INPUT PAPER

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INTEGRATING COMMUNITY-BASED ADAPTATION AND DRR APPROACHES INTO ECOSYSTEM-BASED APPROACHES TO ADAPTATION

Experiences from the field

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Table of Contents

LIST OF FIGURES

Abstract

This paper provides a conceptual framework, which is underpinned by principles of Political Ecology, to help frame the issues of local Disaster Risk Reduction and Adaptation from a Human Rights and Resource Rights perspective. As two emerging approaches to adaptation, i.e. Community-based Adaptation (CbA) and Ecosystem-based Adaptation (EbA), are gaining currency worldwide as an effective way to address the underlying causes of current and future disaster risk, there is a need to identify the overlaps between these approaches and explore their interdependence. Increasingly, EbA projects are being pushed to consistently incorporate human rights-based principles while CbA projects are pressed to integrate an environmental perspective and principles. While both of these approaches seek to integrate DRR into their policies and practice, there are few examples of how to scale-up adaptation practice, while achieving local disaster risk reduction goals.

The proposed paper will be divided into three sub-headings: 1) Conceptual Underpinnings, which will explore the linkages between political ecology and socio-ecological approaches and disaster risk reduction approaches; 2) A review of landscape and community practice, will enable to cover a range of local DRR and adaptation projects and governance processes, that constitute important opportunities for learning and knowledge building. As adaptation practice is still incipient, local DRR approaches constitute stepping stone to achieve longer adaptation goals and address future climate risks. 3) Towards an Integrated and Transformative approach to DRR and Adaptation, as there are inevitable trade-offs between adaptation and disaster risk management, as one community or sector's adaptation can be another's risk. This section will propose a reflection on the current limitations of adaptation practice, in terms of its potential for scaling-up disaster risk reduction and adaptation practice, while building institutions that can help avoid maldaptation.

Conceptual Underpinnings

As climate change impacts accrue, the need to understand the nature of risk has become paramount. There are clear opportunities in drawing from the DRR community to inform current adaptation practice and policy. At the same time, the emerging adaptation approaches, both Ecosystem and Community-Based, can offer a unique vehicle to integrate collective action around disaster risk reduction and sustainable livelihoods.

As Ken Hewitt (1997:71) well puts it: "*Every society is constructed as a complicated 'negotiation' between artifice and nature, a two-way flow of materials, control and mutual adjustments*." This negotiation is at the heart of Political Ecology, as it provides a useful framework to understand how the global and local environmental changes that impact vulnerable communities are both the result and the driver of risk-construction processes that are ultimately political in nature. Michael Watts (2000) suggests that Political Ecology seeks *« to understand the complex relations between nature and society through careful analysis of what one might call the forms of access and control over resources and their implications for environmental health and sustainable livelihoods.* » From this perspective, local risk governance is necessarily linked to the control over and access to resources.

From the global commons of a changing climate, to dwindling local forest and water resources, ecosystems are at the heart of the political ecology of the 21st Century. In a 4° warmer world, sovereign states will tighten political control over scarce resources, as competing interests both public and private will tend to increase the pressure on resource. This, in turn, will push states establish new legal frameworks to arbiter the governance of natural resources. However the

quality of procedural justice can vary considerably from one country to the next, particularly in terms of the recognition of women's participation in decision-making or the incorporation of indigenous people's perspective in adaptation or mitigation policy (Pelling, M. 2011). Adaptation will most likely take place in an increasingly resource constrained world, where climate change will affect already degraded landscapes and vulnerable communities. As Robbins (2004) points to the emerging concern more generally for the way the non-human world impinges on the human one, but also how human societies negotiate control and access over scarce resources. The tragedy of the global commons, in the form of climate change, is also impinging on public and private assets and resources (Hardin, G. 1968). However, climate risks are not distributed equal. There are risk-takers and risk bearers in every society, and these also underpin political relations between who has the control over resources. Similarly, DRR approaches have long studies the nature of risk-taking and risk-aversion in human behaviour. Early works in Disaster Risk Reduction already pointed to the role of human ecology and social drivers in the configuration of risk (Wisner, et al 1976 ;Wisner, et al 1977, Lavell, A. 2009). Poverty, marginalization and gender inequity all contribute to differential vulnerability, and configure risk scenarios for current and future climate scenarios (CARE International, 2012). As a recent CARE publication underlines: ´ Vulnerability to the impacts of climate change has strong overlaps with poverty and marginalisation. It therefore makes little sense to adapt to climate change impacts without also addressing these underlying development issues, since adaptation is driven by a range of different pressures–or drivers of vulnerability–acting together. Community-based Adaptation also addresses social drivers of vulnerability including gender inequality and other factors related to social exclusion. Inequalities in the distribution of rights, resources and power are at the root of poverty and vulnerability. For example, gender roles and relations play a strong role in determining power relations, mostly to the detriment of women and girls, with implications for the vulnerability of whole families and communities who depend on them. These inequalities increase many poor people's vulnerability to harmful climate change impacts while limiting their options for coping and adaptation.(CARE International 2012 :7)

In order to better address future risks, adaptation practice will need to draw from a range of disciplines and approaches, and much can be gained from building on existing knowledge in DRR and Community-based Natural Resource Management (CBRNM) (Reid, H. 2014-*in press*). Community-based Adaptation also offers the opportunities to address the underlying drivers of vulnerability (Huq and Reid, 2007). From the Political Ecology perspective, there is also a relationship between knowledge and power, as the possibilities of collective action in the face of future climate risks are constrained by social drivers of risk, such as gender inequality, political corruption and resource capture (Robbins, 2004; Eijk and Kumar, 2009). From a human rights approach, there are a number of critical equity and justice principles in most developing countries contexts that need to be addressed before tackling issues of sustainability and adaptation (United Nations High Commissioner for Human Rights 1996). These principles include :

