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Community level adaptation to climate change: The potential role of participatory community risk assessment

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Abstract

This paper explores the value of using community risk assessments (CRAs) for climate change adaptation. CRA refers to participatory methods to assess hazards, vulnerabilities and capacities in support of community-based disaster risk reduction, used by many NGOs, community-based organizations, and the Red Cross/Red Crescent. We review the evolution of climate change adaptation and community-based disaster risk reduction, and highlight the challenges of integrating global climate change into a bottom-up and place-based approach. Our analysis of CRAs carried out by various national Red Cross societies shows that CRAs can help address those challenges by fostering community engagement in climate risk reduction, particularly given that many strategies to deal with current climate risks also help to reduce vulnerability to climate change. Climate change can also be explicitly incorporated in CRAs by making better use of CRA tools to assess trends, and by addressing the notion of changing risks. However, a key challenge is to keep CRAs simple enough for wide application. This demands special attention in the modification of CRA tools; in the background materials and trainings for CRA facilitators; and in the guidance for interpretation of CRA outcomes. A second challenge is the application of a limited set of CRA results to guide risk reduction in other communities and to inform national and international adaptation policy. This requires specific attention for sampling and care in scaling up qualitative findings. Finally, stronger linkages are needed between organizations facilitating CRAs and suppliers of climate information, particularly addressing the translation of climate information to the community level.

Keywords: Adaptation; Climate change; Disaster risk reduction; Disaster preparedness; Participatory rural appraisal; Vulnerability and capacity assessment; Community risk assessment

1. Introduction

In recent years, adaptation to climate change has received increasing attention, especially in the United Nations Framework Convention on Climate Change (UNFCCC) and among development and disaster specialists. Early approaches to adaptation took a "top-down" perspective, moving from global climate model scenarios to sectoral impact studies and then to assessments of adaptation options. Many have noted the important role of disaster risk reduction in climate change adaptation (e.g., IPCC, 2001b, 2007b; African Development Bank et al., 2003; UNISDR 2004b; UNFCCC, 2004; VARG, 2006). Yet relatively little disaster management experience has found its way into climate change adaptation research and policy. The disaster management experience provides insights in two specific areas that are also relevant to adaptation to climate change. The first consists of risk reduction involving 'normal' climate hazards at the local level, often using a place-based and bottom-up approach that aims to help those likely to be affected. The second involves the linkages of hazard risk to livelihoods, involving natural resource management, watershed

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management, income generating activities, and poverty reduction.

These elements are reflected in many grassroots-based disaster preparedness activities promoted by various organizations.[1] In this paper, we examine the experience of some of these in using community risk assessment (CRA).[2] This includes examples of vulnerability and capacity assessment (VCA), a method supported by the International Federation of Red Cross and Red Crescent Societies (IFRC) for use by its member National Societies around the world. VCA is carried out at the level of villages and urban neighbourhoods, and uses participatory rapid appraisal (PRA) tools to diagnose vulnerabilities, assess a community's risk priorities, and work together with the people to devise ways of increasing their capacities to resist hazard impacts.

The essence of this paper is to demonstrate the value of CRAs as a means to foster participatory local adaptation to climate change that is focused on people's vulnerability, livelihood, coping and adaptive capacity. However, there are significant challenges in using the CRA approach. It is resource intensive, and yet for meaningful results it needs to be applied in a large number of communities. And there are issues about how to ensure that information from CRAs can be scaled-up and used to ensure that policies and activities that impede adaptation are removed while those that promote it are supported.

Section 2 provides a brief conceptual and historical background on the relevance of community-based disaster risk reduction for climate change adaptation. Section 3 introduces the key methods for community-based disaster risk reduction using CRA (and its inherent participatory rapid appraisal (PRA) tools), and discusses their use in the VCAs used by the Red Cross/Red Crescent. Then in Section 4 we assess the potential role of CRA in adaptation to climate change, illustrated by case studies. Section 5 summarizes our findings.

2. Inadequacies of 'top-down' approaches to climate change

Climate change was first put on the environment and development agenda by scientists working with global models of the atmosphere. From this basis the climate change problem has been socially constructed as a pollution problem, and the UNFCCC and its Kyoto Protocol have been primarily directed at efforts to reduce emissions. The task is extremely complex: the shift away from fossil fuels faces considerable technical and economic challenges, and is bound up with many political disputes. These are concerned with the validity of the scientific arguments, and also the questions of cost, equity, and responsibility. While research has shown beyond reasonable doubt that emissions of greenhouse gases from human activities are already changing the earth's climate (IPCC, 2001a, 2007a), this has been insufficient to achieve international agreement on their reduction. As a result, attention has increasingly focused on how to cope with changing climate, and to give *adaptation* a more central role in the international response to climate change.

The initial approach to adaptation was dominated by the top-down thinking derived from the original characterization of the issue as a global environmental pollution problem. The best-known formulation is to be found in the *IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations* (Carter et al., 1994). These guidelines have been widely adopted in numerous studies of impacts and adaptation, including the US Country Studies (US Country Studies Program, 1996), the Netherlands Climate Change Studies Assistance Program, and the United Nations Environment Programme's Country Case Studies on Climate Change Impacts and Adaptations Assessments (UNEP, 2000).

All these studies, which have been called the classical or first generation of impact and adaptation studies (Burton et al., 2002), share an approach that begins with climate change scenarios derived from Global Climate Models, often in a scaled-down version or regional scenario form. These are then "applied" to some specific target or exposure unit in order to model the impacts of that scenario on that unit. The scenarios include only a simplified version of the climate of the locality, and have commonly been limited to changes in mean temperature, rainfall, and sea level. For example, in climate-crop models the impacts of the projected changes in mean temperature and rainfall are projected on specific crops such as wheat, maize and rice. In a classical study characteristic of the genre the resulting changes in crop yield are characterized as "impacts of climate change" (Parry and Rosenzweig, 1993).

While these studies have made significant contributions to the theoretical understanding of potential climate impacts, their deficiencies soon became apparent. Perhaps the most important is that the climate scenarios provide only a very simplified characterization of the full array of significant climate variables (Smit et al., 2000). Crop yields, for instance, are sensitive to temperature variability and extremes, seasonality, rainfall distribution and many other local and microclimatic effects. The scale of the scenarios (generalized over large areas) and their limitation to mean

[1] Examples include international NGOs such as Oxfam, ActionAid, Save the Children, Christian Aid, Tearfund; developing country NGOs such as Citizen's Disaster Response Centre (Philippines); Third World networks such as La Red (in Latin America), PeriPeri (in southern Africa), Duryog Nivaran (in south Asia); and other organisations like the Asian Disaster Preparedness Centre, Disaster Reduction Unit, as well as umbrellas like the ProVention Consortium and the UN ISDR (International Strategy for Disaster Reduction).

