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POLICY ARENA

DISASTER RISK REDUCTION OR CLIMATE CHANGE ADAPTATION: ARE WE REINVENTING THE WHEEL?

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Abstract: Disaster risk reduction (DRR) policies and strategies are well established within the international development community, being utilised at the grassroots level to address all forms of hazards. An exacerbation and increase in meteorological hazards has in part been attributed to climate change. Climate change also contributes to noticeable seasonal fluctuations that severely affect natural resource based livelihoods. In response, a need in development policy has been identified to address climate change at the community level by helping those most affected through 'climate change adaptation' (CCA) strategies. This paper explores the differences—or, rather, the similarities—between DRR and CCA through analysing climate-related DRR in Papua New Guinea (PNG) within the context of wider development policies. Ways forward are identified for international development policy supporting all forms of risk reduction through integrating DRR and CCA strategies. Copyright © 2010 John Wiley & Sons, Ltd.

Keywords: climate change adaptation; disaster risk reduction; Papua New Guinea; participatory processes; small island developing states

1 INTRODUCTION

Political discourse surrounding climate change advocates for identification of ways to adapt to and mitigate, present and anticipated climate change (UNFCCC, 2007). Yet indigenous (and non-indigenous) communities have been adapting for centuries to climatic trends and extremes (Brokensha *et al*., 1980; Campbell, 1990, 2006; Inglis, 1993; Nunn and Britton, 2001; Gaillard, 2007; Nunn *et al*., 2007, UK; Anchorage Declaration, 2009).

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Whilst some have experienced losses, other communities have adequately recovered through 'building back better' or 'building back safer' (for further discussion on these terms see Kennedy *et al*., 2008). Additionally, disaster risk reduction (DRR) policies and strategies are well established within the international development community (Lewis, 1999; Wisner *et al*., 2004). These are utilised at the grassroots level to address all forms of hazards. This suggests that there currently exists a vast wealth of knowledge in relation to 'adapting to change' and 'dealing with disaster', not currently utilised to maximum effect.

Little doubt exists that climate change resulting from human activity is likely a significant long-term global disaster (IPCC, 2007). Yet, present publicity surrounding climate change often overshadows other long-term environmental issues (Glantz, 1994). These include deforestation and desertification, and the continued mismanagement of natural resources. For example, in Papua New Guinea (PNG) between 1972 and 2002 nearly a quarter of the rainforest was damaged or destroyed through human exploitation (Shearman *et al*., 2009). Such environmental destruction could potentially contribute towards, and be exacerbated by, climate change and environmental hazards.

Climate change is increasingly being utilised as a 'catch all' phrase assigning blame for many disastrous events (Kelman and Gaillard, 2008). Yet climate change is just one factor amongst many (Glantz, 1994) having the capacity to exacerbate disaster incidence. In reality, disasters result from a complex interplay of social, environmental, political and economic factors, strongly linked to development, which can interact with hazard(s) to become disaster(s) (Lewis, 1999; Wisner *et al*., 2004; Hewitt, 2007).

Small island developing states (SIDS) are especially vulnerable to climate change and disasters (see Kelman and West, 2009 for a critical review of SIDS and climate change literature). This is due to their shared challenges in sustainable development, geographical location, and their subsequent propensity to vulnerabilities and environmental hazards (Lewis, 1999, 2009; Pelling and Uitto, 2001; McGillivray *et al*., 2008). As a result of these similarities, SIDS have also formed a relatively cohesive group addressing environmental issues including climate change, placing SIDS on the agenda of international policy negotiations (UNFCCC, 2005; CICERO and UNEP/GRID-Arendal, 2008).

Anticipated climate change impacts including sea-level rise, increased temperatures, decreased water supplies, increased endemic diseases and deterioration in coastal conditions threaten island populations (Lewis, 1999; Shea, 2001, 2003; UNFCCC, 2005). Such impacts will undoubtedly affect livelihoods through an increase in, and an exacerbation of, hydro-meteorological hazards and changes in seasonal weather patterns affecting agricultural production.

