendency for the original intent of the scientific information to be altered during translation from the official to the local language(s). Compounding this communication difficulty was the fact that the language around risk associated with climate change is fairly new and is in many ways still evolving. The terminology varies vastly across disciplines, cultural backgrounds, and educational levels and can cause complications in the clarity of the message and confusion in analysis and interpretation (Pidgeon & Fishhoff, 2011; Quarry & Ramirez, 2009).

Allocating sufficient time for an active dialogue as well as clarification of terms and negotiation to reach shared understanding on meanings are critical to overcome this challenge (Genilo, 2006; Patt & Schröter, 2008). The creative use of drama, songs, and narratives were helpful for mitigating inherent complexities in the information and in overcoming cultural and linguistic barriers to communication. For example, the India team developed a musical drama to create an environment to promote open discussions between community members and authorities, and the team in Malawi used audiovisual tools to involve communities in sharing knowledge on adaptation responses to address current vulnerability. Such interactive communication was viewed as effective for engaging local communities. Another important tactic was the use of narrative approaches that relied on concrete examples and analogies to convey information about climate risks rather than using quantitative approaches to explain change and uncertainty.

Recognizing Uncertainty Is Critical for Building Robust Approaches to Deal With Potential Climate Risks

For individuals and communities to make sound decisions based on climate risk information, it is important to consider the nature of uncertainty associated with that risk. Risk analyses shared or co-generated with stakeholder groups need to account for inherent limitations to the information, making clear where risk information can confidently be applied and where a high level of uncertainty about future climates and socioeconomic conditions warrant cautious application of the information. For example, information about near-term climate change can be especially helpful if it is presented in the context of impacts associated with current climatic conditions, including extreme events, what different groups have done in the past to address these, and what is currently possible to do to prepare for a range of possible future conditions. This kind of approach allows for identification of responses based on where limitations in local coping strategies may be reached and new strategies needed.

Given the significant uncertainties involved in climate projections, decision making needs to be targeted toward adaptation outcomes that are robust across a wide range of possible climate futures (Dessai et al., 2009). Such decision making should be structured to identify strategies that are insensitive to the precision and accuracy of climate projections. Although this approach has trade-offs with respect to identifying optimal actions (Lempert & Collins, 2007), it does help identify strategies that work well across a wide range of possible future scenarios that relate to climatic projections as well as to nonclimatic processes (e.g., population growth, human behavior, economic development), which are very difficult or impossible to predict.

Building Alliances Is Fundamental for Sustaining Climate Risk Communication Efforts

Networks and partnerships formed through the pilot projects serve as a basis for consolidating and sustaining progress in developing risk communication tools and methods to support awareness raising, social learning, and adaptation decisions, provided sufficient resources and motivation are present to sustain the effort beyond the end of a project. Efforts were made by some of the pilot action teams to put informal structures in place to enhance the likelihood of the effort being sustained. For example, in India a core group was formed to discuss climate issues in depth and formulate a district-level action plan. In Malawi, the Malawi Red Cross, Malawi Meteorological Services, Malawi Institute of Management's Audiovisual Unit, and international researchers associated with the project created a partnership for disaster management and climate adaptation that has established a foundation for scaling up participatory video-making as an innovative approach for risk communication. Incorporating risk communication strategies into school curricula, broadcast media, and professional training also helps to broaden and sustain the effort.

Conclusions

The process of developing climate risk communication tools and methods revealed a number of key insights that can inform efforts to engage vulnerable communities, policy makers, and other

stakeholders. One of the main lessons learned from the pilot projects—as reflected in the four examples presented in this article and confirmed by several of the other pilot projects—concerns the need for research teams to engage stakeholder groups in a process of negotiation and exchange of meanings around issues of climate risk perception and appropriate time horizons for action, knowledge, and understandings of environmental change. This process of dialogue and co-exploration of knowledge informs how climate risk information can best be shaped and communicated. The use of varied and creative tools and methods for risk communication was critical for reaching a range of stakeholder groups. These kinds of communication strategies can be relatively easily replicated to reach a broader community. The emphasis on participatory development of risk communication tools and methods created greater stakeholder ownership over the process and is thus more likely to trigger learning and engender capacity for action as compared with risk communication strategies that rely on top-down approaches for information dissemination about climate change.

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