[2] Community risk assessment is a generic term adopted by ProVention Consortium to cover the many methods used by NGOs and other organisations to assess local and community vulnerability and capacity. ProVention (an international consortium of organisations involved in disaster reduction) has compiled a resource base of these CRA methods that is available on its website at: http://www.proventionconsortium.org/CRA_toolkit.htm. As part of this resource base, Davis et al. (2004) provide an excellent overview on the experience in applying CRA.

temperature and rainfall calls into question the validity of the estimated impacts.

A second criticism of the classical scenario-driven approach is that it focuses on future climate. Hence, it tries to address how uncertain impacts can be reduced by the process of adaptation under unknown future socio-economic circumstances. The normal practice has been to assume that adaptation is a function of available adaptation technology and knowledge, and to apply either a 100% full adaptation, or 50% partial adaptation. Such a simplification begs many questions concerning adaptive capacity. Do the affected communities have access to the existing technology? Can they afford the technology? Are they receptive to it and motivated to make the necessary changes? Do they possess the necessary skills, knowledge or awareness to want to adapt and be able to do so? What other stresses are they subject to? How are their potential adaptation choices affected by the social, economic, political, and environmental circumstances in which they live? These complicating questions have not been generally addressed in the classical scenario-driven approach. Research papers and the sections on adaptation in National Communications under the UNFCCC normally go no further than to provide a list of possible adaptation options.

Growing dissatisfaction with the top-down scenario-driven approach has led to the search for adaptation methods relevant at the local scale, and for ways to work from the bottom-up. This was first articulated in the UNEP Guidelines (Feenstra et al., 1998), but more fully captured in the Adaptation Policy Frameworks for Climate Change (APF) (UNDP, 2005). In this context, working from the bottom-up has two dimensions. Firstly, the assessment process closely involves local stakeholders. Secondly, instead of using global model scenarios far into the future, the assessments should examine vulnerability to current climate variability and extremes, as well as the current adaptation strategies, policies and measures, based on actual experience at different scales. Thus the initial step in the analysis is not theoretical and future oriented, but empirical and based on actual observation of current climate risks and how communities cope with them. On the basis of this existing knowledge, the dimension of new risks (of which those communities have no experience) can be introduced, and assessed in the context of current experience and knowledge. This approach can include information on broader changes (including demographic and socio-economic processes) as well as direct climate and indirect climate-related risks such as new or changing pests and diseases.

Several programs and studies that draw upon the APF have been initiated, including a regional project in Central America, Mexico and Cuba (UNDP, 2002); and several studies under the AIACC project (Leary et al., 2005) and its follow-up ACCCA (START, 2006). Other adaptation programs, such as the World Bank's Kiribati Adaptation Program, have been taking similar approaches (e.g., World Bank, 2006). Some of these studies have also started to explore the use of community-based vulnerability and capacity assessments (Adger et al., 2003; Adger, 2003). This paper explores the potential contribution of the CRAs applied in the disaster management community.

3. Participatory methods for disaster risk assessment

A number of knowledge strands have been woven into the evolution of such participatory risk assessments. The principal component is derived from the work of Chambers and others in the early 1980s, which established methods for 'participatory rural appraisal' and related techniques for acquiring information at the grassroots concerning people's livelihoods and daily existence (Chambers, 1983, 1994). In a sense it could be described as 'quick and dirty but with empathy': its intention is to collect information, be rooted with people in their communities, to foster their active participation in the process, and provide the basis for them to discover their own means of solving their difficulties. Although used by researchers, these methods are especially favoured by developing NGOs in order to foster their relations with communities and assist in the design and operation of development projects. In subsequent years this approach has become almost 'mainstream', has diversified into a wide range of tools for rural and urban settings, and was used in a major global survey of poverty by the World Bank (World Bank, 2000).

A second major strand emerged in the 1990s, and is best represented with the work of Anderson and Woodrow (1989) in relation to disaster relief. They argued that emergency assistance must involve the participation of affected people in the practice of recovery through development. This was supported by a capabilities and vulnerability analysis methodology, based on the commitment not to treat affected people as helpless victims, but rather as agents in their own recovery, and whose capacities should be acknowledged as a source of strength. While their approach is linked mainly to recovery, it was apparent that the methodology could also be adapted to disaster preparedness at the community level. In that context, it informed the development of the VCA methodology that was adopted by the International Federation of Red Cross and Red Crescent Societies (IFRC) in the 1990s (see, e.g., IFRC, 1999).

Three other relevant approaches emerged in the 1990s that specifically incorporate elements of hazard risks within a broader analysis. All three focus on livelihoods and related transactions (of household outputs, labour, inputs etc.) as the key framework for investigating the status and changes going on in localities. The first is the entitlements approach developed by Sen in his work on famines. This highlights the significance of different types of entitlements in the determination of levels of hunger in different households and groups of people (Sen, 1981). Second is the access model developed in the work of Blaikie et al. (1994), Wisner et al. (2004), which links people's

differential access to resources as a principle determinant of their level of vulnerability to hazards. Third is the sustainable livelihoods approach that has been supported by the UK Department for International Development (Carney, 1998; DFID 1997).[3] This last approach emphasizes the varying access of each household to a bundle of 'capitals' (basically these are also production or wage-enabling assets or entitlements, usually summarized as natural, physical, human, financial and social capital) as a determinant of livelihood success. This is then linked to disturbances such as trends in climate or commodity prices, and shocks such as natural hazard impacts.

In all these approaches, there is acceptance that development and disaster preparedness interventions must operate at the level of the relatively small entities that are commonly called 'communities'.[4] The goal of such investigations is generally to support the design of programmes (for national-level priorities) and activities (with the communities themselves). However, an important part of the purpose of the intervention is for the investigation to catalyse a process that empowers the people in the community and supports their capacity to alter their own situation. Through engagement with the grass roots, the activities that emerge will have the people's 'ownership' and participation, be based on trust and therefore have more chance of success. In community-based organizations (CBOs) and NGOs around the world, such local investigations have produced a wide range of disaster preparedness activities in communities (community-based disaster preparedness, or CBDP projects), and made a significant impact, partly also through advocacy for disaster preparedness at the national and international level (e.g., ProVention, 2007). The CRAs that we focus on here have been used by many NGOs, Red Cross and Red Crescent societies (the VCAs alone in more than 80 countries in all parts of the world).

3.1. Community risk assessment tools

The investigations gather information of many different types, typically including data about livelihoods, their resilience, local risks and hazards. The methodology involves using a range of PRA information-collecting tools, some of which can be adapted for use in building up awareness and capacities for adaptation to climate change (or, for that matter, to incorporate other trends in risks). These include risk mapping, transect walks, asset inventories and livelihood surveys, historical and seasonal calendars, focus group meetings, surveys and discussions, and key informant interviews (e.g., IFRC 2006c; ActionAid ND/2006).[5] The process should be carried out by trained facilitators (professionals or volunteers), who are intended to act as catalysts to engage members of the community to organize their own experiences and prioritize ways to address the issues they face. In addition, the facilitators make secondary data available in the process to provide context to the community-based information, or to validate their findings.