1. Non-discrimination, equality and special needs of marginalized social groups
2. Active, free and meaningful participation in adaptation planning, policies and practices at all levels
3. Empowerment to help people redress power imbalances, while building capacities, capabilities and skills necessary to adapt
4. Accountability to help people claim their rights and to hold the state accountable

These basic principles are often overlooked when designing adaptation interventions, and run the risk of entrenching corruption and creating conditions for maladaptation to take place. These underlying drivers of vulnerability often determine whether individuals and households can muster

the resources necessary for their wellbeing. In this sense, vulnerability is the risk that a household's commodity bundles will fail to buffer them against hunger, dislocation, or other losses (Ribot, 2009). Vulnerability is therefore lower, resilience most often greater when livelihoods are adequate and sustainable. As Kelly and Adger (2009) suggest, among the critical factors that shape livelihoods and entitlements are poverty; inequality; and the institutional context.

Only then can cross-cutting issues be adequately addressed and acted upon. In a recent effort to look at the complementarity between Ecosystem-based and Community-based approaches to Adaptation Girot et al (2011) identify these common over-arching principles:

1. Sustain ecosystems because they provide critical services that support people
2. Recognize that ecosystems function at different scales
3. Know that ecosystems change over time
4. Understand that ecosystems provide benefits for multiple sectors – water, agriculture, energy, health, etc
5. Recognize importance of both local knowledge and scientific knowledge to assess vulnerability and plan for adaptation

Wetlands International (van Leuween et al 2013:1) has developed criteria for developing ecosystem-smart Adaptation and DRR projects, which would help local organizations to:

1. *Assess and understand the interrelationships between ecosystem functioning and disaster risk, and to appreciate how improved land, water and natural resource management can increase community resilience;*

2. Mobilise interdisciplinary teams capable of designing and implementing more inclusive risk reduction programmes, including vulnerability assessments that combine interventions from the humanitarian, development and environment sectors;

3. Understand how risk is expressed at different spatial scales, and how human interventions related to land, water and natural resource use may affect the vulnerability of communities elsewhere (within a river basin, along coastlines, etc.);

4. Establish policy dialogues with a broad range of stakeholders to advocate the wise use of ecosystem services and highlight the adverse consequences of unsustainable practices regarding disaster risk and community vulnerability;

5. Consider the environmental root causes of disaster risk, convening the right actors at the appropriate scales and clearly identifying institutional responsibilities and stakeholders' roles.

Clearly the interface between disaster risk reduction, adaptation to climate change and environmental sustainability is gaining increase attention (Schipper, L. 2009). There are common grounds and approaches also reflect a growing body of learning by doing, as adaptation practice increases worldwide. But how much of it is really the result of a policy shift, and how much is attributable to emerging, ad hoc practice?

Hardwiring DRR into Environmental Policy

The issue of global environmental change has been at the forefront of multilateral environmental policy processes over the past decade. The UN Convention of Biological Diversity, for instance, has defined ecosystem-based adaptation as 'the use of biodiversity and ecosystem services to help people adapt to the adverse effects of climate change as part of an overall adaptation strategy' (CBD, 2009). This was further elaborated to include the 'sustainable management, conservation and restoration of ecosystems, as part of an overall adaptation strategy that takes into account the multiple social, economic and cultural co-benefits for local communities' (CBD, 2010). Conversely, the continued erosion of biodiversity, and in particular agro-biodiversity, contributes to the reduction of livelihood options, thus curtailing community resilience (Girot, P. 2012; Girot, P. 2002). Holt-Gimenez (2002) following Hurricane Mitch has shown the merits of farmers agro-ecological resistance in the face of extreme climate events.

The role of protected areas in staving off the impacts of climate change has also been addressed, in the 2003 World Parks Congress Resolution V for example, where both the impacts of climate change on protected areas and their role in regulating critical ecosystem services was highlighted. A publication by IUCN-WCPA, TNC, UNDP, WCS, The World Bank and WWF called Natural Solutions, also detailed the key role protected areas play in maintaining ecosystem integrity, buffering local climate, reducing risks and impacts from extreme climatic events such as storms, droughts and sea-level rise (Dudley, N. et al ,2010). IUCN and other organizations have been generating guidance on how to implement Ecosystem-based Adaptation (IUCN, 2009; IUCN, 2010; Colls, A. et al 2009; Crooks, S. et el 2011). Regional parks congresses, such as the III Central American Parks Congress in Mérida, Yucatán, Mexico in 2010 held a symposium on protected areas and climate change, seeking to provide policy guidance to the region's governments on how to manage the impacts of climate change on national protected areas systems, and harness the potential of protected areas in the context of emerging National Adaptation Strategies. The issue will also be addressed in 2014 in the run-up to the World Parks Congress in Australia.

However, there is still much needed in terms of implementation of integrated approaches that can articulate ecosystem-based and community-based adaptation and DRR in practice. In many countries the main obstacle for achieving integrated DRR and ACC approaches are the institutional setting in which these policies emerge. Most adaptation policy depends of environment ministries while most DRR work falls under interior ministries or civil defense organizations. These different lines ministries make for a difficult relationship, particularly from an ecosystem-based approach. In a recent publication on the role of ecosystems in DRR, the authors reach the conclusion that "*despite the international recognition of the role of ecosystems in DRR, there is limited progress in applying ecosystem-based DRR approaches in policy and practice at the country level. Many experiences of ecosystem-based DRR are generally implemented only at project or pilot demonstration levels, and few cases achieve the necessary scale to demonstrate tangible impacts for DRR*." (Renaud et al 2013:8). So, scaling-up is indeed a considerable challenge both in terms of the need to replicate horizontally (scaling-out) successful approaches and best practice, and scale-up robust adaptation and DRR practice into local and national governance arenas. Recent publications address these challenges of scaling-up community based approaches, and point to the need to strengthen institutions that can help articulate local DRR into broader large-scale and longer term adaptation strategies (Rossing, T. el al 2014-*in press*, Schipper, E.L.F. 2014 – *in press*). However, in most countries, adaptation so far has been divided into National Adaptation Planning (through NAPAs or more recently NAPs-National Adaptation Plans), and Local Adaptation and DRR practice through an array of interventions at the landscape and community-level. There is clearly a need for more lessons from the ground on how to better integrate these scales, and help the emerging adaptation policy and practice learn from long-standing practice in community-based natural resource management and DRR (Rossing, T. et al 2014-*in press)*. As noted by Dodman and Mitlin (2011), there is a

