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Disaster Policies and Governance:
Promoting Community Resilience

Editors

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Editorial

Disaster Policies and Governance: Promoting Community Resilience

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Abstract
This brief editorial introduction highlights the importance of policies and effective governance for disaster resilience including communities, individuals, institutions, and organizations through the execution of deliberate choice and collective action. Effective facilitation of development and implementation of disaster policies can lead to more resilient communities in the aftermath of disasters. The success of design, development, and execution of disaster resilience policies require engagement of the "whole community".

Keywords
collaborative governance; community resilience; disaster resilience; politics; whole community

Issue
This editorial is part of the issue "Disaster Policies and Governance: Promoting Community Resilience", edited by Naim Kapucu (University of Central Florida, USA) and Abdul-Akeem Sadiq (Indiana University–Purdue University Indianapolis, USA).

Natural and man-made hazards have and continue to cause significant loss of life and property damage worldwide. In 2011, the economic losses from disasters globally was US$380 billion (Schiermeier, 2012). Hazard vulnerabilities and subsequent impacts over the past few decades have increased due to poor disaster policies and governance practices that lack sustainable outcomes and infrastructure. As a result, communities find themselves struggling in the response and recovery phases to provide both financial and physical resources in the aftermath of disasters. One attainable feature of sustainable development is creating resilience in the face of catastrophic events. *Community disaster resilience* is considered a function of a community's collaborative governance, which helps develop community capacity through adaptive management and continuous learning (Comfort, Boin, & Demchak, 2010; Kapucu, Hawkins, & Rivera, 2013). Collaborative and adaptive forms of governance, as a method of collective decision-making, promote the capacity of organizations and community stakeholders to adjust and adapt their evolving relationships in a dynamic environment of disasters (Kapucu, 2006). A major disaster, for example, can create a "window of opportunity" for community-wide sustainable development (Kapucu & Liou, 2014). This suggests that disasters can provide the impetus for communities to develop and implement structured policies that not only withstand the pressures of politics at all levels of government, but also improve the resilience of communities' social, physical and natural environment, and economic systems.

Resilience can be created by communities, individuals, institutions, and organizations through the execution of deliberate choice and action. To facilitate the development and governance/implementation of disaster policies that lead to more resilient communities in the aftermath of disasters, two important steps need to be taken. First, state and local governments should enact mandates on hazard and disaster risk reduction. Second, state and local governments should collaborate with all relevant community stakeholders when planning for disasters. Such a partnership should focus on identifying a comprehensive list of recovery goals for the entire community (Figure 1).

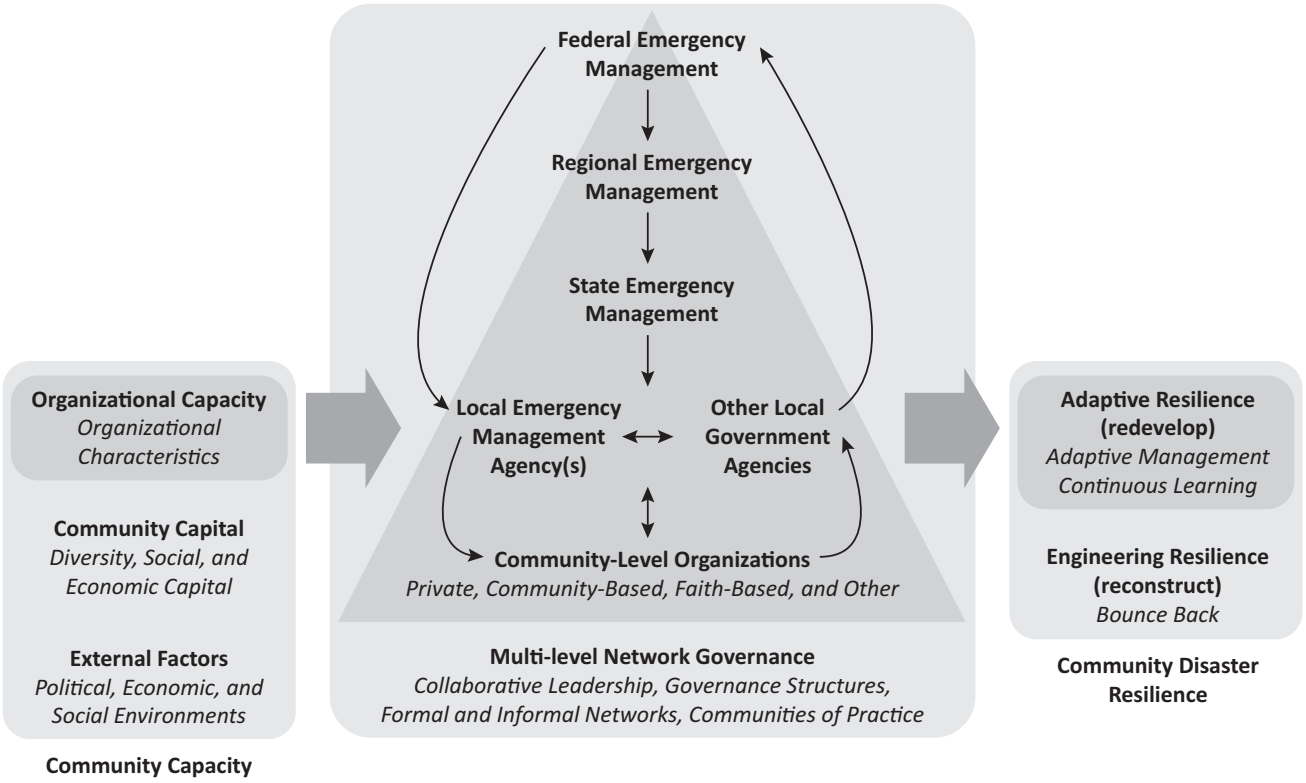

Figure 1. Collaborative governance for community disaster resilience.

To reduce community vulnerabilities to disasters and stem disaster-related losses, governments at all levels have begun to promote community resilience as a possible panacea. As a result, the concept of "resilience" has become the buzzword among academics, practitioners, government officials, and the public. However, there is little consensus on what this concept entails or how to measure it. Moreover, there is limited understanding on ways to promote community resilience at the local level. Hence the purpose of this thematic issue is to put together an excellent collection of articles that will shed light on the conceptualization of resilience, its measurement, and the identification of strategies for promoting community resilience.

Effective community disaster resilience outcomes involve not only government agencies across all levels, but also multiple groups of non-governmental stakeholders such as non-profit organizations, faith-based groups, private sector organizations, individuals, families, and communities (Federal Emergency Management Agency [FEMA], 2011; Kapucu et al., 2013). Organizations work with others to share information and other resources, and to coordinate efforts in building community disaster resilience. During this process, multi-level emergency management networks form and evolve, which not only include inter-governmental networks, but also involve cross-sector inter-organizational networks and partnerships. These extend beyond formal networks, with roles and functions defined by government planning and policy documents, to encapsulate informal networks and community partnerships characterized by flexible structures and communication channels. This perspective highlights the importance of organizational capacity and multi-level collaborative governance, adaptive management, and continuous learning to build disaster resilient communities.

Earlier this year, a call for papers was issued, and scholars from various disciplines submitted several relevant and important studies. After a rigorous peer review and selection process, five papers that provide significant insights on community resilience were selected for publication in this thematic issue. In the following paragraphs, we provide a brief summary of this collection of articles, representing different cultures, geographies, and disasters.

Elizabeth Carabine and Emily Wilkinson (2016) used the Social-Ecological Systems Theory to understand how local governance systems can help strengthen community resilience in the Sahel and Horn of Africa. These scholars were interested in studying how local risk governance structures and institutional arrangements—diversity, polycentricism and connectivity, decentralization and flexibility, participation and community engagement, and learning and innovation—mediated individuals' access to the goods and services provided by climate and disaster resilience programs. Using evidence collected via a thorough literature review, the researchers developed a set of testable hypotheses necessary to build a body of knowledge on the role of risk governance structures in promoting community resilience outcomes.

Lex Drennan, Jim McGowan, and Anne Tiernan (2016) investigated how to incorporate economic re-

silience into a resilience framework using information collected via interviews of community and business leaders from three regional centers in Australia impacted by the 2009 Victorian bushfires and the 2010–2011 cyclones and floods. The authors found, among other findings, that the current disaster policy on recovery does not take into account the complexity and understanding of recovery. For example, the authors noted a lack of provision in the recovery policy for business recovery. The authors concluded that in the Australian context, economic recovery is given less attention in comparison to other streams of recovery such as infrastructure. This study highlights the important contribution economic recovery plays in promoting overall community resilience to disasters.

The United Nation's Millennium Development Goals (MDGs), which began in 2000 and ended in 2015, was criticized for not being able to adequately consider the interactions among the MDGs (Waage et al., 2010). Hence, a major focus of the SDGs developed from 2015 to 2030 is to fully consider the interactions among the SDGs (Waage et al., 2015). Kristine Belesova, Ilan Kelman and Roger Boyd (2016) were the first to explore the interactions among three SDGs: climate change (SDG 13), economic growth (SDG 8), and health and wellbeing (SDG 3). These scholars identified economic concepts like externalities, short-term profit targets, reliance on the Gross Domestic Product, and positive discount rates as primary sources of tension between climate change and economic goals. The authors argue that these tensions can be alleviated through intersectoral governance mechanisms. A better understanding of the tensions among the SDGs can help academics and practitioners develop strategies to enhance synergies among the SDGs and in the process, improve community resilience.

The use of home buyout programs is an effective tool in reducing a community's vulnerability to flood disasters. Despite the benefits of home buyout programs, little is known about its impact on a community. Sherri Brokopp Binder and Alex Greer's (2016) study provided critical insights into the implications of home buyout program design and implementation. Using data collected via observations, surveys, and in-depth interviews, the authors examined the implications of a home buyout program implemented in Oakwood Beach, New York after Hurricane Sandy. The authors found that the design of the home buyout program in Oakwood Beach had a significant impact on citizens' understanding of, progression through, and experience with the program. The authors conclude by recommending ways to improve the effectiveness of future home buyout programs. For example, the authors suggested that the design of future home buyout programs should include inputs from local residents.

Finally, Vicente Sandoval and Martin Voss (2016) studied the relationship between disaster governance and vulnerability using Chile as a case study. Specifically, the authors employed the disaster Pressure and Release Model to examine whether the centralized Chilean model of Disaster Risk Management increased disaster vulnerability in post-disaster Chaitén, Los Lagos Region, Chile. Chaitén was used as a case study due to the significant economic and social cost inflicted by a volcanic eruption in May 2008. Using information from in-depth interviews and government documents, the authors found that residents did not trust their authorities. This is an important finding in the sense that a lack of trust between a government and local residents can exacerbate inherent vulnerabilities to future disasters. For instance, residents may not heed evacuation orders issued by authorities for lack of trust. If residents do not evacuate, this could lead to a bigger disaster loss for the community than if residents had evacuated the hazardous area.

Thomas Birkland (2016) also provided a commentary, which focuses on the intersection of policies and governance in disaster resilience. In this commentary, Thomas Birkland argued that disasters can grab the attention of policymakers, and lead to changes in disaster policies based on lessons learned from past disasters. However, he pointed out that such changes may or may not improve community resilience to future disasters. In conclusion, Thomas Birkland suggested that developing countries should learn from developed countries in terms of strategies to implement community resilience, and emphasized the need for such strategies to be driven by local groups and citizens in order to be successful.

In summary, this collection of insightful articles examined the interplay between disaster policies and governance and community resilience using different types of hazards to include flooding, cyclones or hurricanes, and bushfire. These articles also utilized information from both secondary data (e.g., government documents and academic resources) and primary data (e.g., interviews, surveys, and observations), and used contexts from different geographical locations—Sahel and Horn of Africa, Australia, United States, and Chile—as testbeds. Finally, this collection of impressive articles employed various lenses (e.g., the Social-Ecological Systems Theory, the Pressure and Release Model, and the Reductionist Paradigm) to provide critical insights into how the concept of resilience can be used as a meaningful framework to identify important conditions that lead to stronger, safer, and more sustainable communities with effective disaster governance policies.

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Conflict of Interests

The authors declare no conflict of interests.

References

Belesova, K., Kelman, I., & Boyd, R. (2016). Governance through economic paradigms: Addressing climate change by accounting for health. *Politics and Governance*, *4*(4), 87–96.

Binder, S. B., & Greer, A. (2016). The devil is in the details: Linking home buyout policy, practice, and experience after hurricane Sandy. *Politics and Governance*, *4*(4), 97–106.

Birkland, T. A. (2016). Conceptualizing resilience. *Politics and Governance*, *4*(4), 117–120.

Carabine, E., & Wilkinson, E. (2016). How can local governance systems strengthen community resilience? A social-ecological systems approach. *Politics and Governance*, *4*(4), 62–73.

Comfort, L. K., Boin, A., & Demchak, C. C. (Eds.). (2010). *Designing resilience: Preparing for extreme events*. Pittsburgh, PA: University of Pittsburgh Press.

Drennan, L., McGowan, & J., Tiernan, A. (2016). Integrating recovery within a resilience framework: Empirical insights and policy implications from regional Australia. *Politics and Governance*, *4*(4), 74–86.

Federal Emergency Management Agency. (2011). *Whole community*. Retrieved from http://www.fema.gov/about/wholecommunity.shtm.

Kapucu, N. (2006). Interagency communication networks during emergencies: Boundary spanners in multiagency coordination. *The American Review of Public Administration*, *36*(2), 207–225.

Kapucu, N., Hawkins, C., & Rivera, F. (2013). Emerging research in disaster resiliency and sustainability: Implications for policy and practice. In N. Kapucu, C. Hawkins, & F. I. Rivera (Eds.), *Disaster resiliency: Interdisciplinary perspectives* (pp. 355–358). New York, NY: Routledge.

Kapucu, N., & Liou, K. T. (2014). *Disaster and development: Examining global issues and cases*. New York, NY: Springer.

Sandoval, V., & Voss, M. (2016). Disaster governance and vulnerability: The case of Chile. *Politics and Governance*, *4*(4), 107–116.

Schiermeier, Q. (2012). Disaster toll tallied. *Nature*, *481*(7380), 124–125.

Waage, J., Banerji, R., Campbell, O., Chirwa, E., Collender, G., Dieltiens, V., . . . Unterhalter, E. (2010). The millennium development goals: A cross-sectoral analysis and principles for goal setting after 2015 Lancet and London international development centre commission. *The Lancet*, *476*(9745), 991–1023.

Waage, J., Yap, C., Bell, S., Levy, C., Mace, G., Pegram, T., . . . Poole, N. (2015). Governing the UN sustainable 464 development goals: Interactions, infrastructures, and institutions. *The Lancet Global Health*, *3*(5), e251–e252.

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Review

How Can Local Governance Systems Strengthen Community Resilience? A Social-Ecological Systems Approach

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Abstract
At their core, donor-funded climate and disaster resilience programmes provide goods and services to help build assets and minimise the impact of shocks and stresses on people's lives and livelihoods. Little is known, however, about the way local risk governance systems and the broader institutional arrangements, in which they are embedded, mediate people's access to these services and therefore lead to improved resilience. Drawing on Social-Ecological Systems theory, we explore those characteristics of risk governance systems believed to be more favourable for building resilience at the community level in different developing country contexts. These include: diversity; polycentricism and connectivity; decentralisation and flexibility; participation and community engagement; and, learning and innovation. This review paper proposes a conceptual framework and assesses the evidence linking risk governance and access to the services needed to build resilient outcomes, drawing particularly on evidence from the Sahel and Horn of Africa. In doing so, we can start to understand where the entry points might be for strengthening resilience and the conditions needed for community-level initiatives to be brought to scale from the bottom up.

Keywords
informal institutions; local risk governance; resilience; social-ecological systems; sub-Saharan Africa

Issue
This review is part of the issue "Disaster Policies and Governance: Promoting Community Resilience", edited by Naim Kapucu (University of Central Florida, USA) and Abdul-Akeem Sadiq (Indiana University–Purdue University Indianapolis, USA).

1. Introduction

Risk governance refers to both the institutional arrangements and policy processes that shape risk reduction and management approaches (Renn, Ortleb, Benighaus, & Benighaus, 2011). Until recently, most formal risk governance systems were centralised and response-focused, based on chains of command (Britton, 2001). These were disconnected from local, informal efforts to manage everyday risk (van Voorst, Wisner, Hellman, & Nooteboom, 2015). Increasingly, decision-makers are recognising that multi-level governance is required to manage the range of risks faced by communities in developing countries (Pahl-Wostl, 2009). These include climate change and disasters, conflict, environmental degradation, land use change, food insecurity and human migration and displacement, as well as interacting effects (Intergovernmental Panel on Climate Change [IPCC], 2014). In particular, strengthening of risk governance at the local level, both in terms of decision-making and fiscal representation, is now thought to be key in promoting equitable and resilient development (Wilkinson et al., 2014).

Local organisations and groups perform a variety of functions to manage risk, which have been broadly classified into the following: information gathering and dissemination, resource mobilisation and allocation; skills development and capacity building; providing leadership; liaising with other institutions and decision makers (Agrawal, 2008); as well as law enforcement and conflict resolution (Eriksen & Lind, 2009). The degree

to which any one organisation or group engages (or attempts to engage) in these functions will vary according to its mandate, internal structure, and the resources available.

Notions of risk governance draw heavily on natural resource management and common property regimes literature (see for example Brockhaus, Djoudi, & Kambire, 2012; Frankenberger, Spangler, Nelson, & Langworthy, 2012; Ostrom, 1990; Plummer & Armitage, 2007). Risk governance describes how collective action decisions are taken to manage risk, where emphasis is placed on the characteristics of—and relationships between—institutions and the modes of decision making; but it can also be used in a normative sense to refer to the desirable qualities of a system, such as adaptiveness and self-regulation (Biermann, 2007; Biermann et al., 2009; Pahl-Wostl, 2009; Stoker, 1998). At various times and within various (sub) disciplines, these positive governance characteristics have been collectively given designations such as 'new governance' (Lockwood, Davidson, Hockings, Haward, & Kriwoken, 2012), 'adaptive co-management' (Jerneck & Olsson, 2008). More recently, the concept of 'transformation' places questions of governance and policy at the centre of efforts to foster (or overcome barriers to) the resilience of livelihood systems (Tanner et al., 2015). Carabine, Venton, Tanner and Bahadur (2015) identify five characteristics of risk governance systems that are believed to be important for building resilience, derived from the social-ecological resilience literature (as reviewed recently by Biggs, Schlueter and Schoon, 2015). These are: 1) diversity, 2) polycentricism and connectivity, 3) decentralisation and flexibility, 4) participation and community engagement, and 5) learning and innovation.

Most donor-funded resilience programmes today provide different types of services to help households and communities build the assets and skills that will help them anticipate, absorb and adapt to shocks and stresses (Bahadur et al., 2015). In particular, the provision of ecosystem, climate and financial services is popular in resilience programming (Haworth, Frandon-Martinez, Fayolle, & Simonet, 2016; Jones, Harvey, & Godfrey-Wood, 2016). Little is known however about the way local risk governance systems and the broader institutional arrangements in which they are embedded, mediate people's access to these services and therefore result in improved resilience. Understanding how governance structures shape the resilience of households and communities is key to the success of resilience building programmes that are delivered at the community level and also those that attempt to scale up interventions and replicate at a wider scale.

This paper responds to an identified need to better understand the role of local governance systems in building resilience, by answering the following questions:

- How do the services provided through resilience programmes help households and communities to build the assets that make them more resilient to climate shocks and stresses?
- How do governance arrangements mediate access to these services?

A normative approach to the question of risk governance and resilience suggests that the system characteristics of diversity, polycentrism, decentralisation, participation, learning and innovation would be more supportive of—and facilitate—people's access to resilience services (than more centralised, authoritarian systems using fewer types of knowledge and with information flowing in only one direction). Yet it is not clear *how* they do for these very different kinds of services, or if some of these characteristics are more important than others. In particular, we are interested in whether risk governance systems made up of multiple types of knowledge and institutions (diversity) strengthen management of ecosystem, financial and climate services, and if so, how power dynamics at different scales (polycentricism and connectivity) mediate access to these services for different groups within communities.

The following sections strive to answer these questions. First, we outline the theoretical perspectives on how ecosystem, financial and climate services contribute to building household assets and strengthening resilience. Second, we explore institutional arrangements for risk management of poor and vulnerable communities. The examples provided here focus on the Sahel and Horn of Africa; areas facing significant and increasing climate risk (IPCC, 2014) and where there is an identified need to scale up resilience interventions beyond the community level and engage with governance systems.

2. Social-Ecological Systems Theory for Resilient Risk Governance: A Conceptual Framework

The conceptual approach outlined below draws on social-ecological resilience theory to propose a set of connections between risk governance, access to assets that help strengthen resilience, and some of the anticipated resilience outcomes at household and community levels (Carabine et al., 2015) (see Figure 1).

2.1. Resilience Characteristics

Social-ecological resilience theory recognises that complex and dynamic interactions occur within and between scales (Cumming, Cumming, & Redman, 2006; Gunderson & Holling, 2002). Collective decisions on how to manage risk are the outcome of complex interactions between firmly embedded social structures and the choices and individuals. The growing interconnectedness between global and local scales makes it even more challenging to understand how system level, overarching processes interact with adaptive behaviour and agency at the local level (Adger et al., 2009; Wilbanks, 2007). This section outlines several well-established principles—or

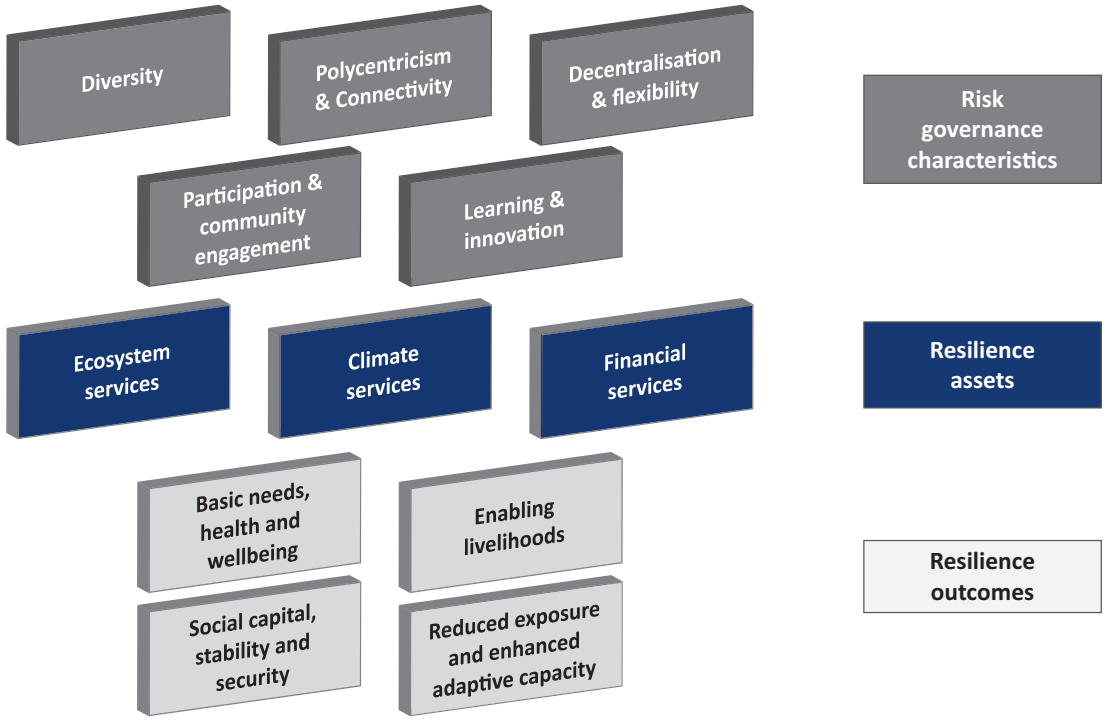

Figure 1. Conceptual framework linking risk governance characteristics with resilience outcomes.

desirable characteristics of—institutions for local-level risk management based on social-ecological systems theory (Biggs et al., 2015).