Some of the methods can be adapted for use in determining community-based adaptation to climate change. Transect walks involve members of the outside investigation team walking through the community with the local people to record significant social and physical features of the area, including hazards of all types. It is a valuable step for gaining the confidence of local people. It can also be adapted in order to identify ways that climate change may have an effect on the locality, either through the intensification of existing hazards, or increased risks to livelihoods through changing trends or new pests and diseases.

Risk mapping is a more elaborate and comprehensive way to assess dangers and trends. It involves using meetings involving different groupings of people in the community who identify what they consider to be the main hazards they face.[6] There are several important issues that usually arise from this process. Significantly, the hazards identified locally (and the priorities given to them) tend to differ markedly from the expectations of the outside agency that has initiated the CRA. Typically, local people highlight health problems, drinking water, crime and security, unemployment, poverty, and traffic accidents before they mention natural hazards.[7] This reinforces the need for outsiders to understand that for most people, the main problem is daily life and livelihoods. A participatory approach to adaptation must respect people's priorities

[3]It is supported by a website, with tools and documents available in several languages at: http://www.livelihoods.org.

[4]Although we use the term 'community' throughout this paper in an uncritical manner, we are aware of the dangers of assuming that the people who happen to live together in a particular location are a homogenous, mutually supportive collection of people with the same interests. For the purpose of argument in this paper we have left aside these issues and problems in order to emphasis the point that disaster risk reduction and adaptation to climate change need to involve assessments and activities at the grass roots. This does not mean that issues of class differences, cultural divisions, gender conflicts and so on should be ignored. A very useful comment on this in the context of CRAs is given by Allen (2006, pp. 84–85). Many CRA investigations involve tools that compile information on all of these factors that act as 'dividers' between people, as well as the issues that 'connect' them and enable collective action, in this case against disasters.

[5]For a comprehensive library of CRA methods, see the ProVention Consortium website http://www.proventionconsortium.org/CRA_toolkit.htm.

[6]In 2001 the UN International Strategy for Disaster Risk Reduction (ISDR) held a competition for risk mapping as a means to promote its use. The results give an idea of what can be done, and can be seen at http://www.unisdr.org/eng/public_aware/world_camp/2001/pa-camp01-winners-riskmap-eng.htm. The approach used by the NGO Tear Fund is described at: http://tilz.tearfund.org/Publications/Footsteps+51-60/Footsteps+56/Risk+mapping.htm (both accessed 23 September 2006).

[7]There may also be significant differences within the community in both the identified risks and their ranking. For instance, women often have a different list and different priorities from men. Some organisations carry out workshops with children, and these also often find different perspectives from those of adults.

and can only deal with hazards in the context of promoting "development" in the wider context. This is important in relation to adaptation to climate change: while all communities are at least aware of 'normal' hazards they face (even if they do not get top priority), most are unaware of the increased dangers resulting from global warming. The climate change agenda is therefore something that is most likely to be "brought in" through the advocacy of the outside agency. Risk mapping can provide that participatory opportunity because it already requires the outside agency to work with the people to engage in disaster risk reduction.

Historical and seasonal calendars are valuable tools to enable people to identify both serious hazard impacts and trends. The first encourages people to recall hazard events in their lifetime, and those in the 'folk memory' of the community. The information from these tools must be interpreted with caution: recent events are likely to mask earlier ones, severe impacts may overshadow by lesser but still significant disasters. Memory of hazard events is often incomplete or distorted, and may vary between different groups of people (e.g., men and women). Calendar reconstructions therefore cannot provide quantitative data on climate trends or events, even though they may offer valuable qualitative information that is unknown to outsiders and hidden from national-level data or histories. A particular risk occurs when outsiders suggest that they are particularly interested in the problem of climate change. This may induce people in the community to reinterpret 'normal' cycles and trends (some of which may have long-term patterns) in that context—especially when projects and funding may follow. It can also produce inappropriate or misleading ideas about how such trends might be projected into the future.

On the other hand, the use of tools like these is also a powerful means to encourage recognition of significant threats, and to engage the people in activities that can help reduce hazard impacts. Awareness of trends, regardless of the many causes, can be a first step in addressing changing risks. Further explorations could include using the calendars to work with the community by looking at various "what if?" scenarios for increases in frequency or intensity of climatic events, and the possibility of adaptation.

Seasonal calendars are more livelihood focused, and record the annual cycle of economic and social activities, their connections with climate events (e.g., monsoon, rainy and dry seasons) and seasonal hazards (including diseases and pests). Again, this tool may reveal information about climate trends (some of which may have been noticed by the people themselves), and also provides the basis for participatory methods for adaptation.

3.2. Challenges facing CRAs

One challenge relating to the application of CRAs for disaster risk reduction is that of coverage. A CRA requires outside facilitators who spend considerable time with the community. Reaching a sizeable number of communities is a human resources challenge. Organizations sponsoring CRAs should be aware of the trade-offs between a comprehensive process that elicits lots of information and makes a significant contribution to risk reduction planning; and the need to keep things simple to be able to quickly train a large number of facilitators.

A second, related challenge involves the limitations in what can be dealt with at the community level. CRAs and community-based disaster risk reduction programs cannot encompass all aspects of hazards or people's vulnerability. Some hazards (e.g., earthquake threats in urban areas) require attention to be paid to the quality and structure of buildings: this is not something a community can easily address through their own actions. Many floods are large scale: mitigation measures are not something easily attempted by a community on its own, and their influence over upstream 'causes' (e.g., in watershed management) may be very limited. In such cases, the organization leading the CRA must take these issues up at levels higher than the community itself.

Integrating climate change actually increases the difficulty of meeting these two challenges. Paying attention to trends, and the inclusion of secondary data, adds to the complexity of the CRA process, and conflicts with the desire to keep it simple so that it can be carried out without too much external assistance. Similarly, it adds extra dimensions to the analysis of the results, and to the translation of these results to policy issues.

Another challenge facing organizations that engage in CRA interventions is that they highlight problems that may not be related to the hazards that are the main concern of the investigators. Often the crucial hazards that prompted the CRA (such as floods, landslides or storms) are low down on the communities' own list. Priority is given to everyday problems, including many that are related to the maintenance of livelihoods, or are the consequence of inadequate livelihoods. Sometimes their reluctance to prioritize the local natural hazards arises because people have adapted to living with them.[8] It may also result from fatalism, which in turn springs from a sense of powerlessness and inability to change the circumstances of daily life. Successful CRAs can empower communities to overcome such fatalism, and to integrate disaster risk reduction into livelihood strategies.