This paper builds upon existing debates within international development on the convergence of DRR and climate change adaptation (CCA) and the meanings for wider development policy. In particular, conclusions are drawn from climate-related DRR research undertaken within three communities in the SIDS of PNG.

2 DISASTER RISK REDUCTION

DRR as defined by UNISDR is 'the systematic development and application of policies, strategies and practices to minimise vulnerabilities, hazards and the unfolding of disaster impacts throughout a society, in the broad context of sustainable development' (UNISDR, 2004: p3). DRR policies and strategies view disasters as socio-economic and political in origin, reflecting a school of thought established since the 1970s (Torry, 1978, 1979;

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Hewitt, 1983, 2007; Lewis, 1999; Wisner *et al*., 2004; Gaillard *et al*., 2007). They consider the wider social, political, environmental and economic environments in which a hazard is situated (Alexander, 2000; Weichselgartner and Obersteiner, 2002). This is in stark contrast to previous views of disasters as unavoidable 'natural events', events which needed to be managed, as opposed to the prior management of risk reduction (see also discussion in White, 1945; Bankoff, 2001; Wisner *et al*., 2004).

DRR is multi-disciplinary in nature, recognising the importance of links between hazards and the wider environment (Lewis, 1999; Wisner *et al*., 2004; Tran and Shaw, 2007). Strategies for DRR include hazard, vulnerability and capacity assessments (for a range of DRR tools see http://www.proventionconsortium.org/?pageid=39). These strategies highlight a community's ability to reduce their own disaster risk, specifically identifying those directly impacted by hazards, as those best placed to identify solutions for risk reduction (Wisner *et al*., 2004). However, grassroots strategies should be linked with appropriate top-down strategies and local government interventions (Anderson and Woodrow, 1998; DFID, 2005; Fraser *et al*., 2006). This ensures the sustainability of any approach adopted, enabling access to outside knowledge which may assist in vulnerability reduction. Successful DRR creates resilient communities, whilst ensuring vulnerability is not increased through development efforts or other externally initiated activity (UNDP, 2004; UNISDR, 2004; DFID, 2005).

3 CLIMATE CHANGE ADAPTATION

Climate change policy negotiations initially focused upon an obvious urgency to address the origins of climate change, i.e. focusing on reducing greenhouse gas emissions from human activities. Whilst this remains an essential activity, climate change impacts at the local level are becoming a reality (see CICERO and UNEP/GRID-Arendal, 2008 for SIDS information; UNFCCC, 2007). As a result, international policy discussions have begun to focus upon a need to 'adapt' (UNFCCC, 2006). CCA as defined by IPCC (2007) is 'an adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits benefit opportunities'.

CCA strategies aim to reduce vulnerability to expected impacts of climate change. However, the concept of CCA is very broad (McGray *et al*., 2007). CCA strategies exist across local and global scales, from community level responses through to local, national and international government interventions (UNFCCC, 2006; McGray *et al*., 2007). At the community level, strategies include improvements to agricultural systems such as crop diversification or the introduction of hazard resistant crop varieties; risk assessments and associated plans; the protection of natural resources; early warning systems; education and awareness measures and protection of water resources (UNFCCC, 2006). At the national level for least developed countries, some countries have developed National Adaptation Programmes of Action (NAPAs). NAPAs identify areas in which adaptation strategies are essential in mitigating against adverse climate change effects.

4 DISASTER RISK REDUCTION AND CLIMATE CHANGE ADAPTATION: ONE AND THE SAME?

A number of researchers, policy makers and practitioners have recently discussed and critiqued similarities and differences between DRR and CCA (e.g. Shea, 2003; Sperling

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and Szekely, 2005; Thomalla *et al*., 2006; Kelman and Gaillard, 2008; Mitchell and van Aalst, 2008; Tearfund, 2008; UNISDR, 2008). Some advocate for increased convergence, whilst recognising existing differences between the DRR and CCA agendas (e.g. Thomalla *et al*., 2006; Mitchell and van Aalst, 2008; Tearfund, 2008). Others outline the need to embed CCA within DRR, making it one factor amongst many, which should be considered in reducing community vulnerability (e.g. Kelman and Gaillard, 2008; Kelman *et al*., 2009). Figure 1 outlines Tearfund's (2008) perceived differences between CCA and DRR, alongside possibilities for convergence of the two agendas.