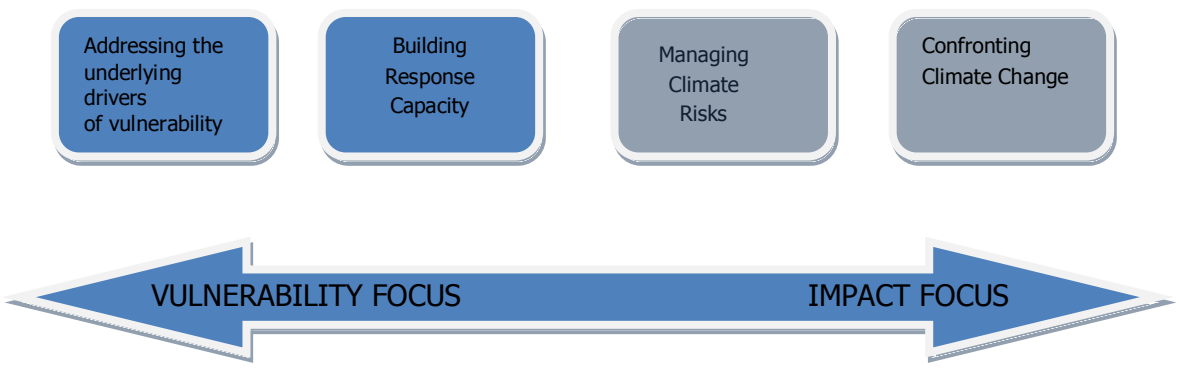
growing body of participatory tools and methods for enabling community-based development at the project level, however little attention has been paid to building up the links with political structures in order to go beyond a projectized approach.

In the following section, we review a few examples of Ecosystem and Community-based approaches which seek to incorporate DRR into landscape and local adaptation practice.

Section II A Review of Landscape and Community Practice

In this section, we present a few examples of Community and Ecosystem-based Adaptation in practice, particularly those that have explicit DRR goals. They are organized according to a typology proposed by McGray et al (2007:18), which helps place these case studies along an adaptation/DRR continuum.

Figure 1: The Adaptation/DRR Continuum (Source: McGray et al 2007:18)



ADDRESSING THE DRIVERS OF VULNERABILITY

1. ***Vulnerability Assessment tools (PfR Philippines) (Source:*** *Red Cross Climate Center, 2012, Changing tools in a changing climate: experiences from the Philippines, Case Study**)***

The PfR programme – a nine-country, five-year project of CARE Netherlands, Cordaid, the Netherlands Red Cross, the Red Cross Red Crescent Climate Centre and Wetlands International – aims to strengthen the resilience of communities dealing with increased disaster risk and the effects of climate change and environmental degradation. They have worked on harmonized risk-assessment tools that combine Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) – the focus of this case study – with Environmental Management and Restoration (EMR) to create a holistic risk reduction strategy.

In the Philippines, the PfR team consists of the Philippines Red Cross and CARE1 and their partners who agreed to focus on applying a "climate lens" to three tools that are common to participatory development: the seasonal calendar (which records what time of the year certain activities and issues occur, such as floods, harvests or dengue fever), the historical profile (which looks at major events that have taken place in the history of the community), and risk mapping (where a bird's-eye view of the community is drawn and issues are identified). Many of these are standard participatory tools that have been developed in the past in the context of assumptions about a stable climate.

The Philippines Red Cross and CARE partners in the Philippines decided to train their community

facilitators, who often include volunteers from the local area, to adjust these three tools to be more sensitive to climate. For example, they learned to draw a seasonal calendar applicable to the present, and developed questions on differences with 20–30 years ago. The facilitators then trialled the use of these three tools in 28 communities in areas vulnerable to disasters, such as in Cordillera, Metro Manila, Agusan del Sur and Surigao del Norte. For example, in the municipality of Talacogon in the southern Philippines, flood waters of up to six metres high inundate several villages located along the banks of the Agusan River for one third of the year most years. Rice paddies and cornfields turn into lakes. Over the years, people see flood waters gradually rising and there are less fish to catch, which heavily impacts their food supply, especially during the flood season. They blame loss of forest cover in the region due to extractive industries such as large-scale logging and mining.

In the Philippines, as was tragically illustrated in November 2013 with the impact of Typhoon Haiyan, extreme rainfall is also likely to become more frequent and severe and communities have decided to pursue risk-reduction initiatives. Community members have taken part in training sessions that involve discussions about disasters, climate change and environmental management, and have committed themselves to creating contingency plans. They also identified risk reduction measures such as alternative livelihood activities and reforestation.

Finally, work in the field shows it is important to facilitate a discussion about the multiple factors that may be leading to changes in the communities and their environment. It is important to stress that not all changes are due to climate change. Other risks and challenges must be considered. But climate-sensitive risk assessment will help communities understand the changing nature of hazards and anticipate the negative impacts further aggravated by the changing climate. They will help plan risk reduction, ensuring that communities are more resilient in order to face future disasters such as the one left by Typhoon Haiyan.