On the face of it, this challenge suggests that the CRA methodology may not to be conducive to helping adaptation to climate change—climate change is generally not among communities' key concerns, and in many cases they may not even be aware of it. But it is precisely the grounded response of people to their immediate needs and

[8]While most CRAs are carried out in developing and transition countries among people who are mostly poor or very poor, this also perhaps resonates with the situation in richer countries (as in California's earthquake-prone areas, Australian cities at risk of wildfires, European cities at risk of flooding) where people's behaviour is not readily modified even when they are aware of significant risks and their recent occurrence.

risks that can provide the basis for others to work with them to assess the measures they can take for dealing with additional trends, shocks and increased uncertainty; not on a stand-alone basis, but integrated into broader livelihood strategies. Two of the most commonly identified 'hazards' that people mention are health and drinking water supply, both of which are likely to be seriously affected by climate change. It is therefore possible to relate climate change information from 'outside' to the experience of the communities involved in CRA, and to integrate risk reduction activities into the results of the investigation.

3.3. Other issues requiring attention in adaptation to climate change

Adaptation at the community level means being able to maintain (and preferably improve) the current living standards in the face of expected changes in climate trends and the intensity and frequency of severe events that may affect people's livelihoods. It is therefore important for CRAs to investigate the strength of people's current resilience and capacity to adapt. Such capacities typically involve a range of coping measures (for instance, access to extended networks of mutual assistance and other forms of social capital, cropping adaptations informed by local knowledge of climate indicators, adjustments to expected slow-onset floods, drought preparedness in semi-arid areas). These may not be sufficient to cope with the new challenges brought by climate change. The CRA process must then assess what can be done to reduce this 'capacity gap' that results from people's lack of experience in dealing with worsening trends or extremes. Moreover, some of the new risks may actually undermine existing capacities and abilities to cope.

There is a further problem related to this, although it cannot be addressed fully in this paper. In Section 3 we examined some of the knowledge bases that have informed the emergence of vulnerability analysis and CRA approaches. These all acknowledge that vulnerability is not something that is generated only at the local level: there are 'root causes' of vulnerability that can be traced back through the myriad processes and linkages that connect people at the grass roots with the national and international political economy. These are remote from the people in their communities: it is difficult (though not impossible) to affect them in order to reduce local vulnerability. For instance, based on work in community-based disaster preparedness (CBDP) in the Philippines, Allen comments:

> Although politically contentious issues like government plans to strip coastal mangroves to make way for urban development or clandestine upland logging by well-connected individuals are recognised both within government and Red Cross circles, CBDP as currently practiced provides little space within which to discuss, much less attempt to address, such issues. Given the complexity and the political nature of the debate surrounding the causes and impacts of climate change, this is of particular concern. (Allen, 2006, p. 90)

It is important that work done in CRAs acknowledges the areas in which people can influence their vulnerabilities and explore the potential for reducing the impact of the root causes through collective action.

An implication of all this is that the climate change component of CRAs does require the imparting of knowledge to the community from 'above'—or at least from outside. At the moment, unlike other key issues in development (e.g., HIV/AIDS awareness, gender equality, campaigning on genetically modified organisms, microfinance) there is very little grassroots awareness or campaigning on issues of climate change. As a result, while many communities may be open to the idea of dealing with known hazards through CRA, they lack the knowledge of the additional risks related to climate change. But as Rojas Blanco comments:

> Not only do local communities have the right to be informed about the ramifications of climate change, but also they are capable of generating solutions likely to work at their level. (Rojas Blanco, 2006, p. 141)

It is outside agencies that are driving this agenda, and they must deal with the problem that information will be transmitted in a top-down manner (especially as it is complex, involves uncertainties, and can induce anxiety or fatalism).

4. Can community risk assessment help in local adaptation to climate change?

We explore this by examining current experience of CRAs, including examples of recent Red Cross/Red Crescent VCAs, drawing on a review of Red Cross applications of VCAs (IFRC 2006d). To what extent do these CRAs (which were carried out without specific attention for climate change) already help to address the disaster risks associated with climate change? How might they be strengthened specifically to address the changing risks and bolster adaptive capacity? At the end of the section, we highlight emerging experiences from two recent sets of VCAs that explicitly incorporated the perspective of a changing climate.

Unfortunately, there has been little systematic effort to evaluate the effectiveness of assessment methodologies and particularly of the resulting risk reduction strategies. Our findings are based on a large body of qualitative evidence and experience of practitioners, as illustrated in these case studies. While we believe that the evidence is sufficiently strong to support our conclusions, further work in this area should include more rigorous evaluations, including longitudinal studies of specific CRAs and the resulting risk reduction programs.

4.1. Case studies

We begin with case studies of Red Cross VCAs, chosen to represent a variety of applications of CRA. The first example is of a VCA done in 2005 in Linda Vista, a suburb of about 7500 people outside the Costa Rican capital San Jose (Costa Rica Red Cross, 2005). Linda Vista is situated on steep slopes prone to erosion and landslides, with a significant part liable to sudden loss of lives and houses. The village was only established around 1970, and grew mainly during the economic crisis in the 1980s, when it attracted a large number of illegal settlers. It still houses a large number of Nicaraguan migrant workers. Employment is mainly in the construction and commercial sector, but unemployment is very high: people initially identify lack of jobs and poverty as their main problems.

The second case is a much larger assessment in the disaster prone district of Sinazongwe in the Southern Province of Zambia, which covers 5000 sq km of hilly terrain, with an arid climate and uneven rainfall (Zambian Red Cross, 2003). The livelihoods of its 80,000 inhabitants are based on agriculture and fisheries. Just before the VCA there were three consecutive years of poor rainfall that led to severe food insecurity, and triggered the selling of valuable assets such as livestock. Together with the AIDS epidemic, this severely increased vulnerability and exhausted people's coping capacity.

The third case is a comprehensive community-based disaster preparedness programme (CBDP), started in 1998 by the Cambodian Red Cross (CRC) (International Institute for Disaster Risk Management, 2002). This program started with community-based assessments but also included follow-up activities at the community level, and was embedded in efforts to improve disaster management at the national scale.

The assessments involved typical PRA tools such as community maps, historical profiles, seasonal calendars, transit walks, as well as focus group discussions and interviews. In Costa Rica, the community clearly highlighted the risks of landslides and the threats to houses and lives. However, the VCA also brought up several other issues unrelated to natural hazards, such as fire risk caused by inadequate electricity supply systems, and drug abuse. Solutions identified included a survey of houses for disaster preparedness; zoning to prevent building on steep slopes; joint solid waste management and protection of drinking water, particularly by reinforcing septic tanks and constructing more septic collection facilities[9]; and the preparation of evacuation plans and establishment of an early warning system. In addition, the community decided to start anti-drugs campaigns, establish community security committees, and improve the electricity supply system (to prevent fires).