To date, there has been no specific analysis surrounding the differences outlined or whether the proposed differences are real or artificial. Detailed discussions surrounding CCA and DRR agendas continue. However, whilst there are clearly different views, there seems to be a general consensus that DRR and CCA should be integrated into wider development planning (e.g. Glantz, 1999, 2003; Lewis, 2007; O'Brien *et al*., 2006; Christoplos *et al*., 2009).

The differences as outlined are inconsequential for practical application, mainly revolving around a suggested historical (DRR) and future (CCA) perspective. Tearfund (2008) and others (e.g. Thomalla *et al*., 2006; Mitchell and van Aalst, 2008) claim that DRR focuses upon existing risks with resulting strategies based upon current and historical evidence. However, DRR encompasses an 'all hazards' approach with a focus on the underlying vulnerability factors or root causes of community vulnerability especially in the context of development (e.g. Lewis, 1999; Wisner *et al*., 2004). This focus in itself suggests that a development or future perspective must be taken, thereby accounting for all the interrelated factors implicated as contributing to community vulnerability. If DRR were to have solely an historical perspective, then any strategy implemented to reduce disaster risk could be deemed immediately obsolete. This is due to the rapid pace of change experienced by communities today, resulting from pressures including climate change. Rather, the failure lies in an inability or reluctance to listen to, and involve those most at risk in identifying solutions to their problems (White *et al*., 2001; Weichselgartner and Obersteiner, 2002).

The focus of DRR is frequently based upon experience at the community level, for which a full range of tools and methodologies have been developed (e.g. Chambers, 2002; ProVention Consortium, 2006; Twigg, 2007; Maceda *et al*., 2009). Meanwhile, CCA experience generally stems from global policy agendas, rather than practical implementation (see the approach taken by Thomalla *et al*., 2006; Tearfund, 2008). Whilst global policies are essential in guiding practical action, policy and action at the community level where climate change effects are being experienced are urgently required in a development context (e.g. Shea, 2001; UNDP, 2004; DFID, 2005; Schipper and Pelling, 2006; UNFCCC, 2007). It would therefore appear more effective, financially and otherwise, to embed CCA within existing DRR tools. This is as opposed to developing tools and methodologies for CCA separately and integrating these with DRR at a later date.

CCA strategies at the community level are similar to, if not the same as DRR strategies (see compendium of case studies at http://www.proventionconsortium.org/?pageid=43). In addition, many indigenous communities as outlined in this paper's introduction have coped effectively with climatic extremes for centuries, albeit with losses at times. Whilst today's rate of change may be reducing the viability of indigenous knowledge, it should still be considered a valuable knowledge base, from which it may be pertinent to draw on for devising new technologies or techniques for CCA (Shea, 2003; Campbell, 2006; Gaillard, 2007; Anchorage Declaration, 2009). For example, the integration of indigenous and