BUILDING RESPONSE CAPACITY

2. ***Ecosystem-based approaches to Adaptation: Restoring páramos in Highland Ecuador (Proyecto PRAA) (Source:*** (SGCA, PE) / (BM, US) / (GEF, US) / (MAE/PRAA, EC) / (CARE, EC). 2013. Proyecto de Adaptación al Impacto del Retroceso Acelerado de Glaciares en los AndesTropicales (PRAA). Quito, Experiencias y Lecciones Aprendidas durante el Diseño e Implementación del Piloto II Proyecto PRAA. EC. 76p.***)***

Since 2010 CARE Ecuador has worked with national authorities and local partners in a regional GEF funded project (PRAA) seeking to increase adaptive capacities in communities impacted by rapid glacier retreat in the high Andes in Bolivia, Peru and Ecuador. In a pilot located in Papallacta, at the foot of the Antisana glacier, CARE Ecuador developed adaptation measures that included: i) Implementation of home gardening techniques to enhance the resilience of subsistence farming ii) Implementation of agroforestry plantations for protection ecosystems and water sources. iii) participatory water monitoring. iv) Implementation of a Wildfire Prevention Plan for the *Páramo* (high mountain wetlands). The Antisana Reserve and the Papallacta headwaters supply 30% of Ecuador's capital city Quito drinking water. The long term management of these high mountain wetlands are critical for the water supply of Quito.

Following the application of several vulnerability assessment tools (CVCA, Cristal) in Papallacta, CARE Ecuador prioritized the following activities: i.) Implementation of home gardens, ii.) the establishment of environmentally sustainable livestock systems, iii.) Restoration of forest cover to protect the *páramo* iv.) Adaptive management of native vegetation, v.) Establishment of live fences with native species, vi) Wildfire prevention programmes through the establishment of local fire brigades, vii.) Design of water harvesting techniques adapted to local cloud conditions (e.g. through the installation of fog gates) viii.) Local land use planning to designate conservation areas, biological corridors and wetlands.

Figure 2: Windbreakers in Papallacta (Andres Cordova, CARE Ecuador)

Figure 3: Restoration of Páramo native vegetation (Source: Andrés Cordova, CARE Ecuador)

Figure 4: Home gardens in Papallacta (Source: Andrés Cordova,CARE Ecuador)

Some of the lessons emerging from the PRAA, show that it is possible to combine short results from agroforestry techniques such as wind breakers or through home gardens on raised hot beds for instance that easy to implement, of low cost and with short term impacts in terms of productivity. The improvement of foraging and native grasses with more resistant varieties has also helped improve livestock productivity. Although restoring high mountain forests are a long term adaptation measure, the implementation of analogous forestry techniques have also helped increase sapling survival rates, and have contributed to increasing forest enrichment and the resulting connectivity in these highland landscapes. The introduction of new water harvesting techniques through fog gates, also provides a long term alternative to dwindling water resources due to glacier retreat.

These interventions have achieved several important short term impacts. By focusing on addressing the drivers of the communities main source of vulnerability (e.g. loss of crops due to bad weather), the introduction of home gardens and the improvement of livestock management techniques has had an impact in family income and well-being. In particular,

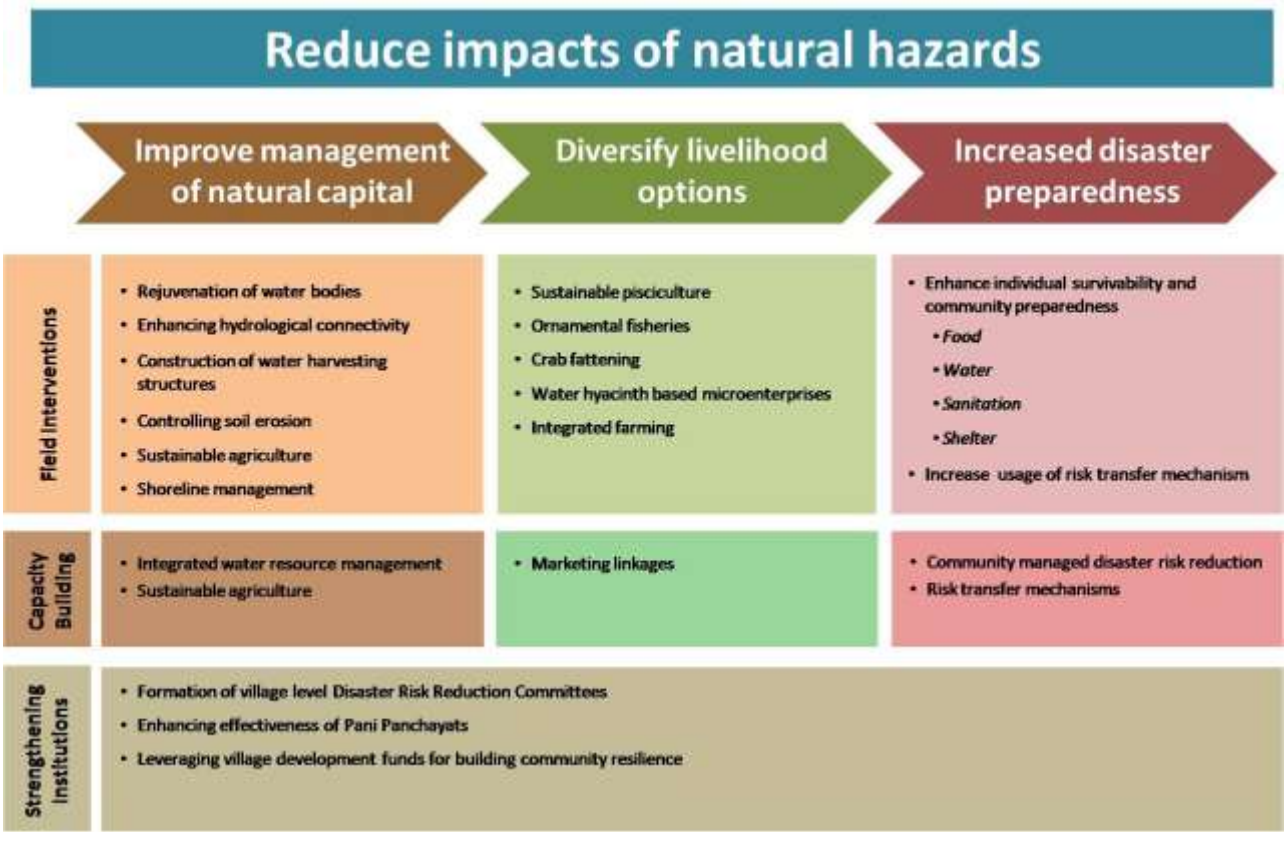
the empowerment of women in the design and management of home gardens also helped address issues of differential vulnerability of women and girls in the community of Papallacta. At the landscape level, these adaptation measures are contributing to reduce the pressure on the *páramo* wetlands, from overgrazing and fuelwood extraction. The long term benefits of the sustainable management of the *páramo* will benefit both the community of Papallacta and the downstream urban users of water in the metropolitan area of Quito.