In Zambia, the VCA identified drought and food security, but also poverty, HIV/AIDS, pollution, flash floods, landmines (mainly near the border with Zimbabwe), malaria and other health issues relating to water quantity and quality. Many of these issues are closely interlinked: drought directly affects water quantity and quality, and can also result in poverty. Indirectly, food shortages related to droughts may force women into commercial sex, thus increasing the risk of HIV/AIDS. The VCA also noted that disasters increase the district's dependency on external assistance to mitigate disaster impacts. By contrast, the VCA process itself helped to bolster an attitude of self-help. This included a number of drought risk measures, such as environmental conservation awareness in schools and communities (leading to reforestation efforts), water harvesting schemes, irrigation schemes, and sustainable agriculture practices. For malaria, communities identified methods such as cutting of grass and general cleaning of surroundings; spraying of stagnant ponds to repel mosquitoes with traditional methods (herbs and cow dung); and the use of bed nets. Among key capacities to deal with disasters, however, communities emphasized alternative livelihoods, rather than specific risk mitigation measures.

In the case of the Cambodian CBDP programme, the assessments were followed by micro-projects constructed with local contributions. These included small bridges to facilitate evacuations; culverts to help floodwater recede faster (saving crops); dams that facilitate evacuation but also allow the impounding of water to irrigate a second crop. The latter example again highlights communities' focus on livelihoods. Besides the physical measures, the Cambodian communities reported an increase in social and organizational capacity, higher motivation to contribute to the village's disaster preparedness, and a reduced sense of dependency on external assistance. These sentiments were strongest in areas where the micro-investments had actually already proven to be effective in reducing the effects of flooding.

To illustrate how community involvement can facilitate local-level adaptation through specific types of interventions, we also refer to the experiences in Kitui, a drought prone district of Kenya, where a local NGO has worked for more than 10 years on projects that are now recognized as a significant factor in enabling communities to cope with climate change (Lasage et al., 2006). The organization SASOL works with communities on one major type of project: the construction of sand dams. These are built on small ephemeral streams that are fed by two rainy seasons. Cement retention walls are built across the stream by members of the community, and the upstream side is filled with sand. This becomes saturated during the rainy seasons and forms an artificial aquifer. It is

[9]The problem with the sewage issue is that the settlement lacks any piped sewage disposal, so many houses use a septic tank system. The buried tanks leak into the soil, and so contribute to the landslide risk. But there is also abuse of the systems when during heavy rain some people open the valves to take advantage of the runoff to empty their tanks. This poses a serious health threat to the community itself, and others downstream.

much less prone to losses from evaporation than open water reservoirs.

The stored water is used for a number of purposes, including drinking, crop irrigation, and for making mud bricks for house construction. These all have very positive effects on livelihoods (including reducing time spent on water collection). They not only enable the people to cope with existing climate fluctuations, but is expected to help reduce enhanced risks from climate change. A total of more than 400 sand dams have been constructed in Kitui district, and they have a very long life. The technique has also been used in Ethiopia and other parts of Africa, and is also supported by other organizations, such as Practical Action (formerly ITDG). These solutions appear to be compatible with community needs, and draw on their own capacities to collaborate in their construction and management. CRAs can help identify such opportunities, building on community capacities to reduce their vulnerability to climate variability and change.

4.2. Focus of the VCAs: hazards and livelihoods

The experience of using CRA in many communities around the world has shown that it can produce an alliance between an outside agency (e.g., NGOs or national Red Cross/Red Crescent Societies) and the community. It motivates people in the community to change things so that they have more control over their own lives. It often revitalizes the outside organization and redirects its purpose to working *with* the people rather than *for* them (IFRC 2006a, b). More fundamentally, it responds to peoples' own priorities and concerns about the risks they face. What this demonstrates is that people tend to be more concerned with everyday survival, and issues that directly affect their current or future livelihoods, rather than just the extreme hazards that organizations 'from outside' are concerned about. This is clearly quite significant—and worrying—in the context of supporting community adaptation to the increased risks of extreme events that will result from climate change.

In this context, it appears that dealing with extreme hazards and disasters needs to become an integral component of the development process, so that resilience to the impact of hazards is achieved without the people feeling that they are being diverted from their concern about their daily survival. This approach is already significantly developed in work on the interface between disasters and development (e.g., Blaikie et al., 1994; Wisner et al., 2004; DFID, 2004; Hewitt, 1983, 1997; UNISDR, 2004a; Pelling, 2003; UNDP, 2004). But it has not had a significant impact on much of the current practice in disaster management, where a very high proportion of spending is on relief and recovery. CRAs are beginning to show how the connections can be made. The challenge then is to form alliances with communities that help to connect the issues concerning livelihoods and everyday survival with the risks from extreme events.[10]

4.3. Can CRAs contribute to adaptation to climate change?

The challenge of linking risk management to the day-to-day development process is also crucial for adaptation to climate change, where the problem consists of the *trends* in temperature, precipitation, seasonality, intensity and so on, coupled with the problem of hazards that are possibly becoming more *extreme* and/or more *frequent*.

For instance, climate change projections for the part of Costa Rica that includes Linda Vista include rainfall reduction in the dry season, as well as a general temperature increase of a few degrees Celsius by 2100 (Costa Rica, 2000). In terms of extreme events, climate change may also result in an increase in rainfall variability, including more intense precipitation events (IPCC, 2007a). In Zambia, climate change will result in higher temperatures, and the average rainfall might decrease in some areas. Furthermore, there could be an increased risk of dry spells as well as intense rainfall events, and increased uncertainty in the timing of the rainy season (IPCC, 2007a). For Cambodia, climate change is projected to result in higher temperatures and precipitation, as well as increases in extreme events (IPCC, 2007a; Cambodia Ministry of Environment, 2002). There is limited information about precise impacts at the scale of the affected communities, but all of them face rising uncertainty and increased risks in relation to climate variability and extremes.

All of the measures identified by the VCAs to address the risk of climate-related natural hazards will help in some way to adapt to the new risks and uncertainties associated with climate change. In Costa Rica and Cambodia, the scale of existing challenges from floods and landslides suggest that climate change will not require different measures. However, the information about increasing uncertainty and risks may generate an even greater sense of urgency to take action. In Zambia, the current climate variability (possibly already including an element of the changing climate) has already pushed the region beyond the local coping capacity, affecting decisions about livelihoods (types of agriculture) and water distribution systems.

Hence, while CRA-based disaster risk reduction programs will generally already contribute to adaptation to climate change, they may also help to address trends in hazards (and rising uncertainty), as well as the consequences of trends in the average conditions. This would require CRAs to include appropriate external information about changing risks, and paying specific attention to communities' perceptions of changing conditions, as well

[10]The linkages between climate change and development, and between these different scales, are the subject of a recent report from the International Institute for Environment and Development (Huq et al., 2006).

as the way coping strategies are being applied, stretched, and possibly modified.