2.1.1. Diversity

Inclusion of a diverse range of actors and institutions in risk management, both informal and formal, will generate a diversity of responses (Renn et al., 2011; Robinson & Berkes, 2011). In particular, the inclusion of different knowledge systems and blending of scientific and indigenous knowledge is encouraged (Agrawal, 1995).

2.1.2. Polycentricism and Connectivity

The structure of the governance system should be such that the diversity of actors can organise themselves and there be multi-level interactions across administrative boundaries and vertical integration (Pahl-Wostl, 2009). This polycentricism in institutional arrangements (i.e., multiple sources of decision making) is needed to address complex problems (Biggs et al., 2015; Osbahr, Twyman, Adger, & Thomas, 2010). Similarly, in a risk governance system connections between institutions across scales is thought to improve communities' resilience to shocks and stresses (Twigg et al., 2013), by helping to ensure resources and information are channelled to the local level effectively (Nelson, Adger, & Brown, 2007) and lessons from local level risk management can inform higher level policies (Wilkinson, 2013). At the same time, it is recognised that risk governance at one particular level can also be affected by cross-scalar dynamics between levels of decision making (Walker, Holling, Carpenter, & Kinzig, 2004).

2.1.3. Decentralisation and Flexibility

The decentralisation of decision-making and fiscal responsibility to manage risk to the local level can promote approaches that are more appropriate to the local context (Biggs et al., 2015; Wilkinson, 2012). In principle, a local risk governance system should have the flexibility to make decisions regarding planning and service delivery and change course in response to local conditions (Nelson et al., 2007). In practice however, decentralising decision making to the lowest level may not be more sustainable or equitable unless there are mechanisms in place to promote financial responsibility and political accountability (Ribot, 2002).

2.1.4. Participation and Community Engagement

The importance of community engagement and participation in the management of natural resources and risk are well recognised in the resilience literature (Biggs et al., 2015; Manyena, 2006; Nelson et al., 2007). Building in processes for meaningful engagement can help foster ownership, ensure solutions are focused on local needs and are sustainable (Wilkinson, 2012).

2.1.5. Learning and Innovation

Given the complex dynamics of socio-ecological systems and their interaction with a changing climate, iterative

learning processes are needed as well as management plans that are explicitly designed to evolve as new information becomes available (Morgan et al., 2009; National Research Council [NRC], 2009). Continual learning and innovation are valuable processes to enhance institutional memory and avoid mistakes being repeated (Gunderson & Holling, 2002).

2.2. Methodology

The review methodology employed was designed to assess the evidence on how governance is shaping the provision of services, how these are accessed and whether they can contribute to resilience outcomes. This review focuses on the Horn of Africa and Sahel where resilience programmes have been implemented and where the three kinds of services are being delivered and accessed.

Without attempting a full systematic review, the methodology employed is nevertheless employed to achieve rigour, transparency and objectivity (Collins, Miller, Coughlin, & Kirk, 2015; Haddaway, Woodcock, Macura, & Collins, 2015). This approach has been designed specifically to manage the realities of the 'information architecture' found within the field of humanitarian and development programming, which includes the grey literature as well as journals (Hagen-Zanker & Mallett, 2013). Thus, literature searches of both peer reviewed journal articles and relevant grey literature were conducted, using Scopus, Web of Science Core Collections, Eldis and Google Scholar. In the first instance, a review of key theoretical papers was used to aid the identification of key words and phrases, along with their variants and synonyms, which formed the basis of search strings and inclusion/exclusion criteria.

The literature search yielded significantly more evidence on how governance systems shape the delivery and use of ecosystem services. There are relatively few studies on how climate services are delivered, as these are relatively new. Similarly, the literature linking financial services with resilience and risk governance is relatively nascent.

3. Governance for Access to Resilience Assets: Experience from the Sahel and Horn of Africa

A review of the literature offers numerous examples -ranging from broad descriptors to highly contextual examples—of how ecosystem services, financial services and climate forecasting can foster adaptive capacity, through the diversification of livelihood activities and strategies (including both agricultural and non-agricultural activities), by building livelihood assets and incomes, and informing long-term planning, among others (see for example Frankenberger et al., 2012). These kinds of changes, collectively referred to here as 'resilience outcomes', are linked in different ways to the provision, access and use of ecosystem, financial and climate services. This section reviews the hypotheses for how these sets of assets—ecosystem services, financial services and climate services—can contribute to resilience and what the literature tells us about the role of good governance in delivering these assets, with a particular focus on the Sahel and Horn of Africa regions.

3.1. Ecosystem Services

Globally, rural livelihoods rely heavily on provisioning, regulating and cultural ecosystem services. Ultimately, ecosystem services also provide many of the basic livelihood assets that provide overall health and well-being, including water, fuel, food and fiber, the availability of which, under normal conditions, can help to strengthen household and community resilience in periods of stress and shock (Carabine et al., 2015). The relative importance of various specific ecosystem services may vary within and between communities. For example, pastoralists inhabiting arid and semi-arid lands in Africa and Asia practice transhumance (moving livestock from one grazing ground to another in a seasonal cycle) as a strategy to exploit spatial variation ecosystem services. These include rainfall patterns, the natural regulation of ground and surface water and the inherent regenerative capacity of savanna and forest ecosystems to help ensure that a diversity of resources are available to help withstand shocks ranging from severe and prolonged drought, to long-term land degradation and political upheaval (Frankenberger et al., 2012; Hesse, Anderson, Cotula, Skinner, & Toulmin, 2013; Robinson & Berkes, 2011).

More settled populations depend upon the availability of wild edible plants and other non-timber forest products, as well as the provision of primary inputs for alternative livelihood activities, such as timber and charcoal production; fishing and hunting (Shumsky, Hickey, Johns, Pelletier, & Galaty, 2014); and cultivating a diversity of crops (Folke et al., 2004). For example, in Ethiopia, forested areas provide wild edible plants and other subsistence food-stuffs, which are particularly valuable during droughts and other periods of hardship. Marketable commodities including frankincense, myrrh, gum arabic and henna offer opportunities for alternative sources of income and the diversification of livelihood activities. Across four districts of Ethiopia, community forestry management has been mainstreamed, with initial results showing promise for achieving sustainable management of ecosystem services like non-timber forest products and the more equitable distribution of their benefits (Flintan et al., 2013). Managing diverse ranges of ecosystem services enables people to pursue alternative income-generating and livelihood strategies during periods of shock or stress, such as adverse weather conditions (Carabine et al., 2015).

For many years, practical support to build resilience in the Sahel and Horn of Africa has aimed to establish community-based natural resource management systems and foster sustainable and equitable governance of common pool resources. This experience has led re-

searchers, development practitioners, policymakers and others to appreciate the influence governance structures have in mediating the development and provision of those assets and services that underpin such initiatives.

Given the climate-sensitive nature of many livelihood assets such as pastures, water resources, coastal and inland fisheries, forests, and even physical infrastructure such as roads, bridges and irrigation systems, climate change is poised to create a variety of new and qualitatively distinct challenges to rural livelihoods, which local institutions will be central to addressing. To do so, it is crucial that new and more adaptive risk governance structures and institutional arrangements are forged (Agrawal, 2008; Brown & Sonwa, 2015; Fankhauser, Smith, & Tol, 1999; Sharma, Orindi, Hesse, Pattison, & Anderson, 2014; Washington-Ottombre & Pijanowski, 2013).

In many cases, the seeds of such resilient risk governance systems are already present, particularly at the local level. Then the task becomes one of identifying, maintaining, strengthening and better integrating institutions across scales of risk governance. For example, a sizable body of evidence has emerged to suggest that many of the management strategies that pastoralists in the Sahel and Horn of Africa regions of Africa employ—including the maintenance of traditional governance structures and various informal institutions—are not merely coping strategies, but strategies for managing risk through the optimisation of resources (Flintan et al., 2013; Hesse & MacGregor, 2006; Krätli & Schareika, 2010; Little, McPeak, Barrett, & Kristjanson, 2008). Effective drought risk management should incorporate such customary, local-level institutions and other natural resource management authorities (Hesse & Macgregor, 2006), as well as informal institutions such as transhumance, herd-splitting, social and familial networks of livestock 'loaning' and customary property rights regimes (Flintan et al., 2013).

However, the authority and efficacy of these customary institutions have been eroded considerably in recent decades, in part due to policy decisions and development interventions, as well as changing economic, climatic and security conditions (Helland, 2000; Vedeld, 1994). Continuing the previous example, a proliferation of government- and donor-funded wells and boreholes in semi-arid regions of Kenya, Somalia and Ethiopia coupled with point-source provision of health care, veterinary services, education, emergency food aid and other social protection services, have had significant effects on the pastoralist institutions described above. In turn, this has contributed to negative environmental effects as a result of over-stocking and unsustainable rates of groundwater exploitation, which relate directly with greater sedentarisation and population density (Gomes, 2006; Little et al., 2008). In these cases, the critical role of informal institutions in managing access to resources has been eroded, effectively reducing the resilience of pastoralist communities.

Some sub-Saharan African countries have undergone decentralisation of risk—and natural resource—management functions in recent years with equivocal outcomes for access to ecosystem services. Senegal's Rural Community Councils and Sub-prefects, Zimbabwe's Rural District Councils, and analogous entities elsewhere have assumed authority for a variety of tasks key to disaster risk reduction, natural resource management and the provision of resilience-linked services. But often, these institutions are without adequate support for greater inclusiveness, accountability or democratisation, not to mention financial and technical capacity (Manyena, 2006). Frequently, the effects are such as to undermine customary institutions and governance structures without effectively replacing them. In this way, the failure to adequately integrate formal public and civil sector institutions with informal and customary institutions may actually reduce the diversity of possible responses rather than increase available options (Leslie & McCabe, 2013).

Despite these challenges, innovative governance structures have been developed and piloted to fill these gaps and to create more effective, decentralised and participatory approaches to the management of climate sensitive and resilience-linked livelihood assets. One promising example is the Local Conventions approach being instituted in a number of Sahelian West African states. This approach begins with a natural resource assessment, followed by participatory community deliberation on rights of use and access, and concludes with a formalised agreement among all involved stakeholders. This approach has proved particularly effective in helping to avoid and manage conflict over resources in areas marked by a diversity of livelihood strategies (Roe, Nelson, & Sandbrook, 2009). Another similar strategy, known as the Rural Code, has been developed in Niger. This legal framework grants collective grazing and water access rights to herders in their home areas, while granting the communities authority to negotiate usage rights with other groups. This approach provides both a framework and an incentive for the empowerment of customary governing bodies, effective decentralisation and a clear path toward the equitable provision of important livelihood assets among different stakeholders (Roe et al., 2009). In light of these challenges and opportunities, a number of academics, non-governmental organisations and policymakers are calling for greater support for local governments, customary institutions and governance innovations as well as greater integration among institutions and across scales (Flintan et al., 2013).

To increase participation of communities in risk governance, Shared Learning Dialogues were established in Isiolo, in northern Kenya, which included stakeholders from the local pastoralist and agro-pastoralist communities along with government agencies and local civil society organisations. These platforms functioned as fora to both disseminate and deliberate on climate forecasts from the Kenya Meteorological Department, as well as to collectively prioritise adaptation activities and mobilise

community resources to implement them (Hesse & Pattison, 2013). The Shared Learning Dialogues led to efforts towards deliberately structuring natural resource management institutions that were more diverse, participatory, deliberative, decentralised, and integrated with other relevant agencies and institutions. A similar approach, with equally encouraging results, is reported by CARE (2012) from the neighbouring province of Garissa in Kenya. However, another initiative, known as the focal area approach, encountered a number of challenges when implemented in that same location. This was reportedly due to a failure to adequately integrate the relevant private, public and civil society institutions, along with limited technical capacity on the part of some participating extension personnel, severely constraining the effort's potential impact (Kiara, 2011). While highlighting some of the potential challenges to implementing meaningful governance reform in service of resilience building, these examples do lend further evidence to the importance of these resilience characteristics.

3.2. Financial Services

Financial services, and in particular credit, offer opportunities for livelihood strengthening and diversification extending into small-scale manufacturing, trade, the service sector and other activities (Good Governance Learning Network [GGLN], 2014), in addition to the ability to invest in new or expanded agricultural assets like fertilisers, hired labour, veterinary services, machinery and crop protection products (Madajewicz, Tsegay, & Norton, 2013). Microfinance organisations, particularly savings driven community-based organisations, have also been shown to serve as excellent forums for developing and refining skills such as household budgeting and financial planning, business management, and other aptitudes that can catalyse long-term adaptive planning (GGLN, 2014).

Increased household savings, particularly when coupled with budgeting and financial planning, can make an important contribution to preparedness, not only in the case of unanticipated covariate shocks, such as droughts, floods and conflict, but also with regards to predictable fluctuations in income and expenditure, including seasonally-recurring events (e.g. the 'hunger months' just before harvest or annual school fees) as well as idiosyncratic shocks (e.g., a wedding, illness or injury) (GGLN, 2014).

Evidence of the potential contribution of financial services—including savings, credit, insurance and training in financial literacy—to household and community resilience is convincing (Hallegatte et al., 2016; Haworth et al., 2016). Research on externally supported microcredit schemes has demonstrated that the availability of credit can play a pronounced role in helping women and children avoid acute food insecurity and malnutrition in the immediate aftermath of a shock (Doocy, Teferra, Norell, & Burnham, 2005) while reducing the risk of long-term household asset erosion and chronic poverty following disasters (Carter, Little, Mogues, & Negatu, 2004). Even more innovative financial instruments, such as integrated weather-based index insurance programmes, have shown significant potential for minimising losses and accelerating recovery after climate-related shocks, especially drought (Madajewicz et al., 2013).

Across countries, fiscal decentralisation appears to be a vital component for communities to be able to manage and access resilience assets (Manyena, 2006). However, some governments remain hesitant to devolve fiscal authorities to local communities, noting that administration and oversight of so many small grants is in itself often impractical. In Kenya, the jointly funded Arid Lands Resource Management Project (ALRMP)—which provided technical support, early warning systems and coordinated response strategies across multiple scales—proved effective in significantly mitigating the damage to the country's pastoralist communities. Complementing these governmental programmes are a variety of participatory climate information services and community-led adaptive planning efforts led by various international research and development organisations.

The institutions that govern the provision of financial services, regardless of whether emerging within communities or initiated by external actors, appear to play a vital role in ensuring households possess the resources necessary to withstand unanticipated shocks. They can also help generate social capital and networks, providing complementary benefits (Brown & Sonwa, 2015; Caretta, 2014; GGLN, 2014). How financial services are designed has a significant influence on the extent to which that potential can be reached, and there are numerous examples of microfinance organisations failing, either in part or in full, to achieve their stated objectives (see, for example, Carter, de Janvry, Sadoulet, & Sarris, 2015, and Yaro et al., 2015). Interestingly, many of the design principles employed by the highly successful South African microfinance initiative led by SaveAct, as described in GGLN (2014), correspond closely with the principles of effective governance of common pool resources advocated by Ostrom (1990), Agrawal (2008), and others. These include: having clearly defined membership consisting of those with a history of successful collaborative experiences (i.e., savings groups are self-selecting); having rules that are simple and easy to understand, with clear mechanisms for enforcement; and the availability of low cost adjudication (i.e. savings groups draft their own by-laws, including means of adjudication and sanction).

3.3. Climate Services

Climate services provide community members with localised, probabilistic weather forecasts—sometimes in conjunction with, or incorporating, traditional and ecological approaches to agro-meteorology—helping farmers, pastoralists and other end-users to make informed risk management decisions, reducing their vulnerability

to climate related shocks (CARE, 2012; Kgakatsi & Rautenbach, 2014). Most success in Africa and Asia has been observed in improved forecasting and use of seasonal weather information (Wilkinson et al., 2015).

Medium- and long-term climate forecast data can also serve a variety of functions at local, state/provincial and national levels, including informing decisions around land-use planning, infrastructure investments and urban development, coastal management and flood control efforts, and natural resource management and agricultural policy. Collectively, these functions constitute a contribution to strengthening resilience, although significant challenges exist to the meaningful adoption and use of climate information in developing nations (Jones, Carabine, Roux, & Tanner, 2015). These include the fundamental disconnect between the priorities of producers and end-users of climate forecast data, challenges to effective communication between the two groups and technical issues related to scale and resolution of available information (Jones et al., 2015). Compounding these challenges are a host of technical, financial and institutional constraints that conspire to limit the uptake and effectiveness of medium and long-term climate forecasts in public policy making (Fankhauser et al., 1999; Jones et al., 2015).

The literature on governance and the use of climate services is relatively limited. At the regional level in the Horn of Africa, there is a shift towards greater investment in, and cross-scalar integration of climate services provision and drought early warning systems (Fitzgibbon & Crosskey, 2013). One example of this trend is the establishment in 2011, of the National Drought Management Authority (NDMA) in Kenya, which has been delegated responsibility for operating Kenya's Early Warning System as well as coordinating district and community-level disaster risk reduction and contingency funding initiatives. A second, though to date less developed, initiative comes from the Ethiopian Disaster Risk Management—Agricultural Task Force. In terms of regional institutional arrangements, drought risk governance is coordinated under the Inter-Governmental Authority on Development in the Horn of Africa (IGAD) Drought Disaster Resilience and Sustainability Initiative (IDDRSI). Each member state is responsible for embedding this regional initiative into national processes, of which Kenya is the most advanced, launching its Ending Drought Emergencies (EDE) framework in 2015. Institutional development and knowledge management are central to the framework, drawing together a wide range of stakeholders (Carabine et al., 2015). However, across the region climate services remain centrally provided and largely disconnected from local knowledge about the dynamics of weather and seasonality.

4. Discussion

Based on the examples provided in the literature for the Sahel and Horn of Africa regions and elsewhere, Table 1 offers a concise, if simplified, representation of the principal resilience outcomes associated with ecosystem services, climate forecasting services and financial services, particularly in rural regions (where these have been observed) and the resilient governance characteristics most likely to promote these. It is not exhaustive but does suggest that some aspects of risk governance are more strongly connected with particular resilience outcomes. A risk governance system that has all the characteristics represented in the matrix, would therefore strengthen access to a variety of services and produce multiple resilience outcomes.

A significant caveat is warranted here, however, with important implications for the direction of future research and development efforts. Many developing nations face severe limitations in the availability of human, financial and technical resources, which make it necessary to prioritise development initiatives and governance reforms (Herrfahrdt-Pahle, 2013). In other words, it is rarely possible to achieve all of desired risk governance characteristics, in all localities, across all sectors simultaneously. There is a need to further identify and test best practice in terms of how to approach piecemeal governance reform with aims to contain costs, maximise synergies and avoid contradictions.

A further complication is the reality that risk governance characteristics may themselves be subject to threshold effects. An example would be the case when greater community participation did not provide a proportionally greater contribution to resilience, with no observable benefit at all prior to the achievement of some minimum effective level of community engagement (Cornwall, 2008). However, much more needs to be learned considering the significant impacts such conditions would have on the design and implementation of initiatives targeted at improving resilience (Young, 2010).

Finally, Table 1 is intended to capture the principal relationships between governance characteristics and community resilience (via access to key services), but the level of importance or specific impacts of different risk governance characteristics is likely to vary significantly according to the locality in question, and depending on the types of livelihood activities communities are engaged in. In interpreting this table, it is interesting to note that the governance of ecosystem services is seemingly more closely linked to livelihood outcomes, whereas financial and climate services also have the potential to help communities reduce exposure and enhance adaptive capacity. Enhanced social capital to deal with shocks and stresses appears to be mostly associated with financial and climate services if there are strong processes of learning and innovation in their provision.

All of these gaps point to the need for further research that might eventually guide the creation of a decision support tool or tools capable of offering practical guidance on programming on governance reform for improved resilience in light of the diversity of real-world development contexts encountered. In doing so, it will be possible to better identify the entry points for improved

Table 1. Matrix of resilience outcomes associated with different risk governance regimes.

	Ecosystem Services	Financial Services	Climate Services
Diversity	A, B, D	B, D	A
Polycentricism and Connectivity	A, B	A, D	A, D
Decentralisation and Flexibility	A, B, C	A, B, D	B, D
Participation and Community Engagement	A, B, C	A, B, D	B, D
Learning and Innovation	C	C	C

Key to resilience outcomes:
A = Basic needs, health and well-being
B = Enabling livelihoods
C = Social capital, stability and security
D = Reduced exposure and enhanced adaptive capacity

risk management and where the thresholds lie in terms of local risk governance.

5. Conclusions

There is a growing literature documenting experiences around how ecosystem, financial and climate services can strengthen resilience at the local level. There is less evidence regarding the importance of governance systems in mediating access to these assets. Most examples can be found in the field of natural resource management, where there is a longer history of interventions aimed at building resilience relative to financial or climate services. The evidence indicates that these services are delivered in different ways through different institutional arrangements with implications for the way in which people access them.

Ecosystem services are often delivered at the local level and governed by complex institutional arrangements with actors, including governments, non-governmental organisations and community-based organisations, that often overlap. With such complex institutional arrangements, the risk governance characteristics discussed in this paper may help to identify routes towards more resilient risk governance at the community level.

In many cases, climate services are delivered by national governments, often bypassing local governance structures. Therefore, while access to, use and application of weather and climate information and services in Africa and elsewhere are increasing, end-users continue to face challenges in receiving and applying these services. Greater integration between the national, scientific institutions that produce climate and weather information, with the local, informal institutions, which are more easily accessed, appears therefore to be critical to building resilience. Polycentricism and diversity of institutions, as principles of risk governance, would seem to be particularly important for the delivery of climate services in resilience programmes.

In many areas of the Sahel and Horn of Africa, the formal financial sector is largely absent. In these cases financial services are often provided informally, by women's savings groups or through reciprocity within social groups. Increasingly, non-governmental organisations are delivering financial services, via Village Savings and Loan Associations for example, and private sector actors are also moving into this service area, delivering microfinance and insurance products in places that are vulnerable to climate change and extreme weather events. In assessing the implications for community resilience of these shifting institutional arrangements, it will be important to consider the role these actors can play in wider risk governance systems.