BUILDING RESPONSE CAPACITY

3. Community-based Ecosystem Restoration (PFR-India) (Source: Partners for Resilience, 2012 Narrative Prograa Report- India)

Partners for Resilience – India aims to reduce vulnerability and build resilience of communities living within Mahanadi Delta, Odisha and Gandak- Kosi floodplains, Bihar through ecosystem restoration, disaster risk reduction and climate change adaptation. Its implementation was initiated in 2011 by a partnership of 21 NGOs led by Wetlands International – South Asia, Cordaid and Red Cross-Climate Center. Field implementation of the project in Mahanadi Delta, Odisha is led by NetCoast and CENDRET, whereas Caritas leads implementation in Gandak – Kosi floodplains, Bihar. In this approach, piloted by PfR in India, the village-level DRR plans are still at the core of risk reduction practice, but the interventions are reviewed using ecosystem management and climate change adaptation criteria. Additionally, interventions are jointly planned with a cluster of villages to better enhance regional resilience. This regional approach to risk reduction practice will not be limited to physical activities, but will also connect planning to policy dialogues and efforts to strengthen the capacity of civil society groups.

Figure 5: The Conceptual Framework for Partners for Resilience (Source: Partners for Resilience, 2012)



The Gandak-Kosi region is replete with riverine wetlands in the form of river/streams, natural waterlogged areas, ox-bow lakes, ponds, and cut-off meanders. Locally known as *Mauns, Chaurs* and *Taals,* these wetlands play an important role in regulating hydrological regimes, particularly floods and ensuring water supply for agriculture and domestic uses. Fisheries and vegetation sources from these wetlands have immense socio-economic significance and are major source of livelihood for communities living in and around. However, of late these lakes are under tremendous anthropogenic pressure and are in a critical phase of ecological transition owing to changes in land use pattern, increased sediment and nutrient load and loss in hydrological connectivity.

Figure 6: Landscape Clusters in the Mahanadi Delta

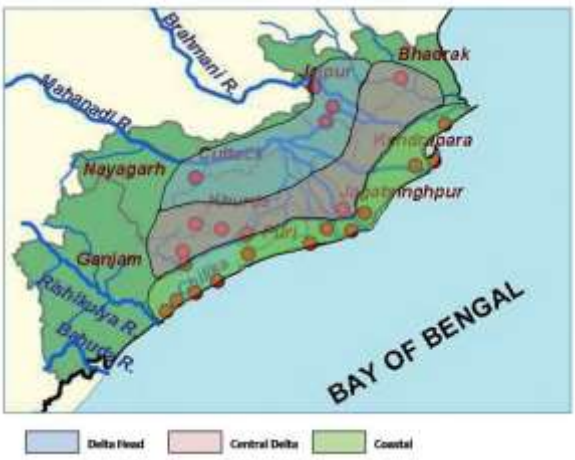


Figure 7: The Kabar Taal Wetlands

The Kabar Taal wetland complex, located in the Begusarai District of North Bihar forms a part of the extensive floodplain wetland linked to River Gandak and Kosi. Its waterspread is known to vary widely from ~400 ha in summer to ~ 7,400 ha in monsoon wherein Kabar connects with nearby waterbodies, marshes and Budhi Gandak river channel. The wetland plays an important role in regional economy, in particular local livelihoods through a range of ecosystem services which include provision of water for irrigation and domestic purposes, fisheries, wild rice, edible mollusc (*Pila globosa*), and reducing flood risk. Communities living in 21 villages around the wetland system practice a mix of dry season agriculture and fisheries for sustenance. Kabar is eutrophic, sustains rich plant and animal diversity and teems with waterbirds. Every year, over 20,000 waterbirds of more than 26 species are known to descend into the wetland, making it one of the most important waterbird habitats in Indo-Gangetic Plains. More than 40 economically important species of fish have also been recorded from Kabar. Considering its rich diversity, Kabar was declared as a protected area in 1986 under the Wildlife (Protection) Act, 1972.

Despite its rich diversity and role in local livelihoods, Kabar has been under tremendous anthropogenic pressure and is rapidly degrading. Increasing upstream demand of water for agriculture and fragmentation of hydrological regimes through construction of dykes and channels has led to overall reduction in water availability, sedimentation and overall shrinkage in area (by over 800 ha during 1984 – 2002). The hydrological connectivity with River Kosi has been almost severed by choking of the connecting channels. *Phragmites karka* and *Eichhornia crassipes* infest the wetland growing luxuriantly on the nutrient enriched waters from the runoff of adjoining agriculture fields. There is an intensive pressure on waterbird habitats through poaching (prior to declaration of the Sanctuary) and more lately through poisoning. Dispute on land ownership has further impacted effective implementation of provisions of Wildlife (Protection) Act. Increasing pressure on expansion of agriculture through drainage of the wetlands is a big deterrent to community

participation in management of Kabar. The overall availability of water in the region has declined as the riverine flows have limited connectivity with the wetland. With construction of embankments, the risk of waterlogging and impeding loss of human lives and assets due to breaches has significantly increased.