Because CRAs are tuned in to people's concern to protect their livelihoods, they can be used to assess the impacts of both climate trends and shocks on people's assets at the household level. They can also help the collection of information about climate, and initiate adaptation measures at the local level as a result of the community's involvement in the process. This adaptation will need to deal mainly with processes that are already under way, but may also include anticipatory adaptation to take account of future trends (e.g., through the adoption of new crop varieties) and changes in the occurrence of extreme events (e.g., through the retrofitting or relocation of buildings). This would require CRAs to examine trends that are already apparent at the community level, as well as make optimal use of secondary data.

4.4. Use of external information on climate change

There is no evidence that secondary data on climate change (or other climate information) was used in the VCA case studies (or most other VCAs and CRAs). It is difficult to interpret conventional climate change projections for the small areas involved in CRAs. In general, climate change can be projected relatively well for large areas in regard to changes in average temperatures and, to a lesser extent, changes in precipitation. In addition, there is some information about "simple" extremes such as heat waves, which represent the tail of a probability distribution with a shifting average (see e.g., IPCC, 2001b, Fig. 18-3).

It is much more difficult to project what will happen to smaller-scale atmospheric phenomena such as storms. And in particular, it is very difficult to get confident predictions for local risks, such as landslides resulting from changes in rainfall variability. In most cases, the main messages are that hazards are likely to become more frequent, and extremes to have a greater magnitude, and that uncertainty about the extremes will increase. Problems will arise especially for places that are not used to dealing with particular hazards, or are accustomed to lower levels of intensity: the dangerous impact of the hazards will fall especially on vulnerable people who do not have experience of them.

In the context of CRAs, this raises a bigger challenge than just uncertainty. When and how should information from outside be introduced, and how can the community be made aware of the analysis of trends they might not be aware of? In the case of infrastructure development, climate information can be included in a formal probabilistic or scenario-based analysis of future hazard risk to determine the optimal design (e.g., Hay et al., 2004). While such incorporation of climate information into infrastructure design still happens only rarely (a problem discussed in OECD, 2005; Burton and van Aalst, 1999, 2004), the uncertainties in the climate information do not pose a fundamental problem.

In the case of CRAs however, such information cannot be included in a simple technical manner. The strength of the process lies in part in its basis in actual experience, and in perceived local priorities; but of course this must also be integrated with the need to prepare people to cope with conditions that they have not yet experienced. Feeding new information about future trends into the assessment process has to be done very carefully, in order to prevent people from focusing only on that new information. It must also be done responsibly: some information may cause people undue anxiety about the timescale of changes that may affect them (e.g., about sea level rise and risks to low-lying islands). If introduced in the right way however, the information may help the community to arrive at better-informed choices and priorities. In some cases, knowledge of significant changes to the environment can motivate change in people's behaviour, and help them become less fatalistic about disasters. Once an NGO, CBO or RC/RC Society is aware of climate change and the implications for risk management, it can collect the appropriate information by liasing with national and international centres of expertize, and include it in the instructions for local facilitators undertaking CRAs.

4.5. The need to focus on trends

That information however, is only relevant in the context of the local realities and priorities identified by the communities themselves. In order to deal with changing risks, CRAs should facilitate the analysis of trends in risks, so that communities do not only respond to past conditions, but anticipate what may be coming. People are generally aware of how some risks have changed over time, and would give higher priority to addressing risks that they perceive as being on the increase.

CRAs involve several assessment methods, such as historical calendars, that bring out changing circumstances, including changes in local geography, people, and assets, but also the occurrence of natural hazards. A focused discussion of shifting risks is needed to identify local factors involved in these trends. At the same time, facilitators should be able to check whether this information might fit the observed or projected climate change for the region (triangulation with secondary climate data).

To the extent that climate change is already occurring and might continue in the same direction, local experiences may provide enough information to plan for the future. In some cases, communities may also be able to identify trends that are not related to climate change, but which will strongly affect future disaster risk (e.g., deforestation in upper watersheds, migration of certain groups from the community). Such extrapolations towards future disaster risks can be of great value in designing a risk reduction strategy.

However, there may also be cases where the historical record is not a good guide to the future. Low-frequency high-impact hazards are especially difficult to capture this

way. This is a general problem of CRAs and many other disaster management efforts. There is also a tendency to respond to recent big disasters, rather than to the whole spectrum of possible hazards, weighed in terms of priority by likelihood and possible impacts. At the same time, past disasters do motivate people to get involved and take responsibility for risk reduction. Again, the facilitators have a responsibility to discuss the additional information that is relevant to the communities' risk reduction efforts, which might include information about new or increasing risks related to climate change.

None of our case studies reflects how the analysis of trends influenced the communities' prioritization, and none of them features a systematic analysis of the reported trends in natural hazard risks. In the case of Linda Vista, it would be very difficult to deduce climate-related trends from the short record of experiences. The vulnerability of the community has clearly risen rapidly, but mainly due to construction in unsafe areas. In Zambia and Cambodia, the assessments do not reflect explicit attention to trends beyond what is already experienced by the communities. In the Kenyan sand dam cases, existing variability and uncertainty was sufficient to make communities support the projects, although they are now increasingly seen as a key resource for climate change adaptation.

This lack of explicit analysis of trend data makes it difficult to assess how these particular CRAs could have been used to generate information that might inform adaptation policy at a larger scale. In principle however, the PRA tools used in CRAs could indicate changes in rainfall, timing of seasons, extreme events and other aspects of climate and weather in places where there are no meteorological observation stations. This information is of a different character than formal meteorological data (which may appear more robust than it really is), and might be seen as 'merely' anecdotal information by some. But it can provide valuable qualitative evidence within the context of larger-scale meteorological analyses or model projections. More importantly, the CRA can bring out changes in vulnerability that affect a community's adaptive capacity, and have a bearing on larger-scale adaptation and disaster risk reduction strategies.

Information on coping strategies, and the extent to which they are being exhausted (e.g., by subsequent disasters as in Zambia), is of great relevance for adaptation strategies at district, national, and even international levels. For example, Kasakula (2005) reports evidence that Zambia farmers are noticing a trend for shortening (at both ends) of the normal November to April rainy season (along with interruptions and dry spells during it). Without funding for the expansion of small-scale irrigation, and encouragement of a shift from the preferred hybrid maize to more drought-tolerant crops such as cassava and sorghum, the people face increasing hunger and worsened livelihoods.

In this way, CRAs can also build on the observations of changes made by the people themselves in the communities. Combined with the knowledge brought by outsiders, this can lead to a beneficial increase in awareness of trends and issues at all scales, from the grass roots to policy makers at national and international levels. For instance, Dahal summarized impacts of changing climate patterns in villages in two districts of Nepal. He notes that while this data conforms with larger-scale scientific predictions, it is only through noting how these changes are translated into an impact on people's lives and livelihoods that action can be taken (Dahal 2005).