The literature on resilience is rapidly expanding beyond concepts and theory into areas of practice, looking at the various roles that services play in strengthening people's capacities to anticipate and adapt in the face of shocks and stresses. Limited attention has been paid however, to the institutions governing how households and communities access and use these services. The socio-ecological resilience literature suggests that some risk governance systems will be more effective than others in reaching the most vulnerable. In this paper we have indicated a way forward for researchers and practitioners to test these hypotheses and build a greater body of evidence on the role of risk governance in delivering resilience outcomes.

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Conflict of Interests

The authors declare no conflict of interests.

References

Adger, W. N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D. R., . . . Wreford, A. (2009). Are there

social limits to adaptation to climate change? *Climatic Change*, *93*(3), 335–354. doi:10.1007/s10584-008-9520-z

Agrawal, A. (1995). Dismantling the divide between Indigenous and scientific knowledge. *Development and Change*, *26*(3), 413–439. doi:10.1111/j.1467-7660.1995.tb00560.x

Agrawal, A. (2008). *The role of local institutions in adaptation to climate change*. Washington, DC: World Bank.

Bahadur, A., Peters, K., Wilkinson, E., Pichon, F., Gray, K. & Tanner, T. (2015). *The 3As: Tracking resilience across BRACED*. London: ODI.

Biermann, F. (2007). "Earth system governance" as a crosscutting theme of global change research. *Global Environmental Change: Human and Policy Dimensions*, *17*, 326–337.

Biermann, F., Betsill, M. M., Gupta, J., Kanie, L., Lebel, L., Liverman, D., . . . Siebenhuener, B. (2009). *Earth system governance: People, places and the planet. Science and Implementation Plan of the Earth System Governance Project*. Bonn: The Earth System Governance Project.

Biggs, R., Schlueter, M., & Schoon, M. L. (2015). *Principles for building resilience: Sustainaing ecosystem services in social-ecological systems*. Cambridge: Cambridge University Press.

Britton, N. (2001). A new emergency management for the new millennium? *Australian Journal of Emergency Management*, *16*(4), 44–54.

Brockhaus, M., Djoudi, H., & Kambire, H. (2012). Multilevel governance and adaptive capacity in West Africa. *International Journal of the Commons*, *6*(2), 200–232.

Brown, H. C. P., & Sonwa, D. J. (2015). Rural local institutions and climate change adaptation in forest communities in Cameroon. *Ecology and Society*, *20*(2). doi:10.5751/ES-07327-200206

Carabine, E., Venton, C. C., Tanner, T., & Bahadur, A. (2015). *The contribution of ecosystem services to human resilience: A rapid review*. London: ODI. Retrieved from https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9394.pdf

CARE. (2012). *Decision-making for climate resilient livelihoods and risk reduction: A participatory scenario planning approach*. Retrieved from http://www.careclimatechange.org/files/adaptation/ALP_PSP_Brief.pdf

Caretta, M. A. (2014). "Credit plus" microcredit schemes: A key to women's adaptive capacity. *Climate and Development*, *6*(2), 179–184. doi:10.1080/17565529.2014.886990

Carter, M. R., de Janvry, A., Sadoulet, E., & Sarris, A. (2015). *Index-based weather insurance for developing countries: A review of evidence and propositions for scaling-up* (FERDI Working Paper no. 112). Clermont-Ferrand: FERDI.

Carter, M. R., Little, P. D., Mogues, T., & Negatu, W. (2004). Shock, sensitivity and resilience: Tracking the economic impacts of environmental disaster on assets in Ethiopia and Honduras. *International Food Policy Research Institute*. Retrieved from http://www.ifpri.org/publication/shocks-sensitivity-and-resilience-0

Collins, A., Miller, J., Coughlin, D., & Kirk, S. (2015). *The production of quick scoping reviews and rapid evidence assessments: A how to guide*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/560521/Production_of_quick_scoping_reviews_and_rapid_evidence_assessments.pdf

Cornwall, A. (2008). Unpacking "participation": Models, meanings and practices. *Community Development Journal*, *43*(3), 269–283.

Cumming, G. S., Cumming, D. H. M., & Redman, C. L. (2006). Scale mismatches in social-ecological systems: Causes, consequences, and solutions. *Ecology And Society*, *11*(1). Retrieved from file:///C:/Users/Rodrigo%20o%20Grande/Downloads/ES-2005-1569.pdf

Doocy, S., Teferra, S., Norell, D., & Burnham, G. (2005). Credit program outcomes: Coping capacity and nutritional status in the food insecure context of Ethiopia. *Social Science & Medicine*, *60*(10), 2371–2382. doi:10.1016/j.socscimed.2004.10.025

Eriksen, S., & Lind, J. (2009). Adaptation as a political process: Adjusting to drought and conflict in Kenya's drylands. *Environmental Management*, *43*(5), 817–835. doi:10.1007/s00267-008-9189-0

Fankhauser, S., Smith, J. B., & Tol, R. S. J. (1999). Weathering climate change: Some simple rules to guide adaptation decisions. *Ecological Economics*, *30*(1), 67–78. doi:10.1016/S0921-8009(98)00117-7

Fitzgibbon, C., & Crosskey, A. (2013). *Disaster risk reduction management in the drylands in the Horn of Africa*. Retrieved from https://cgspace.cgiar.org/bitstream//handle/10568/27614/tc_brief4.pdf?sequence=2

Flintan, F., Behnke, R., & Neely, C. (2013). *Natural resource management in the drylands in the Horn of Africa*. Nairobi: ILRI. Retrieved from https://cgspace.cgiar.org/handle/10568/27611

Folke, C., Carpenter, S., Walker, B., Scheffer, M., Elmqvist, T., Gunderson, L., & Holling, C. S. (2004). Regime shifts, resilience, and biodiversity in ecosystem management. *Annual Review of Ecology, Evolution and Systematics*, *35*, 557–581.

Frankenberger, T. R., Spangler, T., Nelson, S., & Langworthy, M. (2012). *Enhancing resilience to food insecurity amid protracted crisis*. Rome: FAO. Retrieved from http://www.fao.org/fileadmin/templates/cfs_high_level_forum/documents/Enhancing_Resilience_Food Insecurity-TANGO.pdf

Good Governance Learning Network. (2014). *Community resilience and vulnerability in South Africa: Perspectives from civil society on local governance in South Africa*. Retrieved from ggln.org.za/1solg-publication-2014.pdf

Gomes, N. (2006). *Access to water, pastoral resource management and pastoralists' livelihoods: Lessons learned from water development in selected areas of Eastern Africa* (LSP Working Paper 26). Rome: FAO

Haddaway, N. R., Woodcock, P., Macura, B., & Collins, A. (2015). Making literature reviews more reliable through application of lessons from systematic reviews. *Conservation Biology*, *29*(6), 1596–1605.

Hagen-Zanker, J., & Mallett, R. (2013). *How to do a rigorous, evidence-focused literature review in international development: A guidance note* (Working Paper). London: ODI.

Hallegatte, S., Bangalore, M., Bonzanigo, L., Fay, M., Kane, T., Narloch, U., . . . Vogt-Schlib, A. (2016). *Shock waves: Managing the impacts of climate change on poverty*. Washington, DC: International Bank for Reconstruction and Development. doi:10.1596/978-1-4648-0673-5

Haworth, A., Frandon-Martinez, C., Fayolle, V., & Simonet, C. (2016). *Climate resilience and financial services*. Retrieved from http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/10316.pdf

Helland, J. (2000). Institutional erosion in the drylands: The case of the Borana pastoralists. *Pastoralists and environment: Experience from the Greater Horn of Africa*. Addis Ababa: OSSREA.

Herrfahrdt-Pahle, E. (2013). Integrated and adaptive governance of water resources: The case of South Africa. *Regional Environmental Change*, *13*(3), 551–561. doi:10.1007/s10113-012-0322-5

Hesse, B. C., Anderson, S., Cotula, L., Skinner, J., & Toulmin, C. (2013). Building climate resilience in the Sahel. *Proceedings of a Joint FAO/OECD Workshop 23–24 April 2012*. Rome: FAO. Retrieved from http://pubs.iied.org/pdfs/G03650.pdf

Hesse, C., & Macgregor, J. (2006). *Pastoralism: drylands' invisible asset? Developing a framework for assessing the value of pastoralism in East Africa* (Drylands Issue Paper 142). London: IIED.

Hesse, C., & Pattison, J. (2013). *Ensuring devolution supports adaptation and climate resilient growth in Kenya*. London: IIED.

Intergovernmental Panel on *Climate Change. (2014). Climate change 2014: Impacts, adaptation, and vulnerability* (Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change). Retrieved from http://ipcc-wg2.gov/AR5/images/uploads/WG2AR5_SPM_FINAL.pdf

Jerneck, A., & Olsson, L. (2008). Adaptation and the poor: Development, resilience and transition. *Climate Policy*, *8*(2), 170–182. doi:10.3763/cpol.2007.0434

Jones, L., Carabine, E., Roux, J.-P., & Tanner, T. (2015). Promoting the use of climate information to achieve long-term development objectives in sub-Saharan Africa: Results from the future climate for Africa scoping phase. *American Journal of Infection Control*, *43*(2). doi:10.1016/S0196-6553(14)01403-5

Jones, L., Harvey, B., & Godfrey-Wood, R. (2016). *The changing role of NGOs in supporting climate services* (BRACED Resilience Intel No. 4). London: ODI. Retrieved from https://www.odi.org/sites/odi.org.uk/files/resource-documents/10885.pdf

Kgakatsi, I. B., & Rautenbach, C. J. deW. (2014). The contribution of seasonal climate forecasts to the management of agricultural disaster-risk in South Africa. *International Journal of Disaster Risk Reduction*, *8*, 100–113. doi:10.1016/j.ijdrr.2014.01.002

Kiara, J. K. (2011). Focal area approach: A participatory community planning approach to agricultural extension and market development in Kenya. *International Journal of Agricultural Sustainability*, *9*(1), 248–257. doi:10.3763/ijas.2010.0566

Krätli, S., & Schareika, N. (2010). Living off uncertainty: The intelligent animal production of dryland pastoralists. *The European Journal of Development Research*, *22*(5), 605–622. doi:10.1057/ejdr.2010.41

Leslie, P., & McCabe, J. (2013). Response diversity and resilience in social-ecological systems. *Current Anthropology*, *54*(2), 114–143.

Gunderson, L. H., & Holling, C. S. (2002). *Panarchy: Understanding Washington, transformations in human and natural systems*. Washington, DC: Island Press.

Little, P. D., McPeak, J., Barrett, C., & Kristjanson, P. (2008). Challenging orthodoxies: Understanding pastoral poverty in East Africa. *Development and Change*, *39*(4), 585–609. doi:10.1111/j.1467-7660.2008.00497.x

Lockwood, M., Davidson, J., Hockings, M., Haward, M., & Kriwoken, L. (2012). Marine biodiversity conservation governance and management: Regime requirements for global environmental change. *Ocean & Coastal Management*, *69*, 160–172. doi:10.1016/j.ocecoaman.2012.07.015

Madajewicz, M., Tsegay, A. H., & Norton, M. (2013). *Managing risks to agricultural livelihoods: Impact evaluation of the HARITA program in Tigray, Ethiopia 2009–2012*. Boston: Oxfam.

Manyena, S. B. (2006). The concept of resilience revisited. *Disasters*, *30*(4), 434–450. doi:10.1111/j.0361-3666.2006.00331.x

Morgan, M. G., Dowlatabadi, H., Henrion, M., Keith, D., Lempert, R. J., McBride, S., . . . Wilbanks, T. (2009). *Best practice approaches for characterizing, communicating, and incorporating scientific uncertainty in decision making* (Synthesis and Assessment Product 5.2 of the US Climate Change Science Program). Washington, DC: US Climate Change Science Program.

National Research Council. (2009). *Informing decisions in a changing climate*. Washington, DC: The National Academies Press.

Nelson, D. R., Adger, W. N., & Brown, K. (2007). Adaptation to environmental change: Contributions of a resilience framework. *Annual Review of Environment and Resources*, *32*(1), 395–419. doi:10.1146/

annurev.energy.32.051807.090348
Osbahr, H., Twyman, C., Adger, W. N., & Thomas, D. S. G. (2010). Evaluating successful livelihood adaptation to climate variability and change in Southern Africa. *Ecology and Society*, *15*(2).
Ostrom, E. (1990). Governing the commons. *The Evolution of Institutions for Collective Action*, 302. doi:10.1017/CBO9780511807763
Pahl-Wostl, C. (2009). A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmental Change*, *19*, 354–365.
Plummer, R., & Armitage, D. R. (2007). Charting the new territory of adaptive co-management: A Delphi study. *Ecology and Society*, *12*(2).
Renn, O., Ortleb, J., Benighaus, L., & Benighaus, C. (2011). *Risks Safe or not safe: Deciding what risks to accept in our environment and food*. New York, NY: Springer Science.
Ribot, J. (2002). *Democratic decentralization of natural resources: Institutionalizing popular participation*. Washington, DC: World Resources Institute.
Robinson, L. W., & Berkes, F. (2011). Multi-level participation for building adaptive capacity: Formal agency–community interactions in northern Kenya. *Global Environmental Change*, *21*(4), 1185–1194. doi:10.1016/j.gloenvcha.2011.07.012
Roe, D., Nelson, F., & Sandbrook, C. (2009). *Community management of natural resources in Africa: Impacts, experiences and future directions*. London: IIED.
Sharma, V., Orindi, V., Hesse, C., Pattison, J., & Anderson, S. (2014). Supporting local climate adaptation planning and implementation through local governance and decentralised finance provision. *Development in Practice*, *24*(4), 579–590. doi:10.1080/09614524.2014.907240
Shumsky, S., Hickey, G. M., Johns, T. C., Pelletier, B., & Galaty, J. E. (2014). Institutional factors affecting wild edible plant (WEP) harvest and consumption in semi-arid Kenya. *Land Use Policy*, *38*, 48–69. doi:10.1016/j.landusepol.2013.10.014
Stoker, G. (1998). Governance as theory: Five propositions. *International Social Science Journal*, *50*(155), 17–28.
Tanner, T., Lewis, D., Wrathall, D., Bronen, R., Cradock-Henry, N., Huq, S., . . . Thomalla, F. (2015). Livelihood resilience in the face of climate change. *Nature Climate Change*, *5*(1), 23–26. doi:10.1038/nclimate2431
Twigg, J., Tanenbaum, J. J. G., Williams, A. M., Desjardins, A., Tanenbaum, K., Peres, E., . . . Minshall, T. (2013). An integrated conceptual framework for long-term social-ecological research. *International Journal of Production Research*. doi:10.1890/100068
van Voorst, R., Wisner, B., Hellman, J., & Nooteboom, G. (2015). Introduction to the "risky everyday." *Disaster Prevention and Management: An International Journal*, *24*(4). doi:10.1108/DPM-04-2015-0077
Vedeld, T. (1994). *The state and rangeland management: Creation and erosion of pastoral institutions in Mali* (Drylands Networks Programme Issues Paper no. 46). London: IIED.
Walker, B., Holling, C. S., Carpenter, S. R., & Kinzig, A. (2004). Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society*, *9*(2), 5.
Washington-Ottombre, C., & Pijanowski, B. C. (2013). Rural organizations and adaptation to climate change and variability in rural Kenya. *Regional Environmental Change*, *13*(3), 537–550. doi:10.1007/s10113-012-0343-0
Wilbanks, T. J. (2007). Scale and sustainability. *Climate Policy*, *7*(4), 278–287. doi:10.1080/14693062.2007.9685656
Wilkinson, E. (2012). *Transforming disaster risk management: A political economy approach*. London: ODI.
Wilkinson, E. (2013). *Disaster risk governance in volcanic areas* (Work Package 4 of the Strengthening Resilience in Volcanic Areas [STREVA] programme). London: ODI.
Wilkinson, E., Budimir, M., Ahmed, A. K., & Ouma, G. (2015). *Climate information and services in BRACED countries* (Resilience Intel No. 1). London: ODI. Retrieved from http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/10128.pdf
Wilkinson, E., Caravani, A., Canales Trujillo, N., Nakhooda, S., Terpstra, P., & Peterson Carvalho, A. (2014). *Going in the right direction? Tracking adaptation finance at the subnational level*. London: ODI.
Young, O. R. (2010). Institutional dynamics: Resilience, vulnerability and adaptation in environmental and resource regimes. *Global Environmental Change*, *20*(3), 378–385. doi:10.1016/j.gloenvcha.2009.10.001

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Article

Integrating Recovery within a Resilience Framework: Empirical Insights and Policy Implications from Regional Australia

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Abstract
Within Australia's federal system, responsibility for preventing, preparing for, responding to and recovering from natural disasters is shared between the three tiers of government. Intergovernmental policy and funding arrangements are premised on shared responsibility and aim to foster individual, business and community resilience. These arrangements underpin Australia's international reputation for effectiveness in its management of natural disasters. The capacity of the diverse networks that comprise the disaster management system to coordinate and deliver in the preparedness and response phases of a disaster, and to provide relief in the immediate aftermath, has been developed over time and tested and refined through the experience of frequent, severe disaster events over recent decades. Less well developed is the system's ability to support economic recovery in disaster-affected communities over the longer term. This paper presents case studies of regional communities affected by two of Australia's most expensive and deadly natural disasters—the 2009 Victorian bushfires and the cyclones and floods that struck the state of Queensland in 2010–2011. It highlights significant gaps in policy and funding arrangements to support recovery and offers lessons for aligning recovery within a resilience framework.

Keywords
disaster governance; disaster recovery; economic recovery; resilience policy

Issue
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1. Introduction

Natural disasters are inherent to Australia's climate, geography and environment. Disaster events span the spectrum of hazards from bushfire, cyclone and earthquake to flood, heatwave and storm surge. Since 2009, natural disasters have wrought damage and destruction to life, infrastructure, private property and the natural environment across the states and territories. The estimated total economic costs of natural disasters was calculated to have been AUD$9 billion (USD$6.9 billion) in 2015.[1] Some reports predict this may increase to as much as AUD$33 billion (USD $25.5 billion) per year by 2050 as the impacts of climate change increase (Deloitte Access Economics, 2016, p. 2). Australia follows the comprehensive approach to disaster management, which comprises the phases of prevention[2], preparation, response and recovery (the PPRR framework) and addresses all hazards. Within Australia's federal system, responsibility for preventing, preparing for, responding to and recovering from natural disasters is shared between the three tiers of government. Intergovernmental policy and funding arrangements are premised on shared responsibility and, since 2001, have aimed to foster individual,

[1] Currency conversions to USD are calculated at the prevailing exchange rate for the period in question.
[2] By 'prevention' we mean 'mitigation' as it is the more common technical term used around the world.

business and community resilience. Less well developed, however, is the system's ability to support economic recovery in disaster-affected communities and to embed resilience over the longer term (see, for example, McGowan, 2014; McGowan & Tiernan, 2014).

This article responds to calls for more holistic approaches to disasters and in particular, economic recovery. It draws on the findings of a major study of the experiences of economic recovery practices in regional communities affected by two of Australia's most expensive and deadly natural disasters—the 2009 Victorian bushfires and the cyclones and floods that struck the state of Queensland in 2010–2011 (Regional Australia Institute [RAI], 2013). Our case studies highlight significant gaps in policy and funding arrangements to support recovery. We identified a disconnect between the experience and lessons learned from disaster recovery and prevention and preparedness. Indeed, we found that actions and decisions of policy-makers taken in the immediate aftermath of a disaster had the unintended consequence of undermining individual and community resilience over the longer term.

Since resilience remains the core policy intent, we offer lessons for how Australia's disaster governance arrangements, and those of other countries, might be amended to embrace 'adaptive resiliency'—'the ability to adapt through the redevelopment of the community in ways that reflect the community's values and goals, and its evolving understanding of the external forces with which it must contend' (Kapucu, Hawkins, & Rivera, 2013, p. 357). We conclude that the 'structural' or 'engineering approach' to resilience has become predominant in Australia's disaster governance, leading to a primary focus on reconstruction during the recovery phase post-disaster. Our case studies demonstrate the imperative for a greater focus on 'non structural' resilience, in particular the 'community capital' that can be brought to bear, to develop adaptive capacity and adaptive resilience.

In the context of this thematic issue, which is focused on promoting community resilience through disaster policies and governance, this article offers empirical support for the 'adaptive resiliency framework' proposed by Kapucu et al. (2013, p. 356). A key element of their framework is 'integrating learning and adaptation into the traditional phases of disaster management'.

2. Disaster Recovery: An Overview of Policy Issues in Australian Arrangements

Government funded disaster relief in Australia operates within the framework of the Natural Disaster Relief and Recovery Arrangements (NDRRA) (Attorney-Generals Department, 2012). The NDRRA framework establishes cost sharing arrangements between the State and Federal Governments as well as specifying eligible expenditure activities. Since 2007 the NDRRA has included provision to redevelop eligible public infrastructure to a higher, more resilient standard. Known as the principle of 'betterment', this provision provided—at least in theory—the link between recovery and mitigation against future disasters (McGowan, 2014). Its adoption was intended to align with the goal of improving community resilience, formalized in the *National Strategy for Disaster Resilience 2011* (NSDR).

Despite numerous disasters requiring reconstruction and spiralling expenditures under NDRRA (see Productivity Commission, 2014), only limited use has been made of the betterment provision. Until 2012 when the Queensland Government instituted a AUD$40 million (USD$40.9 million) fund that was matched by the Federal Government, the only successful application had been for a community pool betterment program in regional NSW (Productivity Commission, 2014). This remains an area of significant policy contention between the Commonwealth and State governments. Extraordinary increases in NDRRA expenditure—approximately AUD$12 billion (USD$10.7 million) from 2009–2013 can be contrasted with investments in mitigation under the Natural Disaster Resilience Program (NDRP) that totalled AUD$100 million (USD$89 million) over the same period (McGowan & Tiernan, 2014, p. 8).

In 2013 then Commonwealth Treasurer, Joe Hockey, tasked the Productivity Commission with responsibility for conducting a comprehensive review, including of cost-sharing principles and the apparent 'weighting' of Commonwealth funding towards recovery. The Commission was asked to 'take into account the priority of effective mitigation to reduce the impact of disasters on communities' (Productivity Commission, 2014, p. iv). At the time of writing, the Commonwealth government has acknowledged receipt of the report, but has not made a formal policy response to its recommendations.

Whilst these challenges, and the original impetus for the research project, arose in the context of Australian disaster management policy, they are not unique to Australia. A series of reports has identified the growing costs of disaster recovery and reconstruction around the world, all calling for an increased emphasis on building resilience to minimise the costs, both human and financial, of disasters and subsequent recovery. The research presented in this paper was conducted within the context of disaster resilience frameworks that are broadly applicable to all communities, with one important caveat that has implications for generalizability. That is, that it was conducted in Australia—a broadly stable, advanced democracy characterized by sound principles of governance and accountability. Thus, questions of state stability are not considered in our discussion of resilient communities.