Risk assessments conducted in the Gandak – Kosi floodplains distinctly highlighted degradation of Kabar Taal and associated wetlands as one of the key factors contributing to high vulnerability of communities to disaster risk. PfR partner – Caritas generated local evidences on the state of wetland. This was used as a basis for a dialogue with World Bank which is currently supporting capacity building on environment management within the Government of Bihar. A joint project on integrated planning for restoration of Kabar Taal and building capacity for wetland management in Bihar emerged from these efforts. The World Bank assistance will be used to formulate an integrated management plan for Kabar Taal wetland complex. In the work done since October, the Government of Bihar has also evinced integrated in constituting a State Wetland Authority to provide the base institutional arrangement for wetland management.

MANAGING CLIMATE RISK

4. Participatory Scenario Planning in Africa (ALP)

(Source: *CARE 2013* Case study adapted from: *Participatory Scenario Planning Brief: Decision-making for climate resilient livelihoods and risk reduction: a participatory scenario planning approach).* http://www.careclimatechange.org/files/adaptation/ALP_PSP_Brief.pdf **)**

CARE's Adaptation Learning Programme (ALP) for Africa, launched in 2010, aims to increase the capacity of vulnerable households in Sub-Saharan Africa to adapt to climate variability and change. Supported by the United Kingdom's Department for International Development (DfID), The Ministry of Foreign Affairs of Denmark, The Ministry of Foreign Affairs of Finland and the Austrian Development Cooperation, the ALP is being implemented in 40 communities across Ghana, Niger, Mozambique and Kenya, working in partnership with local civil society and government institutions. ALP is developing and applying innovative approaches to Community-Based Adaptation (CBA) to generate and promote best practice models, empower communities, particularly women and vulnerable socio-economic groups, to have a voice in decision-making on adaptation, and thus aims to influence national, regional and international adaptation policies and plans. ALP's work has shown that differential vulnerability and capacity of different groups and individuals to respond to the impacts of climate change, along with their valuable knowledge, must be taken into account when developing responses. And that adaptive capacity is central to building resilience and involves developing processes and capacities which enable continued response to a changing and uncertain climate over time.

Participatory Scenario Planning (PSP), as used by ALP, is a mechanism for collective sharing and interpretation of climate forecasts. PSP is conducted as soon as a seasonal climate forecast is available from meteorological services, meaning it occurs as many times in the year as there are rainy seasons in that particular area. In a workshop setting over one to two days, PSP brings together meteorologists, community members, local government departments and local NGOs to share their knowledge on climate forecasts. The workshop creates space for sharing climate information from both local and scientific knowledge, discussing and appreciating the value of the two sources and finding ways to

interpret the information into a form that is locally relevant and useful. This is achieved by participants considering climatic probabilities (which are an expression of the uncertainty in the climate forecast), assessing their likely hazards, risks, opportunities and impacts, and developing scenarios based on the assessment. Discussion of the potential implications of these scenarios on livelihoods leads to agreement on plans and contingencies that respond adequately to the levels of risk and uncertainty. Participatory Scenario Planning helps make the link between community plans and local government response, support and higher level plans.

Among the main objectives of a Participatory Scenario Planning approach are to:

1. Facilitate access to and shared interpretation of climate forecasts to generate information which can be understood and used, taking risk and uncertainty into account;
2. Assist communities and local governments to agree on options, make decisions, develop and plan for climate-resilient livelihoods (by knowing forecasts and probabilities so as to spread and manage climatic risk);
3. Promote the integration of climate-resilient livelihoods and disaster risk management into local government planning processes;
4. Create a common platform for climate communication which respects, reviews and combines knowledge from communities and different groups within them, meteorological services and service providers;
5. Link government and community actors to enable response and support to community action plans and empower communities through improved contacts and relations.

Since 2011, ALP has facilitated PSP workshops using seasonal climate forecasts, helping communities in Kenya and Ghana to adapt to seasonal climate variability. This is in recognition that changes in seasonal climate patterns are occurring within long term climate change and adaptation needs to address both the short term and long term changes. ALP plans to develop similar fora using projections of climate change over 10, 15, 20 years to inform long term scenarios and plans for adapting to climate change, building on ongoing scenario planning in programmes such as the Climate Change Agriculture and Food Security (CCAFS) Programme.

The success of the PSP approach lies in its combination of knowledge systems. PSP enables meteorologists and the participating local governments to understand this so as to provide relevant information and services to meet local adaptation needs. This highlights the importance of continuous access, understanding, communication and use of climate information to assess local risks and plan for livelihoods and DRR at the local level. It underscores the fact that change is continuous; hence adaptation to climate change means a constant process of adjusting to current and anticipated climate in a manner that enables communities to remain resilient and continue developing sustainably.

CONFRONTING CLIMATE CHANGE

5. Adaptation through DRR: Early warning systems for GLOF in highland Peru (Proyecto Glaciares, COSUDE)

Peru has one of the largest concentrations in the world of tropical glaciers. Most of these are located in the Cordillera Blanca in the Department of Ancash, in northern Central Peru. These high mountain ecosystems have always been prone to major geophysical events, such as the 1970 Ancash earthquake which triggers a glacier lake outburst flood from the Huascarán glacier and a debris flow that destroyed the town of Yungay, leaving 20,000 dead. With climate change, many of these glaciers are retreating fast and the glaciers lakes they leave behind are highly unstable and constitute a growing threat to populations in the valleys below.