The Nepal village studies show that the people have noticed significant increases in temperature and more erratic precipitation. Monsoon rains are becoming heavier at higher altitudes, and having a very negative and costly impact on roofs and walls of traditional mud houses, and bring greater risks of flash floods and landslides. Higher temperatures have led the apple crop to improve considerably, and vegetables can now be grown that before would have needed greenhouses. While these changes have been welcomed locally, many people still rely on livestock and grazing; the quality and extend of grasslands have declined significantly.

So there is a complex of positive and negative impacts, some of which are challenging people's capacities to survive the trends, while extreme hazard problems are increasing (including more risk of glacial lake outbursts). The data is qualitative and 'unscientific', but on the other hand unless it is noticed, respected and incorporated into a structured approach it will be lost and cannot be a part of a partnership that assists the people to overcome their vulnerabilities. As Huq and Reid emphasise:

> The impacts of climate change are unlikely to occur randomly and are likely to be most adverse for the most vulnerable regions and communities. In order to adequately assess vulnerability, information must, therefore, be specific to regions and communities, and will need to include people's own assessments. (Huq and Reid, 2003, p. 7)

The same imperative is reinforced by Zubair:

> Understanding the sensitivity and vulnerability of the environment and society to climate change is as critical as understanding climate. Expertise that links local understanding of disasters, health systems, water resources, agriculture, energy and fisheries is essential if climate information is to be translated into meaningful parameters for decision-makers, policy-makers and the general public. (Zubair, 2004, p.4)[11]

It is difficult to imagine a better way of achieving this than through the use of CRA projects that bring together local people with outside organizations, both to exchange

[11]A remarkably similar view is given by Dolan and Walker (2004) for coastal communities and enhanced risks in parts of British Columbia, Canada.

knowledge and information, and to devise methods for mitigation of existing and future trends and shocks.

4.6. Embedding CRAs into national or global climate risk reduction

Our case studies also provide interesting examples in terms of the potential role of CRAs at higher levels of government. In the case of Linda Vista for instance, the Costa Rican National Emergency Commission has declared the whole village a high-risk area, which means that construction is formally forbidden. However, there has never been any formal spatial or demographic planning, and much of the construction has been ad hoc by illegal settlers. As a result of the unsafe conditions, houses have frequently been lost during floods and landslides. Interestingly, the VCA shows that the community itself is advocating for better information systems (buildings survey, early warning system) as well as better planning and enforcement (building codes, electricity system). Part of that responsibility will now be taken up by the community itself, which might be much more effective than government intervention, particularly for marginal communities such as these. However, the government clearly also has a role to play here. The information from the VCA should be taken up at higher levels of government so that they can provide the support, here and in many other similar communities across the country.

In Zambia and Cambodia, the VCAs were already embedded in larger-scale programs. In Zambia, the VCA started by informing high-level national stakeholders, and then used local teams of ZRCS staff and local stakeholders. In Cambodia, the Red Cross program included close cooperation with the Cambodian government, including assistance to formulate appropriate national disaster management plans, and the institutional development of the National Committee for Disaster Management.

An important issue in attempting such scaling-up is how the results from the VCAs can be used to inform risk reduction or adaptation efforts beyond the communities where the assessment has taken place. The reverse side of that coin is whether the communities where a CRA is carried out have been chosen in such a way that they will provide a useful sample in order to inform broader efforts than in just one small place. Despite these problems, there is considerable value in the way that CRA actions can help to offset problems that can arise in top-down imposed approaches.

In Costa Rica, Linda Vista was selected because of its high vulnerability, both in terms of geography and social circumstances. It is likely to be typical of many other marginal communities in the country. Furthermore, the issue of the migrant labourers and illegal settlers highlights the need to address the interconnections of rural and urban livelihoods, including the potential impacts of natural disasters and climate change on movements from countryside to city. In Zambia, the VCA had to cover a much larger area, and sampled the communities by characteristics of their demography, location (covering rural, peri-urban and "shanty" unplanned settlements). Such an approach shows how results from a set of specific assessments can be scaled up to yield a much higher coverage of adaptation/disaster risk reduction efforts. In Cambodia, the program focused on communities in flood-prone areas, and selected those that showed an interest in participating.

These examples highlight the opportunities and challenges regarding the use of CRAs to inform broader risk reduction efforts (including climate change adaptation). The CRA investigations themselves (except in very small countries) are unlikely to be carried out in more than a small proportion of communities, while local climate risk reduction will need to take place everywhere then significant negative outcomes are expected. A methodology is therefore needed to permit adaptation to take place across much wider regions and yet be rooted in the reality of small-scale community livelihood situations. As indicated in the case studies, the current practice is generally to focus on highly vulnerable communities ("hotspots") or on communities that are particularly motivated or interested (for instance in the case of the Red Cross/Red Crescent it may be because a local branch is well-run and has good volunteers). While both approaches have their merits, neither provides a representative sample that can inform broader risk reduction policies and programs.

One approach in relation to rural areas (but which can also be adapted to some urban situations) is to use the concept of "archetypal livelihoods". This is based on the understanding that in many countries, a very large proportion of people in the rural economy depend on rather specific types of livelihoods that are closely linked to the crop, livestock, forest or fishing opportunities that arise in that agro-economic region. In other words, a relatively large number of people's livelihoods can be assessed through the analysis of relatively few 'economic activity combinations' that are based on the possible archetypal livelihoods of that area.

CRAs can then act as the sampling mechanism that enables the analysis of the potential impact of disruptions of those livelihoods, and these can be scaled up from the sample communities to the larger archetypal livelihood region of which it is a part. The location of CRAs can then be determined on the basis of sampling needs across the various archetypal livelihoods.[12] In turn, the adaptation mechanisms that are designed at the community level as an integral part of the CRA can also be scaled up to form part of the disaster preparedness strategy of the country *and* can inform the development policies such that they are integrated with the problems of climate change trends

[12]This approach need not be rigid (in the form of a 'scientific sample') since it is important to acknowledge that each CRA will be different in type and quality, and each community will have its own special characteristics that cannot easily become 'representative'.

and 'normal' livelihood problems. This approach matches the set-up of the VCA in Zambia, where a limited coverage within the district did provide a good overview of the key issues across all communities. Communities that are not covered by the CRA itself do not benefit from the empowering aspects of the CRA process itself, but can still benefit from risk reduction strategies identified at the local level under similar circumstances.

4.7. Preliminary findings from VCA pilot studies that explicitly address climate risk reduction

In recent years, the Red Cross/Red Crescent has started to explore how to integrate climate change into disaster preparedness programs. Pilot projects typically began by raising awareness at the national level, and connecting the Red Cross societies to scientific institutes that could provide information on climate risks (such as national meteorological offices, universities and international institutes). The national societies then continue to integrate the changing risks into their programs, including community-based disaster risk reduction activities. In Indonesia and Vietnam for example, the national societies have explicitly included climate change in VCAs to inform disaster risk reduction at community level. These VCAs are considered "learning by doing" that inform continuing efforts to provide guidance to Red Cross and Red Crescent Societies around the world. Challenges faced so far clearly reflect some of the concerns identified in this paper, as well as specific operational aspects relating to training and flows of information, as discussed in the following section.