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DIFFERENCES		SIGNS OF CONVERGENCE
DRR	**CCA**	
Relevant to all hazard types	Relevant to climate-related hazards	N/A
Origin and culture in humanitarian assistance following a disaster event.	Origin and culture in scientific theory.	CCA specialists now being recruited from engineering, watsan, agriculture. Health and DRR sectors
Most concerned with the present – i.e. addressing existing risks	Most concerned with the future – i.e. addressing uncertainty/new risks	DRR increasingly forward-looking. Existing climate variability is an entry point for CCA
Historical perspective	Future perspective	As above
Traditional/indigenous knowledge at community level is a basis for resilience.	Traditional/indigenous knowledge at community level may be insufficient for resilience against types and scales of risk yet to be experienced.	Examples where integration of scientific knowledge and traditional knowledge for DRR provides learning opportunities.
Structural measures designed for safety levels modelled on current and	Structural measures designed for safety levels modelled on current and	DRR increasingly forward-looking.
historical evidence.	historical evidence and predicted changes.	
Traditional focus on vulnerability reduction	Traditional focus on physical exposure	N/A
Community-based process stemming from experience	Community-based process stemming from policy agenda	N/A
Practical application at local level	Theoretical application at local level	CCA gaining experience through practical local application.
Full range of established and developing tools	Limited range of tools under development	None, except increasing recognition that more adaptation tools are needed.
Incremental development	New and emerging agenda	N/A
Political and widespread recognition often quite weak	Political and widespread recognition increasingly strong	None, except that climate-related disaster events are now more likely to be analysed and debated with reference to climate change
Funding streams ad hoc and insufficient	Funding streams sizeable and increasing	DRR community engaging in CCA funding mechanisms.

Figure 1. Summary of differences between DRR and CCA (Tearfund, 2008)

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scientific knowledge may strengthen the ability of indigenous communities to cope with climate change, whilst retaining their traditional practices (Kelman *et al*., 2009; Mercer *et al*., 2008, 2009, 2010).

Yet the definition given for CCA by the IPCC (2007) is extremely narrow, applying to climate stimuli only and not targeting root causes. Conversely, the definition by UNISDR (2004) for DRR is much broader and indicates the need to tackle fundamental challenges. The DRR definition also gives scope for integrating and including climate change as one factor amongst many, which may be contributing to increased community vulnerability.

Instead, as Kelman and Gaillard (2008) outline, climate change has been used as a scapegoat, or in many cases a distraction, from other contributory underlying issues such as poverty, social deprivation, lack of resources and poor education. This can be advantageous. The obvious difference between DRR and CCA most clearly lies within the political and widespread recognition that climate change achieves as opposed to DRR (Tearfund, 2008). It would therefore be politically expedient to draw upon this in accessing resources for DRR, both in terms of funding streams and political prominence. DRR, if implemented correctly, would in turn reduce community vulnerability to climate change.

In summary, more similarities than differences exist between CCA and DRR, but DRR presents advantages for development policy and practice that CCA does not. DRR also has a long record of being successfully implemented at the local level to reduce community vulnerability to environmental hazards while supporting development processes (Lewis, 1999; Wisner *et al*., 2004; Twigg, 2007). Such successes could not have been achieved without building upon past knowledge and experience, whilst considering future threats. The main difference between the two lies in the political prominence and recognition that climate change receives internationally.

This paper now draws upon research undertaken in PNG that provides empirical evidence to support the development policy discussions outlined above: that is, that CCA should be embedded within DRR. In this case study, climate change is one factor amongst many contributing to community vulnerability. The prominence of climate change within the international arena could and should be used to promote, and move forward, relevant and applicable development policy to address risk.

5 PAPUA NEW GUINEA

PNG has remarkable social and economic diversity including rich natural resources, the majority of the population being indigenous, 87 per cent residing in rural areas spread out over rugged terrain, and over 800 languages being spoken (Connell, 1997; World Bank, 2004; Gordon, 2005).

5.1 Disaster Risk Reduction and Climate Change Adaptation in PNG

PNG is prone to a wide range of environmental hazards including volcanic eruptions, landslides, earthquakes, floods, cyclones, tsunamis, wildfires, droughts and frost. There is also a high potential risk of technological, biological, health and social related disasters such as civil unrest and conflict (e.g. the Bougainville crisis; see Thompson, 1991). In addition, PNG is experiencing rapid environmental degradation, manifested primarily through deforestation (Shearman *et al*., 2009). As a SIDS, PNG is considered to be highly

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vulnerable to climate change (UNFCCC, 2005). Given the rural population's mainly subsistence livelihoods, climate change has the potential to have a vast impact upon agricultural production and hydro-meteorological hazards.