3. Literature Review

3.1. Resilience Frameworks

In recent years, the concept of resilience has gained currency in disaster management policy. Originating in

ecology and psychology, resilience is envisaged by some scholars as both an outcome and the process by which actors, ranging from individuals, to families to communities, positively adapt to changing environments (Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008). Resilience is an important concept across fields as diverse as health planning, engineering and ecology, to economic development and social science (see Rose, 2009). Other definitions understand resilience as a system characteristic. For Holling (1973, p. 14), resilience is a 'measure of the persistence of systems and their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables'. In various parts of the literature, the changes and disturbances to a system are called stressors, which Norris et al. (2008, p. 131) define as 'aversive circumstances that threaten the well-being or functioning of the individual, organization, neighbourhood, community, or society'.

Numerous resilience models show a disaster-impacted community experiencing a period of interruption followed by a progressive return to an equilibrium point (Cutter, 2009; Norris et al., 2008; Zhou, Wang, Wan, & Jia, 2010). Positive adaptation in the face of a disaster shock incorporates individuals rapidly recovering their wellbeing post-disaster, as well as communities returning to a high, or higher, level of functioning. In achieving a high level of adapted functioning post-disaster, communities are able to develop greater resources to mitigate the impact of future disasters (Berkes & Ross, 2012; Zhou et al., 2010).

The more recent concept of 'adaptive resilience' is concerned with a 'community's behaviour after the disaster', and how to best support 'community-level activities [that] focus on returning social, economic, and environmental conditions to their previous state' (Kapucu et al., 2013, p. 356). This approach seeks to integrate understandings of resilience, and practices for its promotion, from a number of different fields. Inter-disciplinary perspectives are needed to support 'adaptive resilience', because, as Tierney (2013, p. xiv) notes, it is present in all aspects of the system's way of dealing with hazard events:

> "Resilience is a key element in all phases of what is traditionally framed as the 'hazards cycle': mitigation, preparedness, response, and recovery. Prior to disaster, anticipatory resilience consists of activities that enable communities to assess risks, form communities of interest, exercise foresight, and enact mitigation and preparedness measures to manage risks. When disasters strike, responsive resilience makes it possible for social and organisational entities to mobilise resources through emergent interpersonal and inter-organisational networks, to carry out plans, and to improvise and exercise creativity in instances where plans fall short. After disaster, adaptive resilience enables social units to reassess their circumstances, learn from their disaster experiences, and adjust their strategies in light of the 'new normal' ushered in by disaster."

The most comprehensive description of adaptive resilience is provided by Kapucu et al. (2013) (see Figure 1).

The community, or social units, are key to the adaptive resilience framework. In these processes, the 'community participates fully in the recovery process and…has the capacity, skills and knowledge to make its participation meaningful' (Coles & Buckle, 2004, p. 6). Adaptive governance processes become crucial. Indeed, Shaw (2013, p. 220) notes 'it is increasingly observed and agreed that a sustainable [disaster risk reduction] activity is only possible when there is a strong involvement and commitment from the local institutions'.

3.2. Issues in Economic Recovery for Regional and Rural Communities

Extensive research in the United States points to a strong inter-relationship between business recovery and population return post-disaster (Dahlhamer & Tierney, 1998; Vigdor, 2008; Webb, Tierney, & Dahlhamer, 2002; Xiao & Van Zandt, 2012; Zhang, Lindell, & Prater, 2009). Keeping residents in the local region, and assisting those displaced to return, is critical to business recovery. As Xiao and Van Zandt (2012) identified, the return of businesses to an area acts as a pull factor to the return of local residents. The problem of population displacement and return and its link to business return post-disaster is a variant of the collective action dilemma in which every individual's choice is influenced by the choices of other individuals (Storr & Haeffele-Balch, 2012). From the perspective of displaced residents, a key factor in the decision to return to a disaster-affected region is the extent to which businesses commit to rebuild and re-open. Research suggests that this relationship is more heavily weighted towards businesses reopening, meaning that business reopening will pull residents back into a disaster affected region (Xiao & Van Zandt, 2012).

The boom of local economic activity driven by reconstruction is frequently a mirage that masks a longer-term decrease in population and broader business performance issues (see Hayashi, 2012; Vigdor, 2008). Another aspect of the 'reconstruction mirage' faced in recovering communities is the focus on building 'things' to demonstrate commitment and action (Handmer & Hillman, 2004; Rietveld, Simms, & Sparrow, 2001). This theory, where economic development is presumed to flow from possessing or building things, is most frequently seen in practice in developing countries (Handmer & Dovers, 2007; Jacobs, 2000). The focus on building 'things' tends to drive a significant influx of construction workers to the affected region (Vigdor, 2008). The reconstruction boom often distorts measures of a region's economic performance and obscures the long-term challenges faced in achieving sustained economic recovery (Hayashi, 2012; Vigdor, 2008). Hayashi (2012, p. 190) noted this trend in relation to the 1995 Kobe earthquake recovery, observing Kobe's 'economy slid into a long decline, except for the short period during which recon-

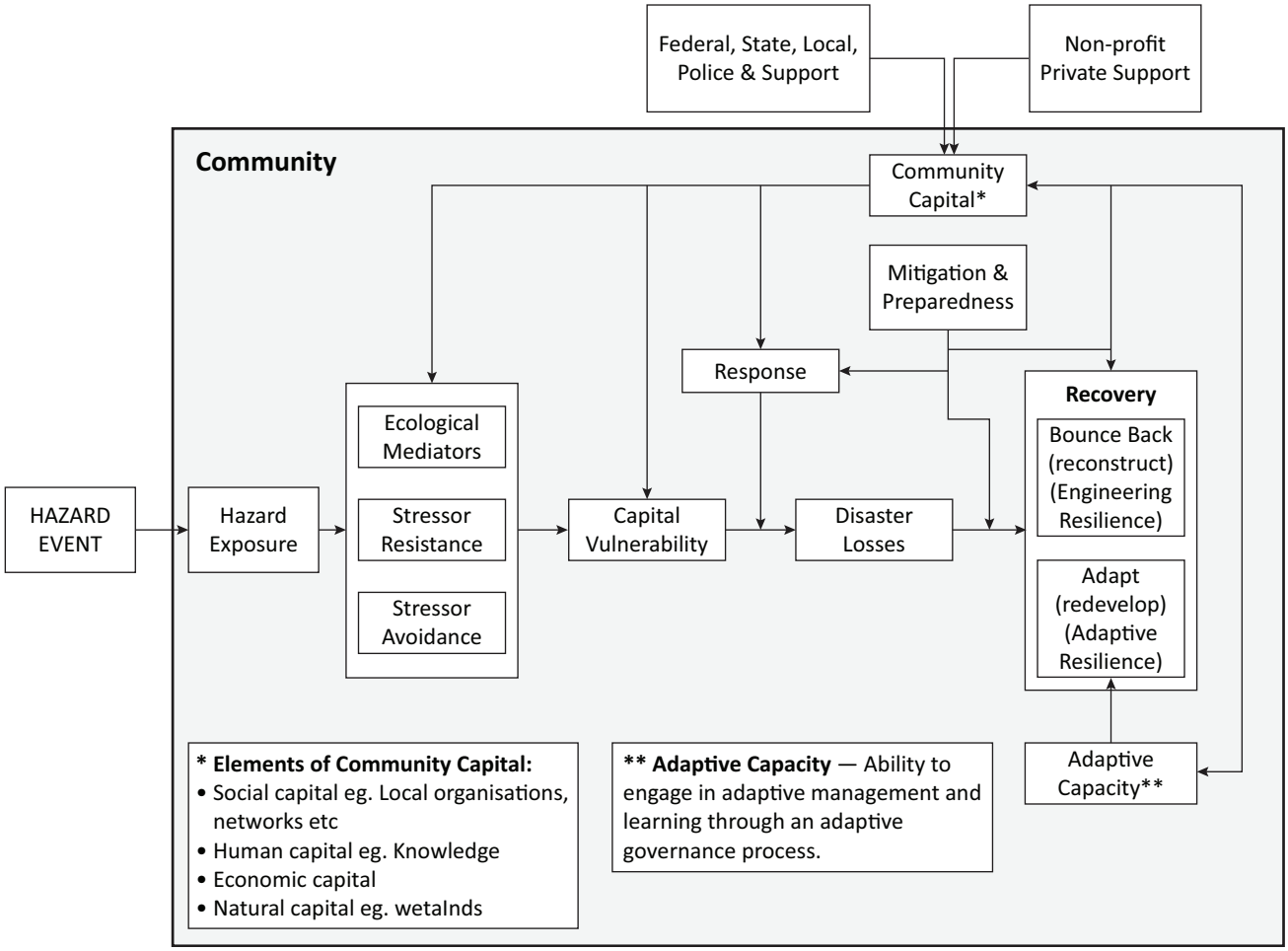

Figure 1. Adaptive resiliency framework. Source: Kapucu et al. (2013, p. 356).

struction spending provided a temporary boost'. New Orleans demonstrated the same pattern, with the construction sector being the only industry sector that did not suffer employment losses after Hurricane Katrina (Vigdor, 2008).

4. Methodology

4.1. Approach

This research was conducted through a case study approach. We used techniques drawn from the broad toolkit of interpretive policy analysis (Bevir & Rhodes, 2015; Rhodes, 2011). The method focuses on beliefs and practices; it is concerned with the meaning ascribed to experiences by those involved and seeks to recover their stories. A case study approach is useful when focusing on contemporary events as it enables an up-close interpretation of events through the interviews with people directly involved in those events. How disaster participants construct the meaning of events matters as this construction of a community's shared understanding of a disaster influences its resilience in future events (Alkon, 2004). As Alkon (2004, p. 147) notes 'Stories matter. Place matters. And stories affect place'. The importance of narrative and storytelling arises as the construction of meaning is an inherently subjective activity (Alkon, 2004; Riessman, 2008). The case study approach was therefore selected as it allowed researchers to ask explanatory 'how' and 'why' questions (Yin, 2009, p. 4).

The case studies were developed through a structured process of consultation and engagement to identify appropriate interviewees. In each of the case study locations, the research team first met with representatives of the local Council and the Chamber of Commerce to seek support for the project and identify interviewees. The research team also met with members of Community Associations and, in Cardwell, with the CEO of the Girringun Aboriginal Corporation. Researchers visited each of the case study locations to conduct intensive fieldwork, involving semi-structured, qualitative interviews.

4.2. Case Study Locations

The case study locations were selected as they had all suffered significant impacts in the various natural disasters. Each was formally declared a State of Disaster under the relevant policy frameworks. Further, due to the extensive damages arising from the events, major recovery

efforts were undertaken at local and state government levels through specially constituted reconstruction bodies. This formalised approach ensured that extensive documentary evidence of the process of recovery was produced and retained by relevant government agencies.

The article presents the data from three regional centres impacted by natural disasters:

Marysville and Triangle, Victoria, Australia—'Black Saturday' bushfires on 7 February 2009;

Emerald, Queensland, Australia—Southern and central Queensland floods in 2010–2011;

Cardwell, Queensland, Australia—Tropical cyclone Yasi, 2011.

The research team developed socio-economic profiles of each community pre and post disaster (see Table 1). These provided a baseline for comparison, and also highlighted the range of businesses present in each community. We sought interviews with a broadly representative sample of community and business leaders from across the spectrum of industries. In Cardwell, researchers conducted 18 interviews with representatives of industry, business owners, the local Chamber of Commerce, community development association, the Mayor and Council representatives. In Emerald, the research team conducted 18 interviews and a further 22 interviews were conducted in Marysville (total n = 58). Each interview lasted approximately an hour and follow up focus groups were conducted in each location, over a two to three hour period, to discuss the preliminary findings.

4.3. Data Analysis

To ensure the case study was rigorous, a comprehensive review of available data and literature was undertaken to provide context to the interview outputs and establish a baseline for analysis (Yin, 2009). In addition to the socio-economic profiles for each case study location noted above, desktop research included reviewing post disaster reports generated by key local groups such as the local Council, Chambers of Commerce and reconstruction authorities. This background research also involved requesting the local Councils to complete a comprehensive survey on the impacts of the disaster on the local area and local approaches to recovery.

The qualitative data collected through interviews were analysed using thematic analysis. The interviews were recorded, transcribed and reviewed by the project team. The thematic analysis was undertaken through an emergent inductive approach that sought to identify and draw out themes from the data (Lofland, Snow, Anderson, & Lofland, 2006). An iterative process of coding was undertaken, seeking first to identify key issues, shared and divergent narratives; and second to review and clarify the emerging analytic themes (Lofland et al., 2006). Different members of the research team reviewed and clarified the thematic analysis as part of an iterative process. Themes were then analysed in light of the existing models of community resilience and recovery (Cutter et al., 2008; Norris et al., 2008). Focus groups were subsequently conducted with key community leaders to reflect on the findings, 'ground truth' the data and identify additional information not elicited during the interviews.

5. Case Studies of Economic Recovery in Regional Australia

5.1. Marysville Case Study—Black Saturday Bushfires, 7 February 2009

The Marysville Triangle consists of the small communities of Marysville, Buxton, Narbethong and Taggety in the Shire of Murrindindi, about 100 km (62 miles) north-east of Melbourne. The area's economy is based on its natural environment. In addition to tourism, the main industries are agriculture, aquaculture, timber and sawmilling. The Black Saturday bushfires were a series of individual bushfires that burnt across Victoria on Saturday 7 February 2009. The fires resulted in Australia's highest ever loss of life from a bushfire, with 173 fatalities. 414 people were injured, 2,133 homes were destroyed, 78 townships affected, over 4,500 km^2 (2,796 $miles^2$) burned, leaving 7,500 people homeless.

Marysville and the surrounding areas suffered the greatest losses, with 39 people killed (35 Marysville, 4 Narbethong). Of the 452 homes that existed in Marys-

Table 1. Attributes of case study communities.* Source: Australian Bureau of Statistics ([ABS] 2006, 2011).

	Marysville		Emerald		Cardwell	
	2006	2011	2006	2011	2006	2011
Population	517	223	10,998	12,895	1,252	1,176
Median Age	46	52	28	29	47	52
Median Income per Week	$974	$880	$1,805	$2,477	$855	$1,004
Unemployment	5.5%	11.9%	1.9%	2.4%	4.7%	5.5%

* Data obtained are Urban Centres and Localities (UCLs) which are an aggregate of Statistical Area 1s (SA1s). They describe populations over 200 people. Urban Centres are areas with a core population greater than 1,000 people. Localities are areas with a population over 200 people and a core urban population less than 1,000 people. Median income is displayed in AUD$.

ville prior to the fires, only 34 remained habitable. Fire damage forced the closure of key tourist attractions including Lake Mountain. Almost all the shops and cafés and restaurants were lost. Essential services in Marysville including the police station, the post office, community centre, medical centre, retirement village and the primary school were destroyed.

5.1.1. Economic Impact

The total value of tourism to the Marysville economy was estimated at AUD$33 million (USD$35 million) per year of which 'visitors' to the area contributed about AUD$28 million (USD$30 million) per year (Boston Consulting Group [BCG], 2009, p. 18). With accommodation and tourism the major industry in the Marysville area, only 200 beds of an estimated 1500 remained available.

The large majority of Marysville and Triangle's businesses are 'micro' businesses with revenues of less than AUD$200k (USD$214,000) per annum. Their economic recovery has been difficult. For example, the general store did not open for nearly 10 months after the fires. A year on, the Marysville region still did not have a service station operating to supply petrol to local residents.

The immediate damage caused by the fires resulted in extensive displacement of the location population. Of the 90% of the population who lost their homes, over 50% have not returned to the region. In addition to the reduction in population since the Black Saturday fires, the age profile has changed dramatically. In 2006, Marysville's age profile showed 36% aged 55 years and over compared to 24% for Australia. By 2011, nearly 47% were aged 55 years and older. The median age in 2006 of 46 years had increased to 52 in 2011. The data reflects the loss of business and employment opportunities and the need for younger workers to move away in search of employment.

The unemployment rate increased dramatically from 5.5% in 2006 to 11.9% in 2011. Only 90 people indicated in the 2011 Census that they were employed and nearly half of these were working part-time or casually. Median weekly rental increased from $135 in 2006 to $350 in 2011 as a result of severe shortages in rental accommodation caused by the Black Saturday fires. In 2006 there were 65 rental accommodation units. There were only nine in 2011.

5.2. Emerald Case Study—2010–2011 Flooding

Emerald is the major centre within the Central Highlands Regional Council, approximately 300 km (186 miles) west of the regional city of Rockhampton. Emerald's economy is based on mining and agriculture. Emerald was flooded twice in December 2010. On 3 December, Emerald was isolated when the flooding peaked at 10.95 metres (35.92 feet) at the Vince Lester Bridge. The second flooding peaked on 31 December at 16.05 metres (52.66 feet), surpassing the 1950 record of 15.7 metres (49.44 feet). Again Emerald was isolated; this time for 11 days. The town itself was cut in half for seven days.

In Emerald, it was estimated that 1060 residences had water over the floor. 2,500 people were evacuated from their homes with more than 400 staying in one of four evacuation centres at the height of the flooding. It was also estimated that over 100 (90%) buildings in the industrial area and approximately 30% of commercial offices were impacted by flood waters.

5.2.1. Economic Impact

The impacts of the flood were largely felt by small and medium businesses in Emerald Township and the surrounding region. 341 businesses of a total of 386 or 80% of Emerald's businesses were impacted. In the regional council area, 88% of businesses affected were in Emerald itself (Central Highlands Regional Council, 2011). According to the Economic Impact report, the total estimated cost of direct damages to businesses (excluding mining) across the Central Highlands as a result of the flooding was AUD$313.6 million (USD$336.1 million) (Central Highlands Regional Council, 2011).

45.5% of businesses that were forced to close reopened within a week, while a further 19.7% opened again within two weeks. The average length of time to reopening was 25.2 days.

In the agricultural sector there was major damage to irrigation infrastructure, fencing, plant and equipment and crops and livestock with 35 primary producers in the Emerald service area reporting significant damage. The Economic Impact report assessed that the average cost of repairing infrastructure, equipment and/or replacing stock losses per property as a result of the 2010–2011 flooding was approximately AUD$306,992 (USD$329,034).

Access to the mine sites from Emerald was cut for an extended period, and as production was halted mine site operators declared 'Force Majeure' to mitigate claims from customers. However, despite this being a more serious flood than 2008, coal mining representatives who were interviewed agreed that the lessons learnt enabled them to be back in production within eight days, compared with 11–14 days in 2008.

5.3. Cardwell Case Study—Tropical Cyclone Yasi 2011

Cardwell is a small coastal community of about 1,200 people, located within the Cassowary Coast Regional Council area of north Queensland. Cardwell's major industries are agriculture (bananas and sugar) and tourism. There is a significant indigenous population in the town. A Category 5 Tropical Cyclone, Yasi made landfall near Mission Beach just north of Cardwell in the early morning of 2 February 2011. Tropical Cyclone Yasi was accompanied by gale force winds with gusts recorded of over 250km/h (155 miles/h). Heavy rain and strong winds were accompanied by a 5 metre (16 foot) storm surge at Cardwell.

The combined action of the heavy rains, gale force winds and the storm surge resulted in approximately 75% of the buildings in the town suffering damage. The storm surge was a major contributor to the destruction, particularly at Port Hinchinbrook, on the foreshore and buildings and facilities along and on the eastern side of the main highway.

The town was isolated as fallen trees and debris blocked the road and cut off both sides of the highway, preventing the return of residents for four to five days. Power, telecommunications and water were all compromised.

5.3.1. Economic Impact

Following Tropical Cyclone Yasi, Cardwell's estimated resident population declined slightly from 1,252 in 2006 to 1,176 in 2011. Furthermore, its median age increased from 47 years to 52 years between 2006 and 2011. It has a much older age profile than the rest of the country, with 44.4% being aged 55 years and older compared to the national population age profile of 25.6% aged 55 years and older. This aging population is also reflected in the industry data with 12.4% working in the 'health care and social assistance' sector (up from 9.0% in 2006).

Tropical Cyclone Yasi made these challenges all the more difficult. All businesses in the town were impacted, many for more than 12 months. Some still had not recovered 26 months after the event. The loss of cash flow from sales was exacerbated by the costs of the clean-up, repairs and rebuilding. Limited supplies reduced ability to provide services in the immediate aftermath.

The tourist industry was devastated with consequent 'flow-on' effects to the tourism-related businesses. The regional value of tourism was valued at AUD$104 million (USD$111 million) per annum. The Census data shows that in the category of Food and Accommodation the workforce has dropped from 12.3% in 2006 to 9.3% in 2011. The post-disaster reconstruction activity changed the employment profile. According to the 2011 Census, 13.5% of people are working in the Construction sector, up from 8.8% in 2006.

Local farming and aquaculture suffered immediate and ongoing damage from Tropical Cyclone Yasi, due to extensive crop loss, damage and destruction of mature trees and farm infrastructure. The loss of the season's crop, combined with extensive repair expenses had negative impacts across this sector.

6. Case Study Findings

In this section we present empirical findings from a study of economic recovery from natural disasters in regional communities commissioned by the Regional Australia Institute (RAI, 2013). The findings discussed in this section distil key themes that emerged across the case studies.

6.1. Draw Card Business Provide an Important 'Pull' Factor

One of the key themes to emerge from all three case studies was that current government recovery policy did not understand or address the complexity of economic recovery. As one Marysville resident succinctly observed, 'The businesses had been forgotten about and not really concentrated on in relation to the recovery'.

Marysville struggled with the circular challenge that without businesses, tourists will not come and people will not invest in businesses without a market to justify the return. Business owners experienced a 'grace' period of support but knew this would be short-lived; 'Yeah look, it's probably been crunch time the last six months because...you can only feed on so many years of sympathy. You've actually got to put up a product'.

The Marysville case study indicated that certain businesses were key 'drawcards' for tourists to the town and they played an important role in spurring economic recovery; 'You need to work out and highlight who are your champion businesses...because you need to support those businesses'. The absence of those drawcard businesses caused significant wider impacts than just the immediate fire damage; 'A lot of the attractions that were up here then (after the fires) didn't bring guests up, tourists up to the area. So it was just the sum of all those had a huge effect'. Marysville residents noted that the artist café and local patisserie shop were attractions that tourists specifically cited as reasons for visiting; 'I remember bed and breakfast people coming and asking me—are you staying? Because if you're not staying, there's nothing left here and you know that we need something straight away' (Marysville business owner). Cardwell residents similarly emphasised the 'drawcard' nature of local environmental attractions, 'Because of the damage to Port Hinchinbrook and to the wharf and to the island, with the complete destruction of the resort on the island, the whole tourism industry was severely affected'.

The 'drawcards' in Marysville and Cardwell formed a fundamental aspect of those regions' identity and economic rationale. Their loss had significant impact at a psychological as well as functional level as it came to symbolize the broader disaster impact on the region. In contrast Emerald, which had a diversified economy and key industries largely unaffected by the disaster, was well placed to recover rapidly from the flood's impacts.

The inter-relationship between business reopening and resident decisions to return to a disaster-affected area has been well researched internationally. However, in the absence of a viable market, businesses are less inclined to re-establish themselves after a disaster. Promoting the rapid recovery of housing, along with keeping residents in the local area during the rebuilding process is central to facilitating business recovery.