The Indonesian Red Cross (Palang Merah Indonesia) carried out a set of VCAs to prepare a climate risk reduction project in Jakarta, which started in 2007. Jakarta was identified as a priority area for climate risk in a national assessment. Like most other VCAs in Indonesia, the Jakarta VCA was carried out by selected volunteers, devoted people able to read and write, but without formal academic training. In principle, this would serve the needs of substantial scaling-up of the VCAs, limited only by the number of suitable volunteers and training capacity. However, training, preparation and interpretation did require further attention. Despite this, the VCA provided valuable inputs for project planning, including the identification of target groups and of the types of community interventions that should be included.

The Vietnamese Red Cross has been undertaking a large pilot program on climate change and disaster preparedness since 2003. This has involved building networks with relevant experts and other agencies in the country, synthesis of key information in a background document, designing training materials, preparation of region-specific information for pilot activities. This was followed by VCAs that inform the community activities aimed at practical risk reduction. These included traditional disaster preparedness measures such as the construction of Search & Rescue Centres, the training of Search & Rescue teams to coordinate rescue operations, and the strengthening of existing loudspeaker systems for early warning. Innovative activities aimed at true risk reduction, such as the protection of agricultural land against strong winds and sand-drift or salt-water intrusion by planting trees and the construction of dams.

As expected, the integration of climate change was not a trivial element. The preliminary evaluations of the VCAs in Jakarta and Vietnam raise concerns matching several of the conceptual and operational challenges identified in this paper. First, the trainings for facilitators for the VCAs highlighted the need to simplify terminology ("changes in the weather" rather than "climate change"). This may seem trivial, but reflects the gap between rather complex scientific inputs and the type of discussions at community level. To some extent, better choice of terminology can indeed help to bridge this gap. Clearly, oversimplification could also lead to confusion, so this aspect requires constant attention (including in all the local languages in which VCAs will be conducted).

A second issue is the involvement of the volunteers/facilitators in the broader objectives of the VCA and the local VCA design process (in which the standard package of tools are adjusted to the local needs and circumstances). In particular, a separate training session on climate change, along with some additional questions in the tools did not do the trick: many volunteers considered climate change as a stand-alone issue, rather than a cross-cutting concern to be integrated into the broader assessment, along with other factors that cause trends in risks. The closer the volunteers were part of the overall preparation process, the more successful the outcomes. Their involvement in the design phase clearly helped to avoid confusion later on, as they appreciated the context of questions about changes and trends (How often do these floods occur? Are they more frequent now than x years ago?). A related challenge arose in the Jakarta VCAs, where many volunteers thought of the VCA an isolated activity, rather than a means towards an end (namely to inform and promote community risk reduction, with both community-based and larger-scale components). The linkages between the VCA and the eventual project could be strengthened if these connections had been made more explicit for the volunteers.

A third issue relates to the use of secondary data. For regular VCAs, most of these secondary data would be collected at the local level, particularly using questionnaires to interview local government officials (e.g., on population and health data). In the case of climate change however, such data typically do not exist at that level, and in any case, would be very difficult to interpret. This is an area where clear national guidance is required. The Vietnam example also highlighted a tension between the needs at national level, where Red Cross officials wanted a more scientific version of the existing background document on climate risks, and the branch level, where the current background document was perceived as too complex.

A fourth issue relates to the analysis of the data collected in the VCA, which takes time, effort and specific skills. This turned out to be a weak link in the overall VCA in Jakarta, particularly with respect to the broader questions on trends in risks and identification of appropriate risk management strategies. Such analysis might be improved by standardization of methodology, and closer supervision by trained national society experts.

In general, the Vietnam and Jakarta VCAs showed that the standard VCA tools provide valuable insights for general risk reduction, but that true integration of climate risks requires further attention, particularly in terms of (a) capacity building among volunteers/ facilitators (b) appropriate presentation and inclusion of secondary data and (c) guidance on analysis of VCA outcomes. No formal evaluation of the impact of the local action based on the VCAs in Vietnam and Jakarta is yet available. However, it appears that this is the level where they may make their main contribution. While the current results have had some use for advocacy at national and international levels, these linkages could be made substantially stronger once the methodological and operational issues identified above would be addressed.

The number of national Red Cross/Red Crescent societies that are addressing climate change in their disaster risk management work is expanding rapidly, which will lead to a growing body of experience on VCAs and community-based disaster risk reduction projects that explicitly integrate attention for climate change. In addition, there is methodological development, coordinated by the Red Cross/Red Crescent Climate Centre,[13] part of the International Federation of Red Cross/Red Crescent Societies. These efforts will provide a rich source of anecdotal evidence, certainly on coping mechanisms and risk reduction strategies, and in some cases possibly also on emerging climate impacts. This should go hand in hand with improved monitoring and evaluation within the VCA-based risk reduction programs (a shortcoming also identified in the evaluation of the Cambodia CBDP program). Such monitoring will also allow a more systematic evaluation of experiences and methodologies for the community-based assessments for adaptation.

5. Conclusions

We conclude that the experience in community-based risk assessments provides valuable tools for climate change adaptation, especially to inform bottom-up approaches to climate change adaptation that are receiving increasing attention within the UNFCCC and among development specialists. While community-based risk reduction is no panacea for all aspects of climate risk, CRAs do already contribute to adaptation to climate change, and could play a larger role if employed more systematically.

We find that CRAs could be improved by making better use of their tools to assess trends, and by discussing the potential of changing risks with communities to bring out their ideas about solutions. At the same time, we note that there is a tension between the integration of such new elements and the need to keep CRAs simple enough for wide application. This issue requires particular methodological attention, for instance in relation to background guidance for CRA facilitators, appropriate trainings (and trainings of trainers), modification of the CRA tools, and in guidance for interpretation of CRA outcomes. Another key issue is the analysis of CRA results for wider application, either for risk reduction programs in other communities, or to inform policies and programs by other stakeholders (including government agencies). While it is not practicable to rely on CRAs alone to generate quantitative information for such policies and strategies, if properly interpreted the qualitative evidence on climate trends, impacts and adaptations from CRAs can be of great value in national and international policy making.

Finally, the integration of climate change into CRAs requires organizations like the Red Cross/Red Crescent and other NGOs to establish stronger linkages with national and international sources of climate information, and to develop tools that can convey that information to the community level, without causing confusion and anxiety, and avoiding simplistic projections that fail to allow for the complexities and uncertainties. Such efforts are under way, and would benefit from evaluation in order to keep refining the approaches and appraise their effectiveness, thus testing the assumptions made in the current study.

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[13] See http://www.climatecentre.org.

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