The National Disaster Centre (NDC; http://www.pngndc.gov.pg) based in the capital Port Moresby was established in response to the country's high disaster risk. It is the central coordinating governmental body dealing with disasters. Each province also has a Provincial Disaster Centre (PDC) operating under the Provincial Government and collaborating with the NDC to reduce disaster risk and to manage disaster impacts. The core functions of the NDC are to provide national training in disaster planning and mitigation, to provide information and create awareness for the general public, to manage national response operations, and to manage funds dedicated to the NDC in collaboration with the PDCs (NDC, 2005). As of 2007, PNG's National Disaster Management Plan has been unchanged since 1987 (NDC, 2005).

The NDC is heavily restricted in its ability to act, due to political and economic issues. In addition, both the NDC and the PDCs operate in an environment of strong cultural diversity. This presents communication and coordination problems within, and between, the offices and the communities they are attempting to support. However, despite the lack of an updated disaster plan, progress in other areas is being made. In 2005, the NDC developed a *National Disaster Risk Reduction and Disaster Management Framework for Action* to be implemented from 2005 to 2015. The aim of this framework is the strengthening of a coordinated approach on an 'all hazards' basis across the country, to significantly improve the capacity of individual provinces and communities for reducing vulnerabilities and managing hazards (Mercer *et al*., 2010). However, given the resource limitations of the country, little progress has been made in addressing the effects of climate change or the impacts of environmental hazards.

PNG's government also has a climate change office (http://www.climatechangepng.org/) as part of their environmental strategy. PNG has not developed a NAPA for climate change, because PNG is not listed as least developed country due to its large resource base. Yet, PNG is already experiencing adverse climate change impacts. For example, the Carteret Islands, located north–east of mainland PNG have experienced sea-level rise resulting in the re-housing of residents (for more background on the so-called 'climate refugees' see Oxfam, 2009; Hartmann, 2010).

In PNG, developing climate change and DRR policies has been very much top-down, frequently initiated with limited community consultation or involvement. This is an all too familiar story, occurring worldwide as evidenced by recent reports analysing progress towards the Hyogo Framework for Action 2005–2015, both at the global and local levels (UNISDR, 2009; Views from the Frontline, 2009). This in itself is a challenge for development policy, considering the effects are felt first and foremost at the community level, and so this topic is discussed in more detail under the section 'International Development Policy Implications'.

5.2 Climate-Related Disaster Risk Reduction in PNG

This section builds upon research undertaken in PNG from 2006–2007. The research specifically looked at the integration of indigenous and scientific knowledge for DRR in three rural indigenous communities in Morobe, and Madang Provinces: Singas, Kumalu and Baliau (Figure 2). These communities are affected by floods, floods and landslides and

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Figure 2. Map of PNG illustrating village locations (based on http://un.org/Depts/Cartographic/map/profile/papua.pdf). This figure is available in colour online at www.interscience.wiley.com/journal/jid

an active volcano, respectively. The hazards impacting upon Kumalu and Singas are hydro-meteorological and so have the potential to be exacerbated by climate change, whereas Baliau is impacted mainly by a volcanic hazard. However, all three communities survive mainly on subsistence agriculture, with climate change having the potential to adversely impact livelihoods. The research resulted in a Process Framework, identifying how indigenous and scientific knowledge may be integrated for DRR (Mercer *et al*., 2010). This

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has subsequently been revised to incorporate climate change concerns (Kelman *et al*., 2009).

The Process Framework integrating indigenous and scientific knowledge for DRR was developed as a community mechanism to reduce vulnerability to hazards (Mercer *et al*., 2010). A process of 'guided discovery' was utilised, whereby community members were facilitated to identify facts, problems and solutions for themselves, with minimal interference from facilitators (see Mercer *et al*., 2008, 2009, 2010 for more information). Such community-driven initiatives also need to be linked with wider DRR mechanisms at local, national and international levels. This is especially important in light of climate change which has a significant impact on indigenous communities in SIDS, but is clearly a cause for concern at all levels (UNFCCC, 2005). This section specifically analyses climate-related DRR in PNG. It identifies what this means for wider development polices in light of similarities between CCA and DRR observed within the three communities.