6.2. Population Displacement and the Adaptation Paradox

One of the critical impacts of disasters on a local economy is the destruction of housing. An immediate flow-on effect is population displacement in the affected region. As the experience of Marysville clearly demonstrates, the longer residents are displaced the less likely they are to return. Of the 90% of residents who lost their housing, over 50% have not rebuilt in the region (ABS, 2011; BCG, 2009). It was argued by many remaining residents that had it not been for the temporary village that was established post-disaster, the population exodus would have been greater.

In the aftermath of Tropical Cyclone Yasi, a significant proportion of the local population decided not to return to Cardwell. This decision was influenced by factors such as damage to residences, loss of employment and perceptions about Cardwell's prospects. As one resident noted, 'A lot of the young families left because there was no work'. Similar concerns were expressed in Emerald, with a local real estate agent noting, 'because of the publicity of the fact that the whole of Emerald was flooded, therefore nobody wanted to buy in Emerald'.

A critical issue highlighted was the negative impact of this population loss on the community and economy of Cardwell. As the population declined so too did the business opportunities, leading to further job losses and further population loss as job seekers move elsewhere. One Cardwell resident summed up the issues as follows; 'Well there is a decrease in houses. Leads to a decrease in population and a decrease in jobs…leads to a decrease in population. That means a decrease in teachers for the school. Just everything decreases, a total decrease in the town'.

A related dilemma is the role of property investors and 'part time residents' in rural areas. Many 'part-time residents' and investors may deem rebuilding a 'bad bet' after catastrophic natural disasters. The absence of rental housing stock places significant pressure on a local economy, particularly in light of a reconstruction boom. By way of example, 'part-time residents' provided nearly 10% of Marysville's income. In Cardwell, Emerald and Marysville, the loss of rental housing stock saw rents spike through the reconstruction boom.

Due to the extensive reconstruction required in Cardwell, the reconstruction phase saw a significant influx of construction workers. This was further augmented by the large infrastructure development projects underway in the surrounding region. One Cardwell resident observed that, 'They needed accommodation and with all the rebuilding done and the highway work, there's an influx of workers, that put the rents up very high'. The combination of damaged housing supply and a surge in demand saw rental prices spike. This resulted in marginal populations, such as those who had lost their jobs due to local business interruption, being forced out of the rental market. 'I think we're suffering with the extra workforce because you've got a phenomenon then. They come in, they put their price on, and in that price, they put phenomenal rents. A lot of our local people that's been here all the time are struggling to find somewhere to rent that's affordable.' (Cardwell Resident). Consequently, the reconstruction process served to exacerbate the population displacement problems experienced in Cardwell.

6.3. The Reconstruction 'Mirage'

In the aftermath of a major disaster, the reconstruction stage of recovery generally drives a significant influx of construction workers to an affected region. The experience in Cardwell highlighted the change in the regional employment profile during this stage. The reconstruction boom often distorts measures of a region's economic performance and obscures the long-term challenges faced in achieving sustained economic recovery. The reconstruction boom can also have the unintended consequence of furthering population displacement, highlighted by this observation from a Cardwell resident; 'I don't know what Cardwell's going to do when this work's finished. There'll be a lot of empty houses, I think'.

In Marysville and Cardwell, the reconstruction boom drove demand for housing in a market with reduced stock causes rental prices spike, serving to push out local residents in marginal financial circumstances and key workers (see also Yates, Randolph, & Holloway, 2006). Those most at risk are residents whose employment or employment opportunities have been compromised by interruptions to business operations. The boom of activity driven by reconstruction is frequently a mirage that masks a longer-term decrease in population and broader business performance issues. The data from the case study locations supports this observation; reconstruction activity does not equate to overall economic recovery (see Table 1 above). Residents in Emerald were highly critical of the outsourcing of repair work to non-local businesses, noting:

> "It's an absolute slap on the face for the community that has rallied to try and save the community....It stood out. Everybody saw it. Especially when you've got a community that has got all those people, qualified people, sitting here, who dealt with it [previous flooding] back in 2008, know exactly what has to be done, and has the resources and has the absolute need to have a job, needs an income in this community and they go out of town to get someone else in here."

Although Queensland and Victorian government recovery plans identified long-term outcomes, the experience of residents in affected communities is of a short-term focus on reconstruction. Respondents in the three case study areas expressed deep fears about what would happen after the reconstruction boom ended. Residents in

disaster affected areas were acutely aware of the reconstruction mirage, directly linked to the masking effect of the reconstruction boom. The dispersion of authority for managing recovery due to the short remit of previous recovery agencies adds to their sense of short-term focus.

Another aspect of the 'reconstruction mirage' faced by Marysville was the Government's commitment to building 'things' to demonstrate action on restoring the town. As one resident noted, 'I think it's seen a bit cynically by a lot of people at the moment because there's all this fantastic infrastructure and there's no-one to use it'.

The highway reconstruction in Cardwell was a similarly hot-button issue for residents. 'The highway was reopened, of course, pretty quickly, but it's not been reconstructed to appropriate standards.' Residents criticised the speed to rebuild without giving serious consideration to 'betterment' of the asset through improvements such as laying a new route and improving the carrying capacity of the road.

There is a difficult balance to strike between government taking action to break the negative consequences of population displacement and investing in 'things' that exacerbate the reconstruction boom yet fail to support long-term community adaptation. The hotly debated new community centre in Marysville embodies this problem; many residents feel it is unnecessary and under-utilised asset. An excessive focus on building 'things' appears to have resulted in over-expenditure on infrastructure that does not serve the community's long-term needs, as it is not integrated with longer-term economic recovery strategies. Early commitment to rebuilding 'things'—under political pressure to be seen to be doing something—also tends to lock-in pre-existing vulnerabilities; opportunities to fundamentally redesign the future of a disaster-affected region may be missed.

7. Aligning Recovery within a Resilience Framework

The contracting adaptation spiral (Figure 2), depicts the process by which a business adapts to a shrinking population and, in so doing, exacerbates the problem. Beneath the surface issue of population loss lies a marked change in the demographic composition of the remaining population. As economic opportunities decrease, working-age residents leave the region, meaning that the remaining population becomes older, generally with lower disposable incomes, thereby simultaneously decreasing the economic productivity and increasing the vulnerability of the region. Marysville and Cardwell both exhibited this cycle. Emerald, with a diversified economic base and a strong mining sector, was able to rebound and grow.

The contracting business and population spiral is a logical system response to a major shock and represents adaptation. It exposes the bias inherent in how the term 'adaptation' is deployed in disaster policy. Adaptation is often positively connoted—implying there will be population growth, improvement in GDP and general improvement in the viability of a given region. At a whole-of-system level, by reducing exposure to disasters and the population broadly leaving an unproductive/unsuitable area to seek opportunities elsewhere, the reduction in population size and GDP of the region also represents adaptation. It does not, however, represent 'recovery' through a short-term policy lens.

Researchers in the field of disaster management argue that there has been too much emphasis on response and too little investigation of the economic impacts of disaster and disaster recovery (see, for example, Kapucu & Liou, 2014, p. 2). As noted above, the potential for more holistic approaches to resilience to be embedded as a key element at all phases of the 'hazards cycle' or PPRR framework (see Tierney, 2013) has been identified as an important direction for future research.

This insight, and calls for more integrated approaches that link disaster management and development, are supported empirically in the Australian context. Our case studies show economic recovery is largely overlooked compared to other recovery streams. In Marysville, for example, governments collectively spent AUD$135 million (USD$145 million) on infrastructure and other community recovery activities. In contrast AUD$2.77 million (USD$2.23 million) was provided in direct grants to businesses through the NDRRA. This trend was repeated in the other case study communities. Despite the emphasis in official plans and documents on the inter-relationship of all the strands of recovery, there was disproportionate emphasis on the engineering resilience approach of physical reconstruction. Opportunities for redevelopment that might have reflected community values and priorities for future development were not grasped because there had been no pre-event planning to engage the community in contemplating alternative futures—an adaptive resilience approach.

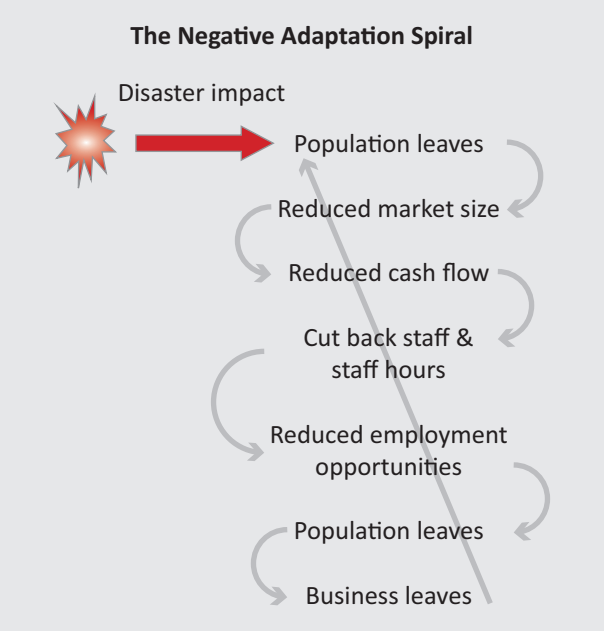

Figure 2. The Contracting Adaptation Spiral.

Communities with high levels of social capital are better placed to overcome problems of collective decision-making and support economic recovery (Chamlee-Wright & Storr, 2010; Norris et al., 2008). The interconnectedness of a community with high social capital enables greater information sharing that will therefore provide individuals with more information of other people's intentions from which they can shape their own decision-making (Chamlee-Wright & Storr, 2010; Storr & Haeffele-Balch, 2012). Kapucu et al. (2013, p. 357) describe this 'community capital' as embracing the elements of social capital, human capital, economic capital and natural capital. They argue:

> "Where a community chooses an adaptive rather than an engineering resilience approach, disaster resilience is considered a function of the community's adaptive capacity. This capacity helps the community engage in adaptive management and continuous learning through an adaptive governance process. In this framework, there is a reciprocal relationship between adaptive capacity and community capital.
>
> Adaptive learning enhances community capital and helps develop local capacity. This in turn influences disaster resilience through mitigation and preparedness that enables a more effective response to and recovery from disasters."

In Australia, the NDRRA's focus on reconstruction, the very limited uptake of the betterment provision, and the lack of integration between the phases of the PPRR framework, means that current arrangements do not support—arguably they inhibit—longer-term adaptation. In the absence of strategic planning that might support adaptive resilience, the primary focus in the wake of a severe disaster event becomes reconstruction and the need to restore critical infrastructure such as power, telecommunications (including internet access, electronic banking and electronic funds transfer), along with rail and road networks. The 'policy window' that the 'focusing event' of a disaster presents for change (Kingdon, 2013) cannot be seized in the absence of broad, clearly articulated and integrated community and economic development plans. This requires greater engagement of local community members in planning processes that canvas the range of risks and hazards that it faces. Kapucu and Liou (2014) highlight institutional memory of previous disaster events as a capacity-building resource that supports self-organisation and thus increased resilience.

Given the 'pull' factor exerted on community recovery decision-making by economic recovery, current policy settings' failure to support economic recovery has significant long-term implications. Research into post-disaster psychological/emotional recovery at the individual and community level has highlighted the importance of economic functions to broad community recovery (Norris et al., 2008). Narrow economic bases with high levels of income inequality are correlated to poor individual and community recovery (Adger, 2000; Norris et al., 2008). A community's resilience, and its corresponding ability to adapt post-disaster, is underpinned by its economic base (Norris et al., 2008; Vigdor, 2008).

The distinctions drawn between community recovery and economic recovery, and the seeming lack of focus on economic recovery, miss the vitally important—indeed, the reciprocal link—between the two areas. Community recovery will not occur without economic recovery. In the absence of an adapted and functioning economy, a disaster-impacted region will remain in a state of post-disaster dysfunction (Norris et al., 2008).

8. Conclusion: Towards Adaptive Resilience

The increasing frequency and cost of disaster events is among the strongest arguments for policy-makers to embrace an adaptive over an engineering resilience approach that is primarily focused on reconstruction. Disaster events are likely to increase in the future not only because of climate change, but also because of socio-economic developments such as increased density of settlements, particularly cities, population increase and the increased numbers of settlements in coastal areas (Latham, McCourt, & Larkin, 2010).

Beyond the financial considerations, there is a strong link between risk reduction strategies and the development of community resilience (Council of Australian Governments, 2011). Australia's NSDR notes that risk reduction strategies include ensuring infrastructure and public assets are able to withstand the range of risks and hazards identified in a community's risk and hazard profile.

Despite good intentions and because of the focus on relief and reconstruction activities, potentially positive outcomes from the recovery experience often are not realized. Recovery needs to be an adaptive process between the experiences of disaster-affected communities, their evolving vision for their future, and their ability to translate this vision into reality. Greater attention to community planning processes in the anticipatory, or prevention and preparedness phases would provide a shared basis for decision-making in the aftermath of a disaster.

A community-led renewal planning process that recognizes the specific local and regional context, along with significant support from government agencies, non-government organizations and industry experts, is likely to be more effective than the current recovery process in supporting adaptive resilience, both in terms of outcomes and costs to governments. An integrated national policy and funding framework needs to incentivise proactive investment and planning at the community level for anticipatory resilience, and incorporate development across all other phases of the PPRR framework.

The lesson from major disasters in Australia is that the laudable aspirations of the NSDR need to be matched by actions to achieve its strategic intent. A resilient Aus-

tralia requires policy and funding frameworks that are consistent with the objective of promoting greater individual and community resilience. Current policy and funding frameworks reinforce the traditional emphasis on response and recovery. We have argued instead for a focus on adaptive resilience. This implies greater investment in mitigation and adaptation strategies—to non-structural (that is human-centred) resilience planning, not the predominant engineering resilience approach. Our Australian case studies lend empirical support to integrated frameworks that seek to build adaptive resiliency.

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Conflict of Interests

The authors declare no conflict of interests.

References

Adger, N. (2000). Social and ecological resilience: Are they related? *Progress in Human Geography*, *24*(3), 347–364.

Alkon, A. H. (2004). Place, stories, and consequences: Heritage narratives and the control of erosion on Lake County, California, vineyards. *Organization and Environment*, *17*(2), 145–169.

Attorney-Generals Department. (2012). *Natural disaster relief and recovery arrangements determination, 2012*. Retrieved from http://www.disasterassist.gov.au/Documents/Natural-Disaster-Relief-and-Recovery-Arrangements/NDRRA-Determination-2012-v-2.pdf

Australian Bureau of Statistics. (2006). *Community profiles*. Retrieved from http://www.abs.gov.au/websitedbs/censushome.nsf/home/communityprofiles?opendocument&navpos=230

Australian Bureau of Statistics. (2011). *Community profiles*. Retrieved from http://www.abs.gov.au/websitedbs/censushome.nsf/home/communityprofiles?opendocument&navpos=230

Berkes, F., & Ross, H. (2012). Community resilience: Toward an integrated approach. *Society & Natural Resources*, *26*(1), 5–20.

Bevir, M., & Rhodes, R. A. W. (2015). Interpretive political science: Mapping the field. In M. Bevir & R. A. W. Rhodes (Eds.), *Routledge handbook of interpretive political science* (pp. 3–27). Abingdon, Oxon: Routledge.

Boston Consulting Group. (2009). *Marysville and triangle economic recovery strategy: Final Recommendations*.

Central Highlands Regional Council. (2011). *Annual report 2010–2011*. Retrieved from http://www.centralhighlands.qld.gov.au/wp-content/uploads/2015/12/2010-11-CHRC-Annual-Report-Final.pdf

Chamlee-Wright, E., & Storr, V. H. (2010). Expectations of government's response to disaster. *Public Choice*, *144*(1/2), 253–274.

Coles, E., & Buckle, P. (2004). Developing community resilience as a foundation for effective disaster recovery. *Australian Journal of Emergency Management*, *19*(4), 6–15.

Council of Australian Governments. (2011). *National strategy for disaster resilience: Building the resilience of our Nation to disasters*. Retrieved from https://www.coag.gov.au/node/81

Cutter, S. L. (2009). A roadmap to resilience. *Environment*, *51*, 3–4.

Cutter, S. L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. (2008). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change*, *18*(4), 598–606.

Dahlhamer, J. M., & Tierney, K. J. (1998). Rebounding from disruptive events: Business recovery following the Northridge earthquake. *Sociological Spectrum*, *18*(2), 121–141.

Deloitte Access Economics. (2016). *The economic cost of the social impact of natural disasters*. Retrieved from http://australianbusinessroundtable.com.au/our-papers/social-costs-report

Handmer, J., & Dovers, S. (2007). *The handbook of disaster and emergency policies and institutions*. London: Earthscan.

Handmer, J., & Hillman, M. (2004). Economic and financial recovery from disaster. *The Australian Journal of Emergency Management*, *19*, 44–50.

Hayashi, T. (2012). Japan's post-disaster economic reconstruction: From Kobe to Tohoku. *Asian Economic Journal*, *26*(3), 189–210.

Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, *4*, 1–23.

Jacobs, J. (2000). *The nature of economies*. New York, NY: The Modern Library.

Kapucu, N., Hawkins, C. V., & Rivera, F. I. (2013). Emerging research in disaster resiliency and sustainability: Implications for policy and practice. In N. Kapucu, C. V. Hawkins, & F. I. Rivera (Eds), *Disaster resiliency: Interdisciplinary perspectives* (pp. 355–358). New York, London: Routledge.

Kapucu, N., & Liou, K. T. (2014). *Disaster and development*. Cham: Springer International.

Kingdon, J. W. (2013). *Agendas, alternatives and public policies*. Harlow, UK: Pearson.

Latham, C., McCourt, P., & Larkin, C. (2010). *Natural disasters in Australia: Issues of funding and insurance*. Paper presented at the 17th General Insurance

Seminar, The Institute of Actuaries of Australia, Gold Coast, Australia. Retrieved from http://www.actuaries.asn.au/library/events/GIS/2010/NaturalDisastersInAustralia-Paper.pdf

Lofland, J., Snow, D., Anderson, L., & Lofland, L. (2006). *Analyzing social settings: A guide to qualitative observation and analysis*. Belmont, CA: Thomson Wadsworth.

McGowan, J. (2014). Promoting resilience: A contemporary and integrated policy and funding framework for disaster management. *Australian Journal of Emergency Management*, *29*(2), 8–10.

McGowan J., & Tiernan, A. (2014). *Natural disaster finding arrangements: Submission to the public inquiry by the productivity commission*. Retrieved from http://www.pc.gov.au/inquiries/completed/disaster-funding/submissions/submissions-test2/submission-counter/subdr123-disaster-funding.pdf

Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capabilities, and strategy for disaster readiness. *American Journal of Community Psychology*, *41*(1/2), 127–150.

Productivity Commission. (2014). *Terms of reference; Natural disaster funding*. Retrieved from http://www.pc.gov.au/projects/inquiry/disaster-funding/terms-of-reference

Regional Australia Institute. (2013). *From disaster to renewal; The centrality of business recovery to community resilience*. Retrieved from http://www.regionalaustralia.org.au/wp-content/uploads/2013/08/From-Disaster-to-Renewal.pdf

Rhodes, R. A. W. (2011). *Everyday life in British government*. Oxford: Oxford University Press.

Riessman, C. K. (2008). *Narrative methods for the human sciences*. Los Angeles, CA: SAGE Publications.

Rietveld, K., Simms, A., & Sparrow, J. (2001). The ecology of disaster recovery. *World Disasters Report 2001*. Retrieved from: http://www.recoveryplatform.org/assets/publication/9%20sept/world%20disaster%20report%20on%20recovery.pdf

Rose, A. (2009). *Economic resilience to disasters: CARRI research report 8. Prepared for the Community and Regional Resilience Institute*. Retrieved from http://www.resilientus.org/wp-content/uploads/2013/03/Research_Report_8_Rose_1258138606.pdf

Shaw, R. (2013). Incorporating resilience of rural communities for proactive risk reduction in Shikoku, Japan. In N. Kapucu, C. V. Hawkins, & F. I. Rivera (Eds.), *Disaster resiliency: Interdisciplinary perspectives* (pp. 207–226). New York, NY: Routledge.

Storr, V. H., & Haeffele-Balch, S. (2012). Post-disaster community recovery in heterogeneous, loosely connected communities. *Review of Social Economy*, *70*(3), 295–314.

Tierney, K. (2013). Foreword. In N. Kapucu, C. V. Hawkins, & F. I. Rivera (Eds.), *Disaster resiliency: Interdisciplinary perspectives* (pp. xiii–xvi). New York, NY: Routledge.

Vigdor, J. (2008). The economic aftermath of Hurricane Katrina. *The Journal of Economic Perspectives*, *22*(4), 135–154.

Webb. G. R., Tierney, K. J., & Dahlhamer, J. M. (2002). Predicting long-term business recovery from disaster: A comparison of the Loma Prieta earthquake and Hurricane Andrew. *Environmental Hazards*, *4*(2), 45–58.

Xiao, Y., & Van Zandt, S. (2012). Building community resiliency: Spatial links between household and business post-disaster return. *Urban Studies*, *49*(11), 2523–2542.

Yates, J., Randolph, B., & Holloway, D. (2006). *Housing affordability, occupation and location in Australian cities and regions: Prepared for the Australian Housing and Urban Research Institute (AHURI)*. Retrieved from http://www.be.unsw.edu.au/sites/default/files/upload/research/centres/cf/publications/ahuriprojectreports/housingaffordability_fin.pdf

Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Thousand Oaks, CA: Sage Publications.

Zhang, Y., Lindell, M. K., & Prater, C. S. (2009). Vulnerability of community businesses to environmental disasters. *Disasters*, *33*(1), 38–57.

Zhou, H., Wang, J. A., Wan, J., & Jia, H. (2010). Resilience to natural hazards: A geographic perspective. *Natural Hazards*, *53*(1), 21–41.

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Article

Governance through Economic Paradigms: Addressing Climate Change by Accounting for Health

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Abstract
Climate change is a major challenge for sustainable development, impacting human health, wellbeing, security, and livelihoods. While the post-2015 development agenda sets out action on climate change as one of the Sustainable Development Goals, there is little provision on how this can be achieved in tandem with the desired economic progress and the required improvements in health and wellbeing. This paper examines synergies and tensions between the goals addressing climate change and economic progress. We identify reductionist approaches in economics, such as 'externalities', reliance on the metric of the Gross Domestic Product, positive discount rates, and short-term profit targets as some of the key sources of tensions between these goals. Such reductionist approaches could be addressed by intersectoral governance mechanisms. Health in All Policies, health-sensitive macro-economic progress indicators, and accounting for long-term and non-monetary values are some of the approaches that could be adapted and used in governance for the SDGs. Policy framing of climate change and similar issues should facilitate development of intersectoral governance approaches.