In order to avoid another tragedy like Yungay, the Peruvian government and the Swiss Development Cooperation started to work with CARE Peru and the University of Zurich on a project aimed at improving the national and local capacities for monitoring these high mountain glaciers and associated lakes, and designing early warning systems with communities located downstream from potentially dangerous glacier lakes.

The Glaciares Project has contributed to strengthening the technical and scientific cooperation between Peruvian institutions and Swiss researchers specialized in the monitoring and modelling of glaciers. It also is helping build local capacities in the town of Carhuaz to adapt to a changing high mountain environment and to manage emerging risks from Glacier Lake Outburst Floods (GLOF), by setting-up early warning systems. Both national and local municipal institutions are also involved in managing these early warning systems.

Modelling of different flood scenarios, also help local authorities to identify the potential hazards for the town of Carhuaz, through the mapping of debris flows (See Fig. 8)

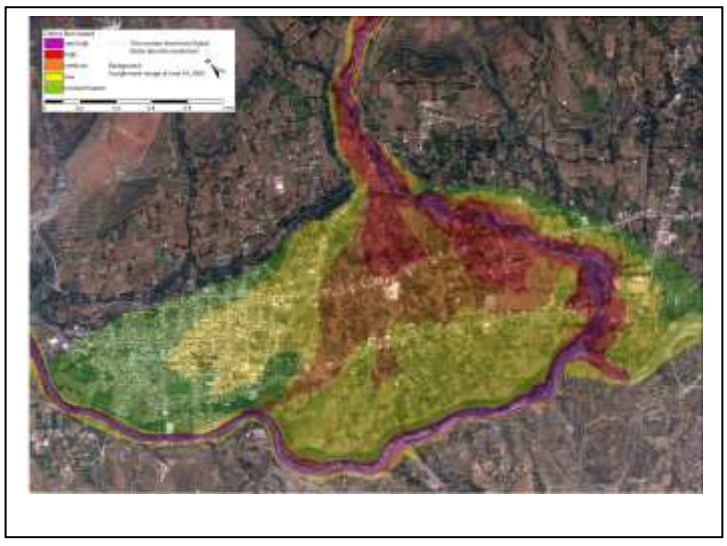


Figure 8: Map of potential debris flow near the town of Carhuaz, Ancash, Peru

(Source: *González, C. El Sistema de Alerta Temprana para Carhuaz, paper presented during the Foro International sobre Glaciares, Huaráz, Julio 1-6, Proyecto Glaciares, CARE Peru, University of Zurich, 2013****)***

These debris flow maps along with monitoring systems help local authorities develop an early-warning system for GLOF and plan evacuation routes and disaster responses in the face of future climate related risks.

The main lesson from this case study is that while high mountain ecosystems are generally prone to extreme geophysical events (earthquakes, landslides), climate change is exacerbating the risks of glacier lake outburst floods (GLOF). Improved monitoring of glacier retreat and applied modelling of debris flows alongside capacity building of local authorities can improve the usefulness of early warning systems and reduce risks in communities impacted by climate change in the Andes.

Section III Towards an Integrated and Transformative approach to DRR and Adaptation

In the light of these case studies, this is timely opportunity to remind the reader of the original terms of reference established by UNEP for Thematic Area Six, in the preparatory phase of the UNISDR GAR2015. The core indicator for the thematic area is "Disaster Risk Reduction is an integral objective of environment related policies and plans, including for land use, natural resource management and adaptation to climate change". The review and the requested input papers must help respond some of the following questions:

1. *Is DRR getting adequate or increased attention in the global/regional policies and outcome documents relating to environmental management and climate change?*
2. *Are there good examples of DRR being hardwired into environmental policies and plans, including for land use, natural resources management and climate change?*
3. *Is there off take in the private sector for bringing in DRR into their environmental or natural resources management approach?*
4. *Is there more scientific evidence base being generated on the effectiveness of an ecosystem based approach to disaster management?*
5. *Is there increasing effort to link between climate change and disaster risk reduction at a systemic level?*
6. *Is there increasing realization in print and social media on the potential linkages between disaster risk reduction and better management of environmental resources?*

As the general principle underpinning the HFA Thematic Research is that this is a retrospective review looking forward. Input Papers should appraise change in understanding risk and how it is managed that has occurred in respective spheres since the adoption of the HFA, and in so doing, provide commentary on the degree to which the HFA has been fit-for-purpose, and consequently provide guidance as to how this might be more effectively represented in the successor framework to the HFA - including suggestions as to how its impact might be better measured.

Taking Stock of Adaptation Practice

Adaptation practice and policy is still clearly in its infancy. Much can be gained in adopting and building on existing DRR practice and in integrating community-based natural resource management approaches into the suite of adaptation options. Practice makes perfect but, more importantly, it should to pave the way towards a more nuanced and contrasted view of adaptation. Adaptation is no longer only a technical issue, an add-on to development practice, but rather one that forces us to look at the broader scheme of things. As Mark Pelling (2011) suggests we should rather refer to adapting *with* climate change, whereby it is a product of humanity's values, decisions and actions but also the result of its coevolution with the environment, so that neither environmental nor social change are independent from each other.

Seeing climate change as an internal challenge rather than an external threat also re-centers the debate around collective and individual responsibilities in the face of environmental change. As stated earlier, the political ecology of climate change means that there are common, but differentiated responsibilities in the face of common but differentiated impacts of climate change. Thus the focus of analysis shifts from individual solutions to the ambiguous role of institutions, organizations and governance systems in either compounding or constraining adaptation practice. As groups in society will compete over scarce resources, those most vulnerable are likely to bear a double burden of being the most exposed and the least able to respond and adapt. The role of local institutions, of knowledge sharing and of harnessing the buffering capacity of ecosystems can also become means of sharing the burden and protecting both ecosystems and vulnerable communities. From the Philippines to the high Andes, the case studies show that individuals and communities are facing up to the challenge, often weaving into this adaptive tapestry local and traditional knowledge, at times combined with forecasting, modelling and other technical tools, that can help monitor natural hazards, identify vulnerable segments of society and prioritize adaptation measures.