Firstly, it is important to outline that terminology such as CCA and DRR meant nothing to the PNG communities. Rather, these communities were concerned with interrelated processes such as political, social, environmental and economic factors impacting their community. These factors were approached as a whole, i.e. set within the community context and everyday life, rather than as individual, disconnected factors. Whilst each community recognised the adverse effects of hazards, they had not necessarily situated the hazards within their community context, in order to analyse reasons for their vulnerability. Baliau, Kumalu and Singas communities had all approached their local government for assistance, the latter two without success. This provided an entry point into the communities, as all were proactive in wanting to reduce their risk (see Mercer *et al*., 2008 for more information).

Each community undertook a detailed situation analysis, whereby they participated in exercises drawn from development-related participatory approaches (Chambers, 2002; Kumar, 2002). These included community mapping to identify hazards and potential safe areas, village and hazard timelines, seasonal calendars and environmental trend analyses (Mercer *et al*., 2008, 2009, 2010). This last activity was especially important in enabling the community to select different aspects of their environment (e.g. land, rivers, forests) and to identify changes occurring over the years.

In Kumalu, for example, after completing such an analysis, the community identified links between changes in land-use practices and increased incidence of landslides, and floods. In Singas, community members concluded that their subsistence farming and clearance of land alongside the riverbanks may have contributed to increased river bank erosion, witnessed over recent years. These conclusions were reached as a result of the community considering their wider situation, especially interaction between themselves and the land that supported them. Linkages between community activities, their surrounding environment and increased environmental hazard impacts had previously not been considered, perhaps due to the slow onset of these changes experienced over the years.

The detailed analysis that each community undertook gave them a much clearer awareness of the interconnectedness between their activities, their environment and the hazards they faced. Using this information, community members analysed the hazards in more detail. They specifically reviewed underlying causes contributing to the hazards and the subsequent effects of the hazards upon their community (see Mercer *et al*., 2009, 2010). Figure 3 outlines the analysis for each community in more detail. The process enabled the communities to situate the hazards within their wider development context. Whilst arguably some of the causes could be considered effects and vice versa, these diagrams

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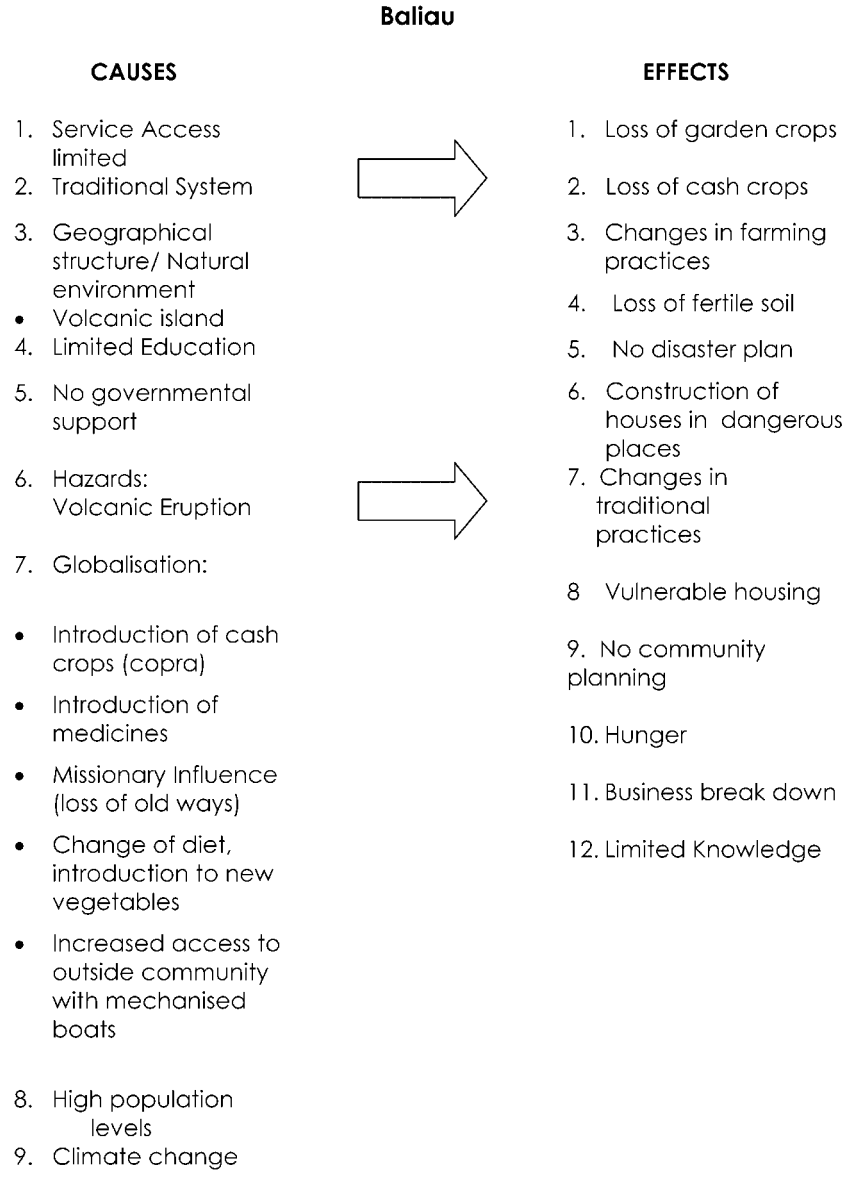