Keywords
climate change; disaster risk reduction; economic growth; health; health in all policies; sustainable development; sustainable development goals

Issue
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1. Introduction

Governance for the Millennium Development Goals (MDGs; United Nations [UN], 2015) from 2000–2015 was critiqued for not having fully considered interactions among the goals (Waage et al., 2010). When the Sustainable Development Goals (SDGs; UN Sustainable Development Platform, 2015) were developed for 2015–2030 to succeed the MDGs, efforts were made to emphasize potential interactions among them (Waage et al., 2015). The 17 SDGs are supported by 169 targets with numerous indicators specified at global, regional, and national levels. Such a framework offers an opportunity to identify and exploit beneficial interactions among the goals. In order to design such governance mechanisms and to ensure their effectiveness, it is essential to examine possible tensions and synergies among the SDGs, thereby learning and applying the lessons from what was rarely achieved for the MDGs.

We examine links between SDG 13 addressing climate change and SDG 8 on economic growth, focusing on accounting for their links with SDG 3 on human health

and wellbeing to illustrate how intersectoral governance approaches could benefit governance for the SDGs. This approach is comparatively unique because the interactions among such ostensibly disparate SDGs have rarely been investigated in detail. Most comparative analyses of SDGs thus far (e.g. Waage et al., 2015) adopt a broad-brush picture for governance framing, rather than detailed critiques of connections among selected goals.

Climate change has been proposed as a major challenge for sustainable development (Intergovernmental Panel on Climate Change [IPCC], 2014; UN, 2015; Worldwatch Institute, 2015). SDG 13 is devoted to climate change: "Take urgent action to combat climate change and its impacts" (UN Sustainable Development Platform, 2015). The specific targets of this goal cover both climate change mitigation (reducing greenhouse gases and increasing their sinks) and climate change adaptation (adjusting to climate change impacts), for this paper collectively termed "climate change action".

The achievement of SDG 13 is challenged by continued pursuit of unsustainable economic progress. SDG 8 sets a target for further economic growth for some countries: "Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7% gross domestic product growth per annum in the least developed countries" (UN Sustainable Development Platform, 2015). Another target of SDG 8 is set for decoupling economic growth from environmental degradation, as per the 10-year framework of programmes on sustainable consumption and production (UN Sustainable Development Platform, 2015).

So far, there has been no absolute decoupling of economic growth from greenhouse gas emissions (Steinberger, Krausmann, Getzner, Schandl, & West, 2013). This may present a significant challenge to the simultaneous achievement of both effective climate change action and economic growth. Furthermore, some argue that climate change may cause significant harm to the global economy, mainly by disrupting set processes and interfering with established mechanisms for creating economic wealth, as measured by Gross Domestic Product (GDP) (Cole, 2007; Weitzman, 2007).

Population health is rarely explicitly considered in decisions pertaining to economic growth even though it is an implicit part of such determinants of growth as labour productivity and human resources. Similarly, the 10-year framework of programmes on sustainable consumption and production, which is the policy and governance mechanism for decoupling economic growth from environmental degradation, suggested in the SDGs, does not refer to human health (UN, 2012).

Both climate change impacts and unsustainable economic growth are expected to have overall negative impacts on the health of populations, although it is always a balance with some positive impacts seen, often delineated by location and subpopulation. To avoid contradictions among the SDGs, such as on climate change and economic growth, their impacts on health targets specified in SDG 3 could be helpful for determining suitable intersectoral governance approaches.

In this paper, we first explain the key tensions between the goals for economic growth and climate change action. We then provide insight into paradigmatic sources of these tensions. Finally, we illustrate how the link of economic growth with climate change is likely to be mediated through human health and then we discuss ways of recognizing how this and similar links could benefit the design of more sustainable intersectoral governance approaches.

2. Economic Growth as a Driver of Climate Change

Major tension between SDGs 8 and 13 lies in the continued contribution of key drivers of economic growth in the furthering of climate change.

Economic growth has been closely linked to high levels of fossil fuel use and greenhouse gas emissions, which perpetuate anthropogenic climate change. In 2013–2014, 306 tonnes of carbon dioxide were produced per each USD 1 million of the global GDP (PWC, 2015). Such a rate of greenhouse gas emissions requires a 6.3% rate of reduction in the carbon intensity of global economic growth to achieve the climate change target of atmospheric warming down to 2 °C above the pre-industrial average which was set in the Paris Agreement from December 2015 (United Nations Framework Convention on Climate Change [UNFCCC], 2015).

The current global economic system was developed during a period of carbon-intensive rapid economic growth (Hall & Klitgaard, 2011; Henriques, 2011; Kraussman & Haberi, 2002), which in many ways it was designed to facilitate (Demirguc-Kunt & Levine, 2001; Fitzgerald, 2006; Rousseau & Sylla, 2001). This has left the global economy heavily dependent upon the continuation of such growth. Canadell et al. (2007) describe how, from 2000–2006, the carbon emissions required to produce a dollar of global economic activity unit have increased approximately 0.3% per year with Peters et al. (2012) reporting a 0.9% increase for 2010 which they attribute principally to burning fossil fuels and producing cement.

According to the Environmental Kuznets Curve hypothesis, economic growth first creates environmental problems, but later serves to reduce them (Grossman & Krueger, 1995). With respect to climate change, the result should be an absolute decoupling of growth from greenhouse gas emissions; i.e., GDP can increase without increasing greenhouse gas emissions (Schandl et al., 2015). Although some relative decoupling of economic growth from greenhouse gas emissions has been achieved through enhanced energy efficiency and an increasingly service-based economy, there has not yet been absolute decoupling (Steinberger et al., 2013).

The small relative decoupling of 1.3% annual decrease in the carbon intensity of global economic growth (PWC, 2015) has been more than offset by the high rate of carbon-intensive economic growth. Between 2004

and 2014, global GDP growth of 44% produced an increase in greenhouse gas emissions of 22% (Handrich, Kemfert, Mattes, Pavel, & Thure, 2015). Hence, the pursuit of economic growth, as it is currently generated, does not meet the environmental sustainability criteria in relation to climate change mitigation.

Target 4 of SDG 8 suggests decoupling economic growth from environmental degradation following a framework of programmes on sustainable consumption and production (UN, 2012). Documentation of this framework uses the word "sustainable" without defining or providing criteria of "sustainable". Hence, interpretation of target 8.4 hinges on the definition of "sustainable" and "sustainable economic growth". It might potentially refer to "sustained"; i.e., forever and hence assuming infinite availability and use of carbon-intensive resources for economic growth.

3. Economic Growth and Climate Change Driving Different Priorities

Another level of complexity augmenting the tension between SDGs 8 and 13 is different levels of vulnerability to climate change impacts of those with different power in making decisions pertaining to economic growth and who may interpret "sustainable economic growth" differently.

Sectors that would benefit most from rapid economic growth tend to have high capacity to protect themselves from the impacts of climate change on their health and wellbeing. For example, Canary Wharf, one of London's financial centres, is located in a zone highly vulnerable to storm surge flooding (Dawson, Hall, Bates, & Nichloss, 2005; Jacob, Gornitz, & Rosenzweig, 2007). Although the Thames Barrier provides some protection, to a large extent its construction facilitated the development of this financial centre due to the perception of it being safe from floods (Ward & Smith, 1998). Under climate change, without changes to the Thames Barrier, the Barrier may be inadequate to prevent a major disaster costing hundreds of billions of pounds (Dawson et al., 2005). Thames Barrier upgrades are being discussed now, for plans covering the rest of the century (Environment Agency London, 2012). Hence, despite the climate-related risks, the financial sector has resources to offset their potential losses through constructing ostensibly protective physical infrastructure, using protective financial services (e.g., insurance), and diversifying assets. To maintain resources of the financial sector for such protection, the preferred interpretation of the term "sustainable economic growth" in the SDG 8 may indeed be "sustained".

By contrast, those who have contributed least to greenhouse gas emissions are those who are starting now to experience adverse impacts from climate change and who are likely to advocate for carbon-neutral or carbon-negative "sustainable economic growth" (Brulle, 2015; Parks & Roberts, 2010). Locations highlighted are indigenous peoples in the Arctic and those living along coasts, such as in Bangladesh, Kiribati, Maldives, and Tuvalu (IPCC, 2014). In risk analysis language, the risk takers are different from the risk makers (Glantz, 1996; Glantz & Jamieson, 2000). Several low-lying island countries organised a 1989 conference highlighting their vulnerability to sea-level rise impacts (Island Vulnerability, 1989), which garnered little action outside of the island states. A generation later, some of the island communities are being forced to deal with climate change related challenges physically (Storlazzi, Elias, & Berkowitz, 2015) and socially (Kelman, 2015)—which is also occurring in some Alaskan communities (Bronen & Chapin III, 2013).

The closed élite circle of financial decision-makers and the technical complexity of the economic decision-making tools, alongside weak accountability of the decision-makers, further complicates transparency in, and possible involvement from, sectors with differing priorities regarding "sustainable economic growth".

4. Sources of Tension: Reductionist Paradigm in Economics

The underlying sources of the above-discussed tensions to a large extent lie in reductionist paradigms of economics. The dominant theory and practice of economics today, including methods for estimating economic growth, do not sufficiently account for the complex interactions of economic activities with outcomes such as climate change and its impacts. The concept of "externalities", reliance on the GDP metric, positive discount rates, and short-term profit targets illustrate how these important links are omitted from economic considerations.

Impacts of greenhouse gas emissions on the atmosphere, and consequently on human health, tend to be treated as "externalities" (Brandt et al., 2010; Matthews & Lave, 2000; Navrud, 2001). The term "externalities" describes the effects of production or consumption of goods and services, whose costs and benefits are not reflected in prices of goods and services provided (OECD, 2003). Hence, greenhouse gas emissions and their impacts tend to be external to cost-benefit calculations over the short-term.

Social and health effects of activities that contribute to economic growth, measured by GDP, are similarly often treated as "externalities". In GDP calculations, war expenditures are judged the same as costs to feed and educate the population. Moreover, after a given level of GDP per capita, additional economic growth tends not to produce increases in wellbeing (Anielski, 2007) or happiness (Inglehart, Foa, Peterson, & Welzel, 2008; Layard, 2003, 2005; Stott, 2012). Hence, GDP can be better characterized as a measure of market-based expenditures, which does not judge whether a given expenditure increases or decreases social welfare.

Another example is the use of positive discount rates. A discount rate is used to calculate how much avoided

future damage, e.g., from a flood, would be worth compared to the initial cost of actions needed to avoid the damage. In relation to climate change, the effects of which manifest over the long-term, positive discount rates value future impacts at a fraction of current costs (Beckerman & Hepburn, 2007; DeCanio, de Lavergne, & Palter, 2003). The use of positive discount rates is well-critiqued in the literature for valuing the present more than the future (Beckerman & Hepburn, 2007; DeCanio et al., 2003). Given positive discount rates, few economic incentives exist to avoid climate change, due to its long-term effects.

Furthermore, short-term profit targets are motivated by shareholder and investor pursuit of immediately optimal financial performance and successful revenue management by businesses, foregoing long-term and non-monetary value creation (EY Poland, 2014). Most business models do not take into account long-term benefits or consequences of their activities, including climate change, or non-monetary values benefitting human health and wellbeing (Paulson, 2015).

Such reductionist thinking renders some economic, financial, and business models to portray climate change action as a costly and irrational act for stakeholders involved in the production of economic growth at all levels: governments, corporations, investors, producers, and consumers.

5. Sources for Synergies: Climate Change Impacts on Economic Growth via Health

The reductionist paradigm is not consistent with the current scientific understanding of the links between climate change and economic growth. Considering health impacts of climate change and their further implications for economic growth highlights potential shortcomings of working towards the SDGs without addressing the aforementioned reductionist approaches.

Indirect climate change impacts on health are rarely accounted for in estimates of the economic impacts of climate change. However, recent scientific evidence suggests that these impacts have significant implications for labour productivity and human resources. Higher temperatures are shown to be associated with a decrease in the productivity of those performing heavy labour outdoors and, when air conditioning is not available, indoors (Sahu, Sett, & Kjellstrom, 2013). Furthermore, higher temperatures would lead to fewer hours of physiologically safe temperatures for work in non-air conditioned spaces. In South-East Asia, 15–20% of annual work hours are estimated to be already lost under the current climatic conditions; this loss could double by 2050 under projected climatic change (Kjellstrom, 2015).

The projected climate change related decreases in global food availability would challenge the decline of global child undernutrition rates achieved over past decades (UN, 2015). This may subsequently lead to a rise in the long-term consequences of childhood undernutrition, such as lower performance of the immune system (Dercon & Porter, 2014), increased risk of chronic diseases (Black et al., 2013), compromised cognitive development (Ampaabeng & Tan, 2013), and lower economic productivity in adulthood (Dewey & Begum, 2011), all further challenging labour productivity and human resources.

As such effects compound, in addition to the health and welfare of people, production and consequently economic growth could be increasingly afflicted. Labour productivity loss is the most substantial economic loss that the world would face from climate change (DARA & Climate Vulnerable Forum, 2012). Already in 2010, the loss of labour productivity globally was suggested as being equated to the net loss of USD 311 billion (2010 PPP), which is around 0.5% of the global GDP (DARA & Climate Vulnerable Forum, 2012). By 2030, the net loss due to compromised labour productivity is projected to reach USD 2.4 trillion per annum (DARA & Climate Vulnerable Forum, 2012). Knock-on effects from these labour impacts mean that even atmospheric warming by 2 °C above the pre-industrial levels is projected to result in a loss of USD 4.2 trillion in the asset management industry from the private sector perspective, which is equivalent to the world's listed value of all oil and gas companies combined and which is the equivalent of Japan's GDP (The Economist Intelligence Unit, 2015).

The link illustrated here emphasizes that population health, which is essential for economic growth, will be (and in some places already is) constrained by climate change. The previously discussed reductionist approaches in economics would leave this link unaddressed. By contrast, integrated intersectoral governance approaches designed on the basis of understanding interactions across the SDGs could provide political space for addressing the complex indirect impacts and could further incentivize synergistic action on climate change across sectors.

6. Suggestions for Intersectoral Governance Approaches: Beyond Reductionism

Links across the SDGs, such as the indirect impact of climate change on economic growth through its impact on health, emphasize the need to govern SDGs in an integrated manner. We discussed four economic paradigms not conducive to such integrated governance approaches, especially as they impede climate change action: (1) the construct of "externalities", (2) reliance on the metric of GDP, (3) discount rates, and (4) short-termism. Alternative governance processes can be suggested for each of these paradigms. We provide three examples of existing governance mechanisms that could be used to counter these paradigms by considering the links of SDG 3 with SDGs 8 and 13. We conclude this section with a case study on the framing of climate change and disaster risk reduction in wider policy contexts, illustrating the need for policies to be formulated

in a way that facilitates development of such integrated governance mechanisms.

6.1. Health in All Policies: To Value "Externalities" and Short-Term Health Co-Benefits

Health in All Policies (HiAP) promoted by the World Health Organisation is "an approach to public policies across sectors that systematically takes into account the health implications of decisions, seeks synergies, and avoids harmful health impacts in order to improve population health and health equity" (World Health Organization, 2014). It draws attention to the consequences of public policies on the determinants of health, aiming to improve policy makers' accountability for health impacts of their decisions (World Health Organization, 2014).

In governance for SDGs, HiAP could be used to incorporate health implications across time scales into cost-benefit considerations made by stakeholders from international to individual levels and across sectors. Tools such as the Health Impact Assessment and Health Risk Assessments could be adapted to suit the range of possible interactions across the SDGs and incorporated as a regulatory element of governance for the SDGs (Winkler et al., 2013). These elements could help to counter the paradigm of health implications being treated as "externalities" in day-to-day economic decisions as well as to link health with promoting the "green economy" (Winkler et al., 2013).

HiAP could also be used to develop intersectoral policy structures and to provide space for representatives of the health sector to communicate health implications to decision-makers in other sectors. For example, in a debate on discount rates, health sector representatives could lobby for climate change action in spite of positive discounting by emphasizing the immediate health benefits of many choices in favour of climate change mitigation, such as the positive health consequences of reduced car use, including cleaner air and reduced cardiovascular disease (Watts et al., 2015).

6.2. Health-Sensitive Macro-Economic Progress Indicators

The UN Statistical Commission and the Inter-Agency and Expert Group on Sustainable Development Goal Indicators have been coordinating the development of an overarching framework of indicators for monitoring and evaluating progress towards the SDGs. As of 17 December 2015, a list of 229 indicators was compiled in a proposal for the framework (United Nations Economic and Social Council, 2016).

The proposed SDG indicators make nearly three dozen references to the GDP metric, including a target for more growth in the least developed countries (United Nations Economic and Social Council, 2016). None of the references exploits possible synergies or addresses tensions between sources of GDP growth and the SDGs. Simon Kuznets, who is credited with developing the GDP measure, never intended GDP to be used as a gauge of general social welfare. Kuznets noted, "Distinctions must be kept in mind between quantity and quality of growth, between costs and returns, and between the short and long term. Goals for more growth should specify more growth of what and for what" (Kuznets, 1962).

The specification of "more growth of what and for what" is limited in the current formulation of the targets and their indicators. Attempts to propose macro-economic progress metrics as alternatives to GDP, which incorporate health, wellbeing, and other sustainability considerations were made in the past, e.g., the Index of Sustainable Economic Welfare (Daly & Cobb, 1989) and the Genuine Progress Indicator (Talberth, 2007). GDP remains the paramount macro-economic metric, to a large extent due to its simplicity and universality (Costanza, Hart, Posner, & Talberth, 2009). To account for "growth of what and for what" in relation to SDGs, complementary macro-economic progress metrics could be developed reflecting the extent to which economic growth of different countries is aligned with their progress towards the SDGs. Such metrics could be used to monitor whether a country's growth becomes more sustainable and more beneficial for the health of the global population. Criteria of what is more sustainable in this context should be defined on the basis of SDG targets and indicators, taking into account their interactions. Interactions concerning SDG 3 may also engage those who would favour interpreting the term "sustainable economic growth" as "sustained". For example, current contributions of economic growth to population health may secure higher potential for economic growth in the future through the links of good population health with higher future human resources and productivity.

6.3. Accounting for Long-Term and Non-Monetary Values

Apart from macro-economic progress indicators and policies, individual participants in the economy and particularly the financial system can be engaged in facilitating progress towards the SDGs through socially responsible investment mechanisms encouraging consideration of long-term and non-monetary values compliant with the SDGs in their financial decisions. Existing mechanisms include positive and negative screening, disinvestment, and shareholder engagement. Often, elements of such mechanisms are already aligned with SDGs such as SDG 3 on health. For example, positive screening often includes health and safety considerations addressing such targets of SDG 3 as exposure to hazardous chemicals and pollutants and prevention of substance abuse (Youssef & Whyte, 2013). Climate change impacts have also been considered in more traditional financial decision-making tools, for example, in the design of the long-term investment portfolio risk management strate-

gies (Mercer, 2015) and in the insurance sector (Gurenko, 2006; Xu, 2014).

Further incentives for the focus on long-term and non-monetary value creation in the business sector could also be achieved through managerial innovation; for example, restructuring executive remuneration schemes in a way that increases the proportion of their compensation based on long-term company performance (EY Poland, 2014). Greater focus on the long-term performance of companies, in turn, would allow more time for costumer choice to be reflected in a company's performance metrics. Concurrently, consumers and other stakeholders could be sensitized to the social and environmental impacts of businesses pertinent to the SDGs such as health and its determinants, at their individual and community levels through comprehensive education and communication strategies.

The above-illustrated approaches could be adapted and used in governance for the SDGs. Approaches similar to HiAP could further be used to ensure policy coherence and use of shared policies across sectors (Becerra-Posada, 2015). HiAP is particularly relevant for this purpose as it focuses on the determinants of health, which are mostly governed by sectors other than the health sector, requiring complex integrated governance solutions. Establishment of virtual intersectoral boards and taskforces would be required to identify synergies across the SDGs and to devise as well as implement ways of accounting for such effects in daily policy decisions while monitoring progress towards the SDGs.

6.4. Beyond Reductionism: Climate Change in Wider Policy Contexts

Development of intersectoral governance mechanisms requires policy framing that permits and encourages intersectoral links. Currently, climate change in policy is mostly formulated as a somewhat isolated environmental process influenced by humanity. Despite its numerous links with many other policies such as those on health and disaster risk reduction, the policy and political processes of climate change have separated it from many other environmental and policy topics.

In the SDGs, climate change is formulated as a separate goal, SDG 13. A footnote to SDG 13 states "Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change" (UN Sustainable Development Platform, 2015). Emphasis on a single forum for negotiations on climate change action may ideologically segregate the issue from other intergovernmental fora that could further facilitate addressing climate change impacts.

A contrast can be made with disaster risk reduction policies. As the agreements for the SDGs and UNFCCC (2015) were shaping up, in March 2015 a voluntary international agreement was signed under UNISDR (United Nations Office for Disaster Risk Reduction) auspices, the Sendai Framework for Disaster Risk Reduction (SFDRR; UNISDR, 2015), also running from 2015–2030. The agreement notes the health and economic benefits of disaster risk reduction, synergising with the discussion here regarding climate change.

For example, the outcome in paragraph 16 of UNISDR (2015, p. 9) is "The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries" specifically noting both health and economics. Paragraph 18 of UNISDR (2015, p. 9) includes disaster risk reduction targets to "Reduce direct disaster economic loss in relation to global gross domestic product" (clause c) and "Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities" (clause d). As a result, disaster risk reduction measures aim to help minimize negative health and economic impacts of disasters—and often succeed through saving lives (meaning reduced adverse health outcomes) and saving money, as demonstrated by benefit-cost analyses of disaster risk reduction interventions (Shreve & Kelman, 2014).

Climate change is reasonably integrated into SFDRR across DRR contexts; however, the statement "The climate change issues mentioned in this Framework [SFDRR] remain within the mandate of the United Nations Framework Convention on Climate Change under the competences of the Parties to the Convention" (UNISDR, 2015, p. 11) distances climate change from the DRR mandate instead of fully integrating it into DRR. Hence, the wording of SFDRR separates governance on climate change action and on disaster risk reduction while the wording of the SDGs segregates global governance on climate change from intergovernmental fora other than the UNFCCC.

Climate change policy integration with disaster risk reduction policies would benefit climate change adaptation efforts. Climate change is an important influence, by affecting several hazards including storms, temperature, precipitation, and infectious disease, sometimes exacerbating the hazards and sometimes diminishing them. As opposed to the policy framing in disaster risk reduction, which ensures connections across all hazards, an isolated focus on climate change may constrain instead of facilitate intersectoral synergies supporting climate change action (UNISDR, 2015).

To move beyond the reductionism of climate change and its separation from other processes, especially for connecting health and economic benefits, considering wider policy contexts is necessary. The SDGs, to a large extent, have mainstreamed disaster risk reduction by mentioning the process in numerous SDGs and targets (UN Sustainable Development Platform, 2015). As such, disaster risk reduction is not a standalone process with its own separate SDG but, rather, is integrated into sustainable development. Climate change, as a single hazard influencer among many, was not accorded similar treatment.

7. Conclusion

Comprehensiveness of the SDG framework offers an opportunity to exploit interactions across the goals. Apart from synergistic interactions, tensions between some of the goals are likely, as shown by our analyses of SDGs 8 and 13, alongside their links with SDG 3 on health followed by the comparison with disaster risk reduction. The reductionist approaches prevalent in economics, such as "externalities", GDP, positive discount rates, and short-term profit targets are likely to be some of the key sources of possible tension between SDGs 8 and 13. These approaches do poorly in considering the complex links among the SDGs, an example being health impacts of climate change and their further implications for economic growth.