These case studies also point to the need for diversified approaches, recognizing that multiple adaptations take place and that by taking stock of adaptation practice there are more options to choose from (Pelling, 2011). This would also help address some of the shortcomings of current approaches, particularly in terms of DRR, where one group's adaptation may be another's risk. There is a vision effect co-existing with the scale effect, whereby not only does adaptation requires an adequate articulation of spatial scales but also a harmonization of policy visions between adapting sectors (Pelling, 2011:167). This explains why you find in most countries contradictory approaches to adaptation (e.g. impact-based and centered on infrastructural mitigation versus "softer" adaptation approaches such as EbA or CbA). Relatively little attention has been paid to non-structural, nature-based alternatives or to community-based strategies for managing natural resources, as the dominant adaptation discourse is still, in many countries, for engineered 'solutions' to climate change, despite the fact that they may be able to provide cheaper, more sustainable solutions with multiple co-benefits (Jeans et al., 2014). Some of the tools and approaches documented in these case studies can help assess levels of differentiated vulnerability, monitor a potential hazard and develop collective actions to reduce vulnerability, manage risks and plan for future climate conditions. However, there is also the need to build new institutions and governance mechanisms that can help bridge the gap between current policy intentions in National Adaptation Plans and local emergent, self-organized adaptation practice.

Scaling-up and Maladaption

As seen through the case studies presented in Section II, adaptation and DRR practice at the community level can achieve tangible results. However to reach broader and longer term impacts, local and national institutions need to be involved early-on to ensure implementation and delivery at different scales through coherent policy, legal and financial frameworks. However, this transition from local emergent

practice to sub-regional and national policy processes can also produce undesirable side effects, such as increased bureaucratic setups and processes, which often tend to empower more the technicians and political actors than those that have to live with risk and adapt with climate change (Rossing, et al, 2014). In such a context, only a transformative approach can really attack the root causes of vulnerability, as Pelling (2011) has spelled out.

Ultimately, maladaptation can be the undesirable side-effect of segmented visions and partial approaches to adaptation. As Hannah Reid (2014 :48) suggests : « *Just as local approaches to adaptation need to be integrated into broader social and political policy and planning frameworks in order to be scaled up effectively, they also need to be integrated into larger-scale issues relating to ecosystem functioning, such as watersheds, natural coastal defence systems and sustainable forest management plans. Without this, scaling up could end up being maladaptive in many natural and urban environments*.» Power relations and social marginalization also influence how scarce resources are assigned, such as in the case of access to irrigation water in Mendoza, Argentina, where the affluent wine producing oases upstream capture the resource and the poorer communities downstream in the plains end up with no access rights to water (Montaña, E. et el 2005, Abraham, E. et al 2009). Once again, the political ecology of adaptation here is not neutral, there are winners and losers.

Future DRR approaches under the new Hyogo Framework for Action, need to address these trade-offs between adaptation at different scales, and between colliding visions and ambitions of groups vying for limited resources. Building and developing institutions and the larger governance structure is thus crucial to scaling up adaptation measures in a policy context in most countries with dispersed and often conflicting interests (Agrawal 2010). These local and national institutions involved in regulating and driving adaptation policy will also need to be wary of the risks of maladaptation and the future risks that lie within apparently sound adaptation policy today.

Hardwiring soft approaches to adaptation

Finally, as the lead question suggests, there are good examples of DRR being hardwired into environmental policies and plans, including for land use, natural resources management and, in particular, in adaptation to climate change. This paper seeks to show this through a range of adaptation practice, both Ecosystem and Community-based, which actively incorporate DRR as a key component. There are also a number of initiatives such as Partners for Resilience that also seek to improve the management of natural capital to diversify local livelihood options, while actively reducing disaster risks.

The trade-offs and synergies between environmental concerns and social vulnerability are at the heart of the political ecology of adaptation as suggested in this paper. Adaptation practice is not just a technical approach to manage climate risks, but

rather it is value laden, and it often reflects complex governance arrangements. Unpacking these aspects will be critical to hardwiring DRR approaches into the emerging business of adaptation. It will require clear political leadership steer, and a great deal of wisdom. As Wisner et al (2012:790) reminds us: " *just the possession of knowledge is not sufficient. Wisdom means having the power to discern and judge which types of knowledge to use, and how to use them, under which circumstances, for which purposes and in whose interest or benefit."*

Conclusions

This paper seeks to assess the degree of integration of DRR into current adaptation practice, both from a Community-based and Ecosystem-based approach. The paper starts with a review of current thinking on the linkages between political ecology and socio-ecological approaches and disaster risk reduction approaches. A review of landscape and community practice, covering a range of local DRR and adaptation projects and governance processes, reveals a wide range of adoption of vulnerability assessment tools, modelling and participatory planning approaches. All point to a greater adoption of DRR practice in adaptation. However, adaptation practice is still incipient in most, and local DRR approaches can constitute effective stepping stones to achieve longer adaptation goals and address future climate risks. As a final reflection on the potential and limitations of current adaptation practice, this paper suggest that while scaling-up DRR practice into existing Adaptation policy requires an Integrated and Transformative approach to risk management. This in turn requires more carefully considerations of the social thresholds for progressive adaptation as suggested by Pelling (2011).There are inevitable trade-offs between adaptation and disaster risk management, as one community or sector's adaptation can be another's risk, through the facilitation of one and the marginalization of the other. And institutions, both national and local, can play a crucial role in mediating these extremes by managing risks across a broad spectrum of sectors and stakeholders. Hopefully, DRR score keeping through the GAR will be able to reveal how risk management can help reduce these trade-off and reduce vulnerability to current and future climate risks.

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