Figure 3. Causes of increased vulnerability to hazard(s) and resulting effects as identified by community members for all 3 villages (adapted from Mercer *et al.*, 2009, 2010)

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were the communities' own interpretations of how the hazards manifested within their communities (Mercer *et al*., 2009, 2010).

Interestingly, and without prompting, all three communities felt that climate change was one of several underlying vulnerability factors contributing to increased impact of environmental hazards. Baliau felt that climate change had an impact upon agricultural production, which in turn increased their vulnerability to adverse effects resulting from volcanic eruptions. However, whilst climate change was clearly of major concern, so too was land degradation, population levels, globalisation and lack of government support, amongst other factors (see Figure 3). Communities felt that all of these combined as underlying vulnerability factors.

The detailed cause and effect diagrams (Figure 3) produced by the community members demonstrate the complex and interconnected nature of disasters and vulnerability, including climate change concerns. The diagrams demonstrate the importance of focusing upon all the underlying vulnerability factors, as opposed to just the hazard *per se* or one factor such as climate change. This is in order to reach a desired end result of increased capacity and reduced vulnerability to hazards. To these communities, at the grassroots level, there is no distinction between CCA or DRR. However, it is clear that climate change, along with many other factors, is having an adverse impact upon communities in terms of hazards and their livelihoods. This gives further weight to the argument of embedding CCA within DRR, thereby ensuring all factors, including climate change are considered.

6 INTERNATIONAL DEVELOPMENT POLICY IMPLICATIONS

To these three communities in PNG, disasters are the result of a complex interplay of cause and effect. It is not sufficient to concentrate on one factor at the expense of others; rather, all factors need to be addressed in a holistic approach to reducing risk. Whilst climate change is a major concern for communities in PNG, so too are other contributory factors. All of these combined, are contributing to increased community vulnerability to environmental hazards. The research in PNG highlights what many have been reiterating within the international development community for decades, i.e. the need for a holistic response to sustainable development considering all interrelated factors (e.g. UN, 1987; Loomis, 2000; UNDP, 2004; DFID, 2005; Grist, 2008).