In terms of its theoretical value, this paper provides a conceptual baseline for overcoming reductionist approaches. As discussed in section 6.4., health and economic considerations are frequently interpreted and applied in a reductionist manner. The formulation of climate change in policy contexts is often structured in a reductionist manner. However, opportunities for integrating climate change action with policies in other fields could enhance the effectiveness and efficiency of action on climate change. We have provided theoretical suggestions and examples of how to retain the important components of all three topics without becoming ensnared in reductionist thinking.

In terms of its policy value, this paper suggests the intersectoral governance mechanism of HiAP and the development of complementary economic progress metrics aligned with the SDGs. Considering the health impacts of policies—such as those related to economics, climate change, and wider disaster risk reduction—in order to ensure health benefits while avoiding deleterious health consequences would be an important step forward in sustainable development approaches. Here, the importance of HiAP for SDG 8 is demonstrated, yet the lessons apply to policies related to other SDGs and their interactions.

Suggestions made in this paper also have value for practice, particularly when making investment decisions for financial portfolios or development projects. Alternatives to carbon-intensive and growth-focused investments are provided, suggesting how a health focus could lend itself to paybacks and outcomes which might not match economic goals, but which are nonetheless sound economic decisions by supporting healthy people and communities.

The growing recognition of a wide range of socioeconomic factors influencing human health and wellbeing has facilitated development of intersectoral governance approaches, such as HiAP. These approaches could be adapted and incorporated into governance for the SDGs, especially through comparison and analysis of SDGs beyond the three considered here.

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Conflict of Interests

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References

Ampaabeng, S. K., & Tan, C. M. (2013). The long-term cognitive consequences of early childhood malnutrition: The case of famine in Ghana. *Journal of Health Economics*, *32*(6), 1013–1027. doi:10.1016/j.jhealeco.2013.08.001

Anielski, M. (2007). *The economics of happiness: Building genuine wealth*. Gabriola Island, BC: New Society Publishers.

Becerra-Posada, F. (2015). Health in all polices: A strategy to support the Sustainable Development Goals. *The Lancet Global Health*, *3*(7), e360. doi:10.1016/S2214-109X(15)00040-6

Beckerman, W., & Hepburn, C. (2007). Ethics of the discount rate in the Stern Review on the economics of climate change. *World Economics*, *8*(1), 187–211.

Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., de Onis, M., . . . Uauy, R. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The Lancet*, *382*(9890), 427–451.

Brandt, J., Silver, J. D., Frohn, L. M., Christensen, J. H., Andersen, M. S., Geels, C., . . . Skjøth, C. A. (2010). Assessment of health-host externalities of air pollution at the national level using the EVA model system. In *International Conference on Energy, Environment and Health—Optimisation of Future Energy Systems* (pp. 91–95). Copenhagen. Retrieved from http://www2.dmu.dk/1_om_dmu/2_afdelinger/3_atmi/ceeh/Collection of Extended Abstracts.pdf#page=103 \ nhttp://vbn.aau.dk/ws/files/75300233/MSJ_prod21325659713716.RESS-workshop_short_abstract__J%C3%B8rgensen_J%C3%B8rgensen_Lauridsen%5B1%5D.pdf

Bronen, R., & Chapin III, F. S. (2013). Adaptive governance and institutional strategies for climate-induced community relocations in Alaska. *Proceedings of the National Academy of Sciences of the United States of America*, *110*(23), 9320–9325.

Brulle, R. J. (2015). *Climate change and society: Sociological perspectives*. New York: Oxford University Press.

Canadell, J. G., Le Quéré, C., Raupach, M. R., Field, C. B., Buitenhuis, E. T., Ciais, P., . . . Marland, G. (2007). Contributions to accelerating atmospheric CO_2 growth from economic activity, carbon intensity, and efficiency of natural sinks. *Proceedings of the National Academy of Sciences of the United States of America*, *104*(47), 18866–18870. doi:10.1073/pnas.

0702737104

Cole, D. H. (2007). The Stern Review and its critics: Implications for the theory and practice of benefit-cost analysis. *Natural Resouces Journal*, *48*(53).

Costanza, R., Hart, M., Posner, S., & Talberth, J. (2009). Beyond GDP : The need for new measures of progress. *Boston University*, (4), 1–47.

Daly, H. E., & Cobb, J. B. (1989). *For the common good: Redirecting the economy towards community, the environment, and a sustainable future*. Boston: Beacon Press.

DARA, & Climate Vulnerable Forum. (2012). *Climate vulnerability monitor: A guide to the cold calculus of a hot planet* (2nd ed.). Madrid: Estudios Graficos Europeos.

Dawson, R. J., Hall, J. W., Bates, P. D., & Nichloss, R. J. (2005). Quantified analysis of the probability of flooding in the Thames Estuary under imaginable worst-case sea level rise scenarios. *International Journal of Water Resources Development*, *21*(4), 577–591.

DeCanio, S. J., de Lavergne, C., & Palter, E. D. (2003). *Economic models of climate change*. New York: Palgrave MacMillan.

Demirguc-Kunt, A., & Levine, S. (2001). *Financial structure and economic growth: Comparison of banks, markets, and development*. New York: The MIT Press.

Dercon, S., & Porter, C. (2014). Live aid revisited: Long-term impacts of the 1984 Ethiopian famine on children. *Journal of the European Economic Association*, *12*(4), 927–948.

Dewey, K. G., & Begum, K. (2011). Long-term consequences of stunting in early life. *Maternal and Child Nutrition*, *7*(Suppl. 3), 5–18.

Environment Agency London. (2012). *Managing flood risk through London and the Thames estuary Thames Estuary 2100*. Retrieved from https://www.gov.uk/government/publications/thames-estuary-2100-te2100

EY Poland. (2014). *Short-termism in business: Causes, mechanisms and consequences*. Retrieved from http://www.ey.com/Publication/vwLUAssets/EY_Poland_Report/$FILE/Short-termism_raport_EY.pdf

Fitzgerald, V. (2006). *Financial development and economic growth: A critical view*. Retrieved from http://www.un.org/en/development/desa/policy/wess/wess_bg_papers/bp_wess2006_fitzgerald.pdf

Glantz, M. H. (1996). An outsider's view of the world of natural hazards. In R. L. Heathcote, C. Cuttler, & J. Koetz (Eds.), *Conference on Natural Disaster Reduction 1996: Conference Proceedings* (pp. 389–396). Barton: Institution of Engineers Australia.

Glantz, M. H., & Jamieson, D. (2000). Societal response to Hurricane Mitch and intra- versus intergenerational equity issues: Whose norms should apply? *Risk Analysis*, *20*(6), 869–882.

Grossman, G., & Krueger, A. (1995). Economic growth and the environment. *Quarterly Journal of Economics*, *110*(2), 353–377.

Gurenko, E. N. (2006). *Climate change and insurance: Disaster risk financing in developing countries*. Oxon: Earthscan.

Hall, C., & Klitgaard, K. (2011). *Energy and the wealth of nations*. New York, NY: Springer.

Handrich, L., Kemfert, C., Mattes, A., Pavel, F., & Thure, T. (2015). *Turning point: Decoupling greenhouse gas emissions from economic growth*. Washington, DC: Heinrich-Böll-Stiftung.

Henriques, S. T. (2011). *Energy transitions, economic growth and structural change: Portugal in a long-run comparative perspective*. Lund: Lund University.

Inglehart, R., Foa, R., Peterson, C., & Welzel, C. (2008). Development, freedom, and rising happiness: A global perspective (1981–2007). *Perspectives on Psychological Science*, *3*(4), 264–285.

Intergovernmental Panel on Climate Change (IPCC). (2014). Summary for policymakers. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, . . . L. L. White (Eds.), *Climate change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects* (pp. 1–32). Cambridge: Cambridge University Press.

Jacob, K., Gornitz, V., & Rosenzweig, C. (2007). Vulnerability of the New York City metropolitan area to coastal hazards, including sea-level rise: Inferences for urban coastal risk management and adaptation policies. In L. McFadden, R. Nicholls, & E. Penning-Rowsell (Eds.), *Managing coastal vulnerability* (pp. 139–156). Oxford: Elsevier.

Kelman, I. (2015). Difficult decisions: Migration from small island developing States under climate change. *Earth's Future*, *3*(4), 133–142.

Kjellstrom, T. (2015). Impact of climate conditions on occupational health and related economic losses: A new feature of global and urban health in the context of climate change. *Asia-Pacific Journal of Public Health*. doi:10.1177/1010539514568711

Kraussman, F., & Haberi, H. (2002). The process of industrialization from the perspective of energetic metabolism: Socioeconomic energy flows in Austria. *Ecological Economics*, *41*(2), 177–201.

Kuznets, S. (1962, October 20). How to judge quality. *The New Republic*, p. 29.

Layard, R. (2003). Happiness: Has social science a clue? In *Lionel Robbins Memorial Lectures 2002/3 at the London School of Economics* (pp. 1–23). London: London School of Economics.

Layard, R. (2005). *Happiness: Lessons from a new science*. Penguin Press.

Matthews, H. S., & Lave, L. B. (2000). Applications of environmental valuation for determining externality costs. *Environmental Science and Technology*, *34*(8), 1390–1395.

Mercer. (2015). *Investing in a time of climate change*. Retrieved from http://www.mercer.com/services/investments/investment-opportunities/responsible-investment/investing-in-a-time-of-climate-change-report-2015.html

Navrud, S. (2001). Valuing health impacts from air pollution in Europe. *Environmental and Resource Economics*, *20*(4), 305–329.

OECD. (2003). *Externalities*. Retrieved from https://stats.oecd.org/glossary/detail.asp?ID=77

Parks, B. C., & Roberts, J. T. (2010). Climate change, social theory and justice. *Theory, Culture & Society*, *27*(2–3), 134–166.

Paulson, H. M. (2015). *Short-termism and the threat from climate change*. Retrieved from http://www.mckinsey.com/insights/strategy/short-termism_and_the_threat_from_climate_change

Peters, G. P., Marland, G., Le Quere, C., Boden, T., Canadell, J. G., & Raupach, M. R. (2012). Rapid growth in CO_2 emissions after the 2008–2009 global financial crisis. *Nature Climate Change*, *2*(1), 2–4. Retrieved from doi:10.1038/nclimate1332

PWC. (2015). *Conscious uncoupling? Low carbon economy index 2015*. Retrieved from https://www.pwc.com/gx/en/psrc/publications/assets/conscious-uncoupling-low-carbon-economy-index-2015.pdf

Rousseau, P., & Sylla, R. (2001). *Financial systems, economic growth, and globalization*. Retrieved from http://www.nber.org/papers/w8323

Sahu, S., Sett, M., & Kjellstrom, T. (2013). Heat exposure, cardiovascular stress and work productivity in rice harvesters in India: Implications for a climate change future. *Industrial Health*, *51*(4), 424–431.

Schandl, H., Hatfield-Dodds, S., Wiedmann, T., Geschke, A., Cai, Y., West, J., . . . & Owen, A. (2015) Decoupling global environmental pressure and economic growth: Scenarios for energy use, materials use and carbon emissions. *Journal of Cleaner Production*, *132*, 45–56.

Shreve, C. M., & Kelman, I. (2014). Does mitigation save? Reviewing cost-benefit analyses of disaster risk reduction. *International Journal of Disaster Risk Reduction*, *10*(A), 213–235.

Island Vulnerability. (1989). Small States conference on sea level rise 14–18 November 1989 Male, the Maldives. Retrieved from http://www.islandvulnerability.org/slr1989.html

Steinberger, J. K., Krausmann, F., Getzner, M., Schandl, H., & West, J. (2013). Development and dematerialization: An international study. *PloS One*, *8*(10), e70385.

Storlazzi, C. D., Elias, E. P. L., & Berkowitz, P. (2015). Many atolls may be uninhabitable within decades due to climate change. *Scientific Reports*, *5*, 14546.

Stott, R. (2012). Contraction and convergence: The best possible solution to the twin problems of climate change and inequity. *British Medical Journal*, *344*, e1765.

Talberth, J. (2007). *The genuine progress indicator redefining progress*. Retrieved from http://rprogress.org/publications/2007/GPI 2006.pdf

The Economist Intelligence Unit. (2015). *The cost of inaction: Reconciling the value at risk from climate change*. Retrieved from http://www.economistinsights.com/financial-services/analysis/cost-inaction

UN. (2012). *Letter dated 18 June 2012 from the Permanent Representative of Brazil to the United Nations addressed to the Secretary-General of the United Nations Conference on Sustainable Development*. Retrieved from http://www.unep.org/rio20/portals/24180/Docs/a-conf.216-5_english.pdf

UN. (2015). *The Millennium Development Goals Report. United Nations*. Retrieved from https://visit.un.org/millenniumgoals/2008highlevel/pdf/MDG_Report_2008_Addendum.pdf

UN Sustainable Development Platform. (2015). Sustainable development goals. Retrieved from https://sustainabledevelopment.un.org/topics

UNFCCC. (2015). *Adoption of the Paris Agremeent: Proposal by the President Draft decision-/CP.21*. Retrieved from https://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf

UN Economic and Social Council. (2016). *Report of the inter-agency and expert group on sustainable development goal indicators*. Retrieved from http://unstats.un.org/unsd/statcom/47th-session/documents/2016-2-SDGs-Rev1-E.pdf

Waage, J., Banerji, R., Campbell, O., Chirwa, E., Collender, G., Dieltiens, V., . . . Unterhalter, E. (2010). The millennium development goals: A cross-sectoral analysis and principles for goal setting after 2015. doi:10.1016/S0140-6736(10)61196-8

Waage, J., Yap, C., Bell, S., Levy, C., Mace, G., Pegram, T., . . . Poole, N. (2015). Governing the UN sustainable development goals: Interactions, infrastructures, and institutions. *The Lancet Global Health*, *3*(5), e251–e252. doi:10.1016/S2214-109X(15)70112-9

Ward, R., & Smith, K. (1998). *Floods: Physical processes and human impacts*. Chichester: John Wiley & Sons.

Watts, N., Adger, W. N., Agnolucci, P., Blackstock, J., Byass, P., Cai, W., . . . Costello., A. (2015). Health and climate change: Policy responses to protect public health. *The Lancet*, *386*(10006), 1861–1914.

Weitzman, M. L. (2007). A review of the stern review on the economics of climate change. *Journal of Economic Literature*, *45*(3), 703–724.

Winkler, M. S., Krieger, G. R., Divall, M. J., Cissé, G., Wielga, M., Singer, B. H., . . . Utzinger, J. (2013). Untapped potential of health impact assessment. *Bulletin of the World Health Organization*, *91*(4), 298–305. doi:10.2471/BLT.12.112318

World Health Organization. (2014). Health in all policies: Helsinki statement, 21. doi:10.1093/heapro/dau035

Worldwatch Institute. (2015). *State of the world report*. Retrieved from http://www.worldwatch.org/state-of-the-world-2015

Xu, X. (2014). Climate change as a challenge to China's insurance industrynull. *International Journal of Climate Change Strategies and Management*, *6*(4), 363–375.

Youssef, S., & Whyte, D. (2013). Ethical investment: What it is and how it works (or doesn't). Retrieved from https://corporatewatch.org/magazine/54/summer-2013/ethical-investment-what-it-and-how-it-works-or-doesnt

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Article

The Devil Is in the Details: Linking Home Buyout Policy, Practice, and Experience After Hurricane Sandy

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Abstract
Federal housing recovery policy bounds many of the decisions made by households after a disaster. Within this policy domain, home buyout programs are increasingly used to encourage residents to permanently relocate out of areas considered at risk for future hazards. While buyouts offer homeowners and governments potential benefits, research exploring the impacts of these policies is limited. In this paper, we present an in-depth examination of the community experience of buyouts, a perspective that is noticeably lacking in the literature. Using data from two mixed-method empirical studies, we explored the implications of buyout program design and implementation for Oakwood Beach, New York, a community offered a buyout after Hurricane Sandy. We found that design decisions made at program conception significantly impacted participants' experience of the buyout, including their understanding of program goals and their progression through the buyout and relocation process. We conclude with recommendations for future buyouts, including increased inclusion of affected communities in the process of and pre-event planning for recovery, along with recommendations for future research.

Keywords
buyout; disaster recovery; housing policy; Hurricane Sandy; planning for recovery; relocation

Issue
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1. Introduction

Home buyout programs facilitate the permanent relocation of residents out of areas considered at risk for future disasters. In their most basic form, buyout programs give homeowners the opportunity to sell their homes to a local implementing agency and relocate, ideally to a less hazardous area. While these programs are federally funded, they are implemented by municipal, county, or state agencies, and the land purchased through buyouts is converted into open space in perpetuity. In theory, then, home buyouts mitigate against future hazards by reducing the number of households at risk and increasing the amount of natural mitigation in place. These programs have been in use in the U.S. since the late 1970s, beginning with the relocation of flooded homes and businesses in Soldiers Grove, WI (David & Mayer, 1984; Tobin & Peacock, 1982).

Several states and communities have implemented buyouts in the intervening years, though our understanding of how these programs impact households and communities remains limited. This is due, in part, to a dearth of empirical research and limited evaluations of past programs. While few studies have examined the risks of buyout programs specifically, previous studies have found displacement to be associated with a range of social costs including losses in homeownership, social networks, access to healthcare, employment, income, and physical and mental health (Blaze & Shwalb, 2009; Hori & Schafer, 2009; Mortensen, Wilson, & Ho, 2009; Riad &

Norris, 1996; Sanders, Bowie, & Bowie, 2003; Weber & Peek, 2012). These risks may be exacerbated for individuals and households who relocate permanently as compared to temporarily (Badri, Asgary, Eftekhari, & Levy, 2006; Blaze & Shwalb, 2009; Milne, 1977; Yzermans et al., 2005), for those who relocate outside their original community (Hori & Schafer, 2009; Kessler et al., 2008), and for those who experience ecological stress (e.g. food shortages, overcrowding) while displaced and in the relocation process (Riad & Norris, 1996). Given the potential risks associated with relocation, then, we would argue that a primary goal of any buyout effort, beyond reducing hazard exposure, should be to minimize these risks for participating households.

Further, given their substantive history and on-going use in the U.S., buyouts should show evidence of improvement over time. In a previous study (Greer & Binder, 2016), we used policy learning theory to explore the extent to which these policies and programs had iterated over time. We examined eight buyout programs implemented between 1978 and 2005, and compared them according to key design features including primary funding source(s), number of homes purchased, duration, criteria for inclusion, use of financial incentives and disincentives, and degree of government involvement. We found little evidence of policy learning across buyout programs. Rather, the programs were designed and implemented independently with limited influence from past programs, with minimal guidance from federal funding agencies, and by local implementing agencies that lacked experience purchasing hazard-prone properties.

In this paper we contribute to the nascent literature on home buyout policy by applying case study methodology to examine how program design affects household experience, a question on which the overall success of buyouts hinges. We use the framework presented in our previous study of policy learning in buyouts as a starting point for understanding these processes. We begin by detailing a home buyout program implemented in New York after Hurricane Sandy, providing an overview of how Sandy affected the area and the relevant features of the buyout program. Next, we describe our methodology for exploring New York's buyout based on our framework. Then, we present data on how selection criteria, financial incentives, government involvement, the buyout program progression, and the perceived voluntariness of the program all influenced lived experiences for participating households. We conclude by discussing study implications and by offering recommendations for moving forward.

2. Background

On October 29, 2012, Hurricane Sandy made landfall in southern New Jersey, resulting in 159 fatalities and $50 billion dollars in damages in the U.S. (Hurricane Sandy Rebuilding Task Force, 2013). Sandy was primarily a storm surge event, making it a monumental housing disaster that damaged or destroyed 650,000 homes and displaced residents for many months. In response, New York developed a home buyout program to transform portions of the state's coastal flood zones into preservation land (Kaplan, 2013; New York State Homes and Community Renewal [NYHCR], 2013). In its original form, the buyout plan offered 100% of a home's pre-storm value for substantially damaged homes (damaged beyond 50% of their value) located in the highest risk coastal areas (known as "V Zones" on the Federal Emergency Management Agency [FEMA] flood maps) and to substantially damaged homes located within the 500-year floodplain (NYHCR, 2013). The buyout program was later adjusted to apply only to homes within the V Zones, while substantially damaged homes within the 500-year floodplain were eligible for a separate acquisition program[1] (Governor's Office of Storm Recovery [GOSR], 2014). While a large number of homes were technically eligible for the buyout, the state ultimately selected only ten communities for buyouts, including three in New York City (NY Rising, 2014).

Homeowners in the eligible communities who opted to enroll in the buyout program had their homes appraised by a private company contracted by the state and received an offer based on that appraisal. To encourage participation in the selected communities, the state offered financial incentives in areas it designated as "enhanced buyout zones", defined as "areas at highest risk in the floodplains that are determined to be among the most susceptible to future disasters" (GOSR, 2014, p. 10). Homeowners could then accept the appraised value or hire a private appraiser (at their own expense) and appeal the offer. For those who accepted a buyout offer, a closing date was set and the property transferred to the state. Homeowners were responsible for finding and relocating to a new home once the property transfer was complete. In keeping with the requirements of the U.S. Department of Housing and Urban Development (HUD), which funded the buyout, the state was responsible for demolishing the purchased homes and converting the property to open space. As of July 2015, the state had purchased 713 homes through the buyout program (GOSR, personal communication, July 7, 2015).

3. Methods

In this paper, we present a case study of Oakwood Beach, a coastal community in New York City where most residents opted to participate in the state's buyout program. Yin (2013) suggests that case studies are appropriate when asking "how" or "why" questions, using multiple data sources to explore phenomena in a non-experimental setting. This study focuses specifically on how programmatic design choices impact household buyout experiences, and utilizing case study methodology allowed us to gather in-depth, experiential data surrounding a single program (Berg & Lune, 2012, p. 337).

[1] Property acquisitions, while otherwise similar to buyouts, allow the state to resell and redevelop purchased properties.

Data presented here are drawn from two mixed-method studies that explored housing recovery and decision-making in the wake of Hurricane Sandy. We used three data sources to understand the experiences of residents: observations, surveys, and in-depth, semi-structured interviews. We conducted extensive observations of Oakwood Beach, including attending community meetings and home inspections, touring damaged homes, and spending time with residents in the area. We conducted two surveys. We collected the first survey April–August 2013, utilizing a two-step sampling method that included systematic random door-to-door sampling supplemented by surveys collected at local community events. The second survey was conducted from May–July 2014 using a modified version of Dillman's (1978) methodology that included mailing a survey to every household within the buyout zone and homeowners on adjacent streets. By mailing the survey to participants, we were able to reach households that were displaced or no longer living in their pre-Sandy home. Both surveys included closed-ended questions that explored factors influencing buyout acceptance and open-ended questions that probed experiences with and perceptions of the buyout program. We bound our discussion here to the more relevant open-ended questions. In total, we received open-ended responses from 127 households. To complement our survey data, we conducted in-depth, semi-structured interviews with Oakwood Beach residents. While we were also able to speak with HUD and local officials about the design and implementation process, FEMA, the state of New York, and ProSource Technologies, a Minnesota-based firm the state of New York contracted to run the program, denied our numerous interview requests.