Yet this is not necessarily acted upon in practice, in part due to a disconnect between policy and practice and between practice and policy, as well as through not putting those most at risk at the forefront of any strategy developed to reduce their risk (White *et al*., 2001; Weichselgartner and Obersteiner, 2002; Gaillard *et al*., 2007). This could also be attributed to the propensity of some sectors, such as climate change, to exclusively target their specific topic to attract funds, thereby deflecting from wider development issues upon which those funds might otherwise be expended. Lessons learnt at the community level need to be listened to and built upon for relevant and applicable development policy. Without utilising the knowledge and expertise of communities, they could become further at risk through the application of poorly thought through, and less relevant policy, not directly addressing the problem at hand (e.g. Chambers, 1980; Dahl, 1989; Payton *et al*., 2003; Cronin *et al*., 2004a, b; Donovan and Puri, 2004).

There is currently disengagement between policy development and the practical application of such policy at the grassroots level (UNISDR, 2009; Views from the Frontline,

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2009). The Hyogo Framework for Action (HFA) was adopted in 2005 as a ten-year plan by 168 governments to build the resilience of nations and communities to disasters, yet evidence suggests that it is far from meeting this goal by 2015 (Holmes, 2009). Action to reduce risk may be occurring at the top level as identified by a recent UNISDR (2009) report assessing global progress towards the HFA, but this is not trickling down to those who are directly impacted. This has been identified by a coalition of civil society organisations who have undertaken a complementary review to UNISDR's global assessment report, on progress towards the HFA at the local level (Views from the Frontline, 2009).

The HFA outlines a need to integrate DRR with CCA strategies but does not delve further into climate change. This paper questions the reasoning behind a separation of the two agendas of DRR and CCA, considering the similarities between the two; i.e. are risks reduced or increased when one aspect contributing to vulnerability is concentrated upon at the expense of others? Rather, the focus should be upon risk reduction within the context of wider sustainable development, considering all the interrelated factors affecting a community, both positive and negative. It should be about reducing risk through a holistic approach to sustainable development. As outlined in the HFA, DRR needs to be integrated into sustainable development policies and planning (see also much DRR literature that supports this point from a development perspective, as exemplified by Lewis, 1999 and Wisner *et al*., 2004). In turn, CCA should be embedded within DRR ensuring threats both now and in the future are addressed through targeting underlying risk factors of vulnerability.

The policy lessons for international development arising from climate-related DRR research in PNG are not new, but are often overshadowed by the prominence of climate change within the international arena. Whilst the difficulties of integrating the wider socio-economic environment, hazard assessments and decision-making processes are accepted, it is just such an integrated, holistic approach which is most needed in order to further community development and reduce vulnerability.

Climate change should not be considered a stand-alone issue, but rather incorporated into a DRR approach, whereby all vulnerable factors contributing to community risk are addressed. If CCA is embedded within DRR, then DRR needs to be embedded within wider sustainable development policy. All disasters, climate related or not, hinder development and it is the root causes contributing to them which need to be adequately addressed.

7 CONCLUSION

The communities in PNG identified that climate change was one factor amongst many contributing to their vulnerability to hazardous events (Mercer *et al*., 2009, 2010). To focus solely upon climate change through CCA, rather than considering all contributory factors to community risk would be detrimental to communities concerned. There is an inherent danger of over-focusing upon a need to adapt to climate change due to its prominence in the international arena, rather than focusing on vulnerable conditions identified by communities themselves.

Whereas DRR evolved from both top-down and bottom-up perspectives, which are merging in some circumstances, CCA generally emerged from a top-down driven policy that was initially disconnected to a large extent from communities directly affected by climate change. Community-based DRR could thus provide an entry point for CCA, including more recent community-based CCA work. That would avoid separating

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community-based DRR and community-based CCA and would connect policy with practice and practice with policy.

This research was undertaken with communities in one SIDS, yet lessons equally apply elsewhere. Climate change is at the top of the international development agenda and urgently needs to be addressed to prevent further irreversible damage. However, should this be undertaken at the expense of other contributory factors to community risk and vulnerability? Whilst the impacts of climate change are expected to be worst in developing countries, as evidenced by this research, climate change is viewed by local communities as one contributory factor. Solely addressing climate change would not adequately address the development concerns of communities.

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