We utilized both inductive and deductive coding processes to explore the open-ended survey and interview data. Initially, we used inductive, descriptive coding to capture the major topics in our data in a word or phrase (Saldaña, 2012, p. 88). Next, we used deductive, elaborative coding to explore the ways buyout participants experienced the buyout program, including how the design of the buyout program influenced their experience, perspective, and opinion of the program. Elaborative coding allows for the use of deductive codes from previous studies, thereby adding depth to study findings (Saldaña, 2012, p. 229). We built our deductive codes to mirror key dimensions of buyout programs based on prior work exploring historical development and variation across buyouts (Greer & Binder, 2016).

4. Case Study of New York's Post-Sandy Home Buyout Program

In this section we present findings related to the implications of program design and implementation in a community context. Focusing on one buyout in one community, we examine how key elements of buyout design influence the buyout experience for affected households. These elements include the criteria for inclusion in the program, the financial incentives offered, the government's involvement in the buyout process, the progression of the buyout program, and the perceived voluntariness of the program. We present qualitative data that provide insight into the experience of residents of Oakwood Beach related to each of these programmatic elements.

4.1. A Separation of One Street

As was the case with previous buyouts, the criteria for inclusion in New York's buyout was initially broadly conceived, inclusive of substantially damaged homes within the 100- and 500-year floodplains. The geographic focus of the program shifted and shrank over time, however, such that the buyout was eventually extended to only a limited number of purposely-selected communities. These decisions were contentious. Several communities within New York City that vocally and actively pursued inclusion in the State's buyout, for example, were ultimately excluded from the program (Rizzi, 2014).

Even within Oakwood Beach, which was designated as the pilot community for the buyout program, decisions about which properties to include were controversial. The initial enhanced buyout zone designation in Oakwood Beach included approximately 165 properties in the coastal Fox Beach neighborhood (Fox Beach 165, 2013). Over time the buyout zone shifted, though neither the state nor the city offered residents a clear explanation of why the line of inclusion was drawn where it was. Dissatisfied with the original delineation, some residents whose properties were located just outside of the buyout zone organized, gathered signatures, and petitioned to be included in the buyout, though most of these efforts were unsuccessful. Ultimately, the buyout zone included the original properties in the Fox Beach neighborhood, along with approximately 115 additional homes in some, but not all, of the areas immediately adjacent to Fox Beach.

From the community's perspective this process seemed arbitrary at best, which was a point of significant frustration for residents on both sides of the line. Participants struggled to understand the "haphazard" decisions related to the inclusion and exclusion of properties, and described the impacts of these decisions on their families and community:

> "We fell short just 50 ft. from the buyout….The politicians told us we were in Oakwood and not Oakwood Beach. In the meantime, we receive these surveys we fill out stating Oakwood Beach. This is the problem and pitfall unfortunately for my family. My home was on the market before the hurricane. My child lives with a life threatening condition. Our home was difficult to sell at the market. Now on a short sale. We are on a deficit.
>
> Oh, yeah there was a separation of one street. There was even a separation on one block where one side

> of the street was a part of the buyout and the other side of the street was not....So the way it was zoned, I honestly don't know."

4.2. Here's Rock, Here's Hard Place, Here's Us Right in the Middle

New York used financial incentives to encourage participation in the buyout. While these financial incentives were sizeable relative to past programs, the incentives were not static. As originally designed, residents in enhanced buyout areas were eligible for incentives equal to a maximum of 25% of the sale price of the home (GOSR, 2014; Office of Community Renewal, 2013). This included a 10% incentive for designated high-risk areas, a 5% incentive if they purchased and relocated to a property within the same county (or within New York City, for city residents), and a 10% incentive for clusters of two to ten homes where owners of adjacent properties located within a V Zone collectively agreed to relocate. The 10% incentive for clusters of homes was later dropped, leaving buyout participants eligible to receive incentives of up to 15% of the sale price of their home.

Even with this decrease in available incentives, participants generally described the incentives as a positive component of the program. As one resident stated, "the government's gonna buy us out, they're gonna give us 10% above pre-storm, 5% if you stay [on Staten Island]. So financially, with that, we should be okay." At the same time, however, the incentive structure was a source of confusion for participants, few of whom could explain it clearly. Participants described being provided confusing and dated information about the amount of incentives available, and they gave varying, and often misinformed, explanations of eligibility requirements:

> "So, I was originally told that we would get 25%—10, 10, and 5—on top of pre-storm value. Now down the line, that changed. That became 15%.
>
> And then, because we're in an enhanced, what's called, it's called an enhanced area? Because we've had problems before? And we've had deaths in the area?...It's called enhanced. We, if you sell your house to them, you get an extra 10%. Whatever the amount is. And if you buy a house, before, like, the complete closing? Before, you have a certain amount of time. And you stay on the island, or you stay in the area, you get another 5%."

While the incentives were seen as helpful, they did not alleviate participants' financial concerns. Oakwood Beach was a relatively affordable community in the competitive New York City market, which had allowed residents to purchase homes with yards and other amenities that would have been beyond their reach in other areas of the city. After Sandy, finding comparable, affordable housing elsewhere was a challenge even with the financial incentives provided through the buyout. Participants described how this, in conjunction with other Sandy-related stressors, left them with few good options:

> "Market changed and it was not enough to buy the same type of house in better neighborhood far from water. Very stressful was process with mortgage company: show that you have enough money on your account, they don't trust the contract of Buyout Program....Eventually I am not happy because of all extra expenses which appeared because of moving out and in. My 'dream' to pay off the mortgage of former house before retirement was gone and now my current house I will be unable to pay off. On the top of everything my marriage collapsed. It was too much for my husband. P.S. sorry for my English.
>
> Because now we can't go that high on an older house, 'cause we have to keep money aside, because there's no warranties with anything. So, what if we walk in and two weeks down the road the boiler decides to go on the fritz, or, you know, the roof starts to leak. You know….So, that's limiting what we can buy now. You know, here's rock, here's hard place, here's us right in the middle."

The dollar amount received from the buyout, in effect, was not what residents felt was most important. Rather, what mattered was whether the buyout enabled them to replace the home they lost.

4.3. Nobody's Telling Us Anything

There was relatively little government involvement in New York's buyout compared to past programs, and property transfers closely resembled private sales. It is not clear why the state opted to follow this model, but among buyout participants it may have contributed to a sense that the government was detached from the process and unavailable to the community. In their interactions with government agencies and officials, participants reported receiving conflicting information and being unable to get answers to questions that directly influenced their housing recovery decisions. One participant simply stated "That's the problem. Nobody knows nothing. There's nowhere to go to get information."

> Participant: "We waited two and a half hours, stood on line, talked to the FEMA guy? And we had our friend with us…so this way, when we asked a question, got an answer, she could help us remember….And we walked in, and he said, well, who are you. And we told him who we were. Well who's this, and we said a friend of ours. He said well she can stay as long as you guys don't ask any questions. And we were like….Yeah, it, it'd be too much for him to handle for us to ask questions. And I'm like, but what am I sittin' here for two and a half hours on line for if I can't ask any questions?

> So he let us ask questions, but basically gave us the same answers as we had….We waited for two and a half hours for nothing…"
>
> Interviewer: "What were you hoping to get?"
>
> Participant: "Answers! How do you file? Where do you file? What can you expect to get? You know, what are we eligible for?"

Issues with information and communication with government agencies belied a larger issue of trust in the people and agencies directly responsible for administering the buyout. When asked whether or to what degree they trusted the agencies involved in the buyout, responses were mixed. Some participants were unequivocal in their belief that the participating agencies would ensure that the program moved forward as planned, and that they were acting in the best interests of the residents:

> "The governor's people have made it clear. They're moving forward with everyone who wants to move forward. Who agrees to that buyout. They will be taken care of swiftly, quickly, and done so we can move on with our lives.
>
> God gave us this. God gave this to us. The governor brought this to us. God is watching over us…now as it stands? You're getting 15%, you're getting bought out, you're getting fair market value."

For others, experiences with buyout administrators and other officials caused them to question whether there was a sound plan in place for the implementation of the program and, more to the point, whether the government had the residents' best interests in mind.

> "It's federal, I guess, so, I mean, you should trust the government. But, you know, then again, I just, I don't know what they're planning to do. Is there any actual plan?
>
> I went down there, [the Department of Buildings] had slapped green sticker on my house that they had came to my house, on a Sunday, at 3 o'clock in the afternoon, and did a thorough interior and exterior examination of my house, and my house was perfectly sound. I'm like, really!...I said how did you relock my deadbolts on my doors when you got out of my house, 'cause there was nobody there for you to let you in. They never explained that to me. So, we knew at that point, that they were just slappin' stickers on houses for the sake of slappin' the stickers on houses. So, right there, we're all, the whole neighborhood is like, this is ridiculous, because we can't trust the people that are supposed to be helping us."

These issues were further compounded by competing goals at the city and state levels. While the State of New York was pushing for buyouts, New York City developed a recovery plan that prioritized the redevelopment of Sandy-damaged properties. As one official stated, the City was "hoping that people will buy several of these small lots, and then build a bigger house on them." For residents making major decisions about housing, this added yet another layer of confusion. One participant, in expressing her exasperation about the process, stated "[Mayor] Bloomberg is pushing people to rebuild, at the same time [Governor] Cuomo is pushing the buyout."

It is worth noting that participants' expectations for government agencies during and after the buyout were shaped by a history of perceived failures by multiple levels of government. Oakwood Beach was established as a summer beach community, and over time the beach homes were converted into year-round residences. There was a wave of new development beginning in the 1990s that, as reported by participants, ignored a series of mitigation recommendations proposed by the Army Corps of Engineers. Long-term residents attributed increases in local flooding events, including a significant flood in 1992, to these changes. Sandy amplified these concerns and raised questions about why the local government, given their knowledge that the land was vulnerable, had ever allowed it to be developed as permanent housing:

> "Certain areas that, 50, 60, 80 it might be, years ago, never should have been allowed to be year-round. Or made year-round. Never should have even been allowed to be a bungalow area. Never mind homes. Jumping forward into the 80s and 90s, homes like my own included! Shouldn't a been allowed to be built three stories, shouldn't a been allowed to be where they were, so close. I mean, Oakwood Beach, the ocean's up here. And, the street and the homes are down below. You got a sewage plant a half a block away, that did release."

4.4. The Waiting Is the Worst Part

Compared to previous buyout efforts (c.f. buyouts associated with Hurricane Katrina), the Oakwood Beach Buyout launched without delay and did not overstay its welcome. Throughout the process, residents were told that the buyout was moving faster than any buyout had before, and the goal set by community leaders to have the first buyout home purchased within a year of the storm was realized (Sedon, 2013). In retrospect, participants' generally agreed that the buyout program moved relatively quickly. Participants stated that "the New York state buyout was clear-cut and expeditious" and that "it went completely smooth. I think it went fast."

The speed at which the program began and ended, however, was not the only factor that shaped how participants understood and experienced their progression through the buyout program. In the interim between the announcement of the buyout and the actual sale of properties, participants conveyed the stress and difficulty as-

sociated with not knowing when, or even if, their homes would be purchased, a set of experiences that link back to our previous discussion about trust:

> "They don't understand the anxiety—we've lost all our stuff, we're trying to fix our homes, but we're not getting any information. They want us to live a normal life. How do you live a normal life?"

Homeowners described the year between Sandy and the first home purchase as a constant state of waiting: waiting to learn what the state's offer on their house would be, waiting for the results of inspections, waiting for help from FEMA and insurance companies, waiting to see how high the new flood insurance rates would be, and waiting to see whether the sale of their homes would actually go through. Each step in this process was uncharted territory. As one participant stated, "The waiting is the worst part of the buyout."

> Participant 1: "Well I am a little stressed out."
>
> Participant 2: "Yeah, she's washed up."
>
> Participant 1: "You know what it is, too, you're up in the air. You don't know what you're gonna do."

> "It could have been faster. Also people were taking advantage of some of it, too. They had no insurance, they got paid right away. Us, we've been waiting and waiting and waiting. It doesn't seem fair. People who had no insurance got paid right away, people who had insurance had to wait and fight."

Housing issues topped many participants' list of challenges during this ambiguous period. Residents left with uninhabitable homes after Sandy struggled to find interim housing. Neither the city nor the state provided emergency housing,[2] leaving affected residents living in a rented apartment, living with family or friends, or repairing and moving back into their damaged homes:

> "Okay, in the interim we were staying, um, first we were stayin' at my mother's, then my sister's, then my brother had us stay in his apartment, and he had to move out. So we had to pay him rent.
>
> Nobody's [living in the neighborhood] for 6 months. We don't know what's going on. I gotta tell the truth. They just came back. That—nothings moving that quickly, 'cause they're telling you they're gonna buy you out, and, look at all the work we did [repairing our house]. You know? We tried. But if they can't fix the beach up, you gotta get outta here.
>
> We got our life back in order. Uh, we, as you can see we fixed up our house. Probably, if not equal to, a little bit better than what we had."

Each of these temporary living arrangements came with its own set of challenges, and it was not unusual for participants to have done all three. Residents who rented apartments faced the financial burden of paying rent in addition to the mortgage on their damaged home. Residents who stayed with family and friends described the social stressors associated with that choice, especially as these arrangements became longer-term. For some residents, repairing their homes became the best option, even believing that a buyout was imminent.

4.5. They Have No Options

One of the fundamental requirements of home buyout programs in the U.S. is that they must be voluntary, meaning that homeowners cannot be forced to participate. While policy safeguards are in place to protect residents from forced participation, the distinction between voluntary and involuntary is less straightforward than it may appear. Implementing agencies may attempt to influence participants' decisions using policy tools such as moratoria on construction, the condemnation of homes deemed abandoned, or the use of the substantially damaged declaration, where the cost of repairing a home is determined to exceed 50% of the home's predisaster value. In cases where the substantially damaged declaration is invoked, homeowners may be required to implement costly mitigation measures, such as raising the home above the base flood elevation if they wish to rebuild. For homeowners with limited financial means, the implications of this policy are not dissimilar to that of forced relocation. More subtle approaches may have a similar effect, ranging from threats to reduce services or not rebuild critical infrastructure to emphasizing the threat of future hazards or the potential social and economic impacts of rejecting a buyout when most of one's neighbors relocate (de Vries & Fraser, 2012). There are a number of circumstances, then, under which buyout programs that are technically voluntary may not be perceived as such by residents.

In New York's buyout, the experiences and perceptions of participants raised questions as to whether, or to what degree, the program could truly be considered voluntary. One participant stated clearly "People are being forced into leaving. They have no options." While language this direct was unusual, participants described several more nuanced ways in which fears and consequences (real and threatened) made the buyout feel like less of a choice and more like their only real option.

Prior to Hurricane Sandy, residents of Oakwood Beach valued the sense of safety their neighborhood provided. The damage and destruction caused by Sandy, however, violated this sense of safety. The structural mit-

[2] Some participants did receive rental assistance from FEMA, though this process was described as difficult and stressful to the point that several participants simply gave up trying to access it.

igation measures that had been in place failed, including a berm that separated the community from the ocean. This led many residents to believe that nothing could make the community safe from future hazards. This perception was anchored by previous disaster experience and perpetuated by buyout organizers and officials:

> "So knowing that it was already compromised, one of the biggest decisions to me was they'll never get that area back. Everything was totally destroyed, the flood gate, the sea gate, the beach area, everything. It's basically a flat area, so that was one of the biggest decisions for us, that it would never, ever. Even a simple storm at this point is a threat to that area.
>
> Some I'm sure are not back yet in their homes, but it doesn't stop the fact that this will happen again and some of us may not be that lucky again…please don't leave us here in danger there are children, handicap, elders, just simple working people trying to be in a safe place. Now even just a heavy rainfall can make me very scared and my neighbors feel the same way. Our lives have changed tremendously."

In addition to fears about safety, participants described a suite of potential consequences, including loss of choice, for residents who rejected the buyout. While the use of eminent domain is technically prohibited in buyouts, residents still feared that it would be used to forcibly relocate remaining households after the buyout, and that the purchase price of the properties would be lower. For others, the primary concern was that the housing market in Oakwood Beach would never recover after Sandy:

> "Yeah, so when it goes into effect, and, you know, 80% of the houses are gone, or something like that, there's nothing to stop the state from invoking, um, eminent domain….So I think that's the fear, or that's the risk. If everyone else takes it, and you don't take it, you know. That, you may be forced into a different sort of arrangement. I have no idea if that would happen, I have no idea if there's a plan for that. But I think that's one of the dangers.
>
> I do know a few of 'em don't wanna leave….But they're not thinking straight. Because if and when they ever go to sell their house, because of the other houses are gonna be knocked down and it's all gonna be brought back to nature, everybody's gonna remember exactly what happened. So you are never going to get the money you could've gotten through this buyout. Because they're giving us before flood prices. So even if you fix your house up perfectly now, it's not worth what it was October 28. Just because of what happened on October 29."

Participants were also concerned that potential increases in their flood insurance premiums would make staying in their homes a financial impossibility. Fueled by a national debate on the viability of the National Flood Insurance Program and the passing of the controversial Biggert-Waters Flood Insurance Reform Act in 2012, rumors spread of insurance rate hikes in excess of $20,000 per year, an untenable amount for Oakwood Beach's working class households:

> "I mean in all honesty, I would live in the house on stilts if it was on the water. I love the water, but the reality is, um, what kills us, is the flood insurance. You know, because of course the bank's not going to give you more because you don't have flood insurance, and to get flood insurance, it's just crazy what they want to charge you for flood insurance because no one wants to insure you. So that's the dilemma and the kind of stress that you deal with when you want to live in a particular neighborhood or a beachfront property. It creates a lot of stress in terms of the banks and insurance companies and all that kind of stuff."

While buyouts are voluntary by nature, then, our data indicate that this, too, is an area of potential variation across programs. The degree to which New York's program was truly voluntary was influenced not just by the technical design of the program, but also the way in which the buyout option was presented relative to other options and by the broader recovery context.

5. Conclusions

In this paper we have explored how key design components of home buyout programs impact household experiences and outcomes. In our case study of Oakwood Beach, New York, we found that decisions about program inclusion were originally based on familiar metrics, but were ultimately limiting and perceived as arbitrary. Financial incentives employed to encourage participation were not just high, but possibly the highest on record. At the same time, while they did appear to encourage participation, these incentives did not necessarily relieve the financial burden for buyout participants, whose primary concern was their ability to secure appropriate, desirable, and equivalent new housing. The relatively low level of government involvement was not necessarily a distinguishing feature, though the program was shaped by a history of mistrust of the government and complicated by competing goals at the city and state levels. While the buyout progressed relatively quickly, the salient issue from the participants' perspective was not the pace of program implementation, but rather their own progression through the buyout process and their ability (or inability) to access coherent, accurate, and timely information needed to make important decisions. Lastly, a theme emerged related to the voluntary nature of buyouts, an issue that has been previously raised in the literature (de Vries & Fraser, 2012; Fraser, Elmore, Godschalk, & Rohe, 2003). In keeping with findings from

these studies, the buyout in New York was technically voluntary, though there were gray areas in terms of how this was perceived and experienced by participants. In the New York buyout, then, individual program components were tied to experiences and outcomes. This has implications for practice, as it suggests that even seemingly minor differences in program design may have significant impacts on affected households and communities.

While we maintain that the extant literature on home buyout programs is too sparse to draw conclusions about their viability or desirability as a disaster recovery tool, our findings offer some suggestions as to how the experience of buyouts may be improved in cases where they are implemented, or more speficially, how the experience of New York's buyout might have been improved for affected residents. We have previously drawn attention to the need for greater transparency at the implementing agency level (Greer & Binder, 2016). In this case, greater transparency may have reduced confusion and frustration around the issues of program inclusion and eligibilty for incentives, assuaged fears regarding future uses for acquired properties, and enabled residents to make more informed decisions throughout the process. A clear, consistent, and accurate description of steps involved in the buyout process, perhaps in the form of an annotated timeline, would have allowed participants to more accurately track their progress, understand the process, and consider any avilable alternatives. In terms of the lived experiences of affected residents, the inability of the city and state to cooperate in developing and presenting recovery program options is inexcusable, and served to add confusion to an already difficult process. Given that the financial incentives provided, while substantial when compared to previous programs, were not adequate to meet participant needs, their effectiveness could have been increased through supports that assisted participants in locating appropriate, affordable homes in their desired areas. Taken together these changes, while simple, may have ameliorated a host of participant concerns.

We must consider these findings in light of the fact that, while New York's buyout program reflected some characteristics of previous programs, on the whole this was a unique program in a long line of unique programs (Greer & Binder, 2016). By comparison, Louisiana designed a complicated buyout program after Hurricanes Katrina and Rita that was characterized by a novel, though arguably problemmatic, combination of financial disincentives and restrictions (Green & Olshansky, 2012). Studies suggest that this program, in addition to being difficult for participants to understand and navigate, hindered recovery and reinforced pre-existing economic and social inequalities, especially in New Orleans (Gotham, 2014; Green, Bates, & Smyth, 2007; Green & Olshansky, 2012). In buyout programs, then, the devil may be in the details. This signals a need to increase our understanding of the relationship between policy, design, experience, and outcomes across a range of buyout programs, each of which are characterized by a range of program components. This is an important step toward developing a more comprehensive theory of postdisaster relocation, and in establishing an empirical foundation for minimizing risk to buyout participants and informing best practices in all phases of the buyout process.

We offer two specific recommendations for improving buyout policy and practice. First, given the broad range of buyout programs, the variety of contexts in which they are considered and implemented, and the recent climate-induced relocations in the U.S. (Davenport & Robertson, 2016; Kennedy, 2016), there is a clear need for an expanded research agenda in this area. Here, we highlight two specific areas that warrant greater attention. To expand our understanding of how program design relates to experiences and outcomes, we recommend that future studies examine the role of implementing agencies. These agencies have received little attention in the literature (Kick, Fraser, Fulkerson, McKinney, & de Vries, 2011), though they could contribute significantly to our understanding of how programs are conceived, designed, and supported. More generally, the literature is silent on a primary, overarching question: are people better off for having participated in home buyout programs? Previous studies suggest that buyout participants may be subjected to a variety of risks, and without empirical studies to document the potential benefits of buyouts to the households that participate we cannot, either at a policy or household level, give an informed response to this question.

Second, in cases where buyouts are considered a viable option, we cannot overstate the importance of including local communities in the process. The true test of home buyout programs is arguably their impact on affected households and communities. Whether they are considered successful or unsuccessful in any given context, they are enormously disruptive. As such, we recommend that, at the local level, buyout programs be community-led. While an exploration of the process of community inclusion in buyouts is beyond the scope of this paper, the limited literature on buyouts suggests that community engagement in the buyout process improves outcomes (Fraser, Doyle, & Young, 2006; Knobloch, 2005), and participation in the planning process is a consistent push of the larger recovery research community (Berke & Campanella, 2006; Oliver-Smith, 1991; Smith, 2011). We recommend that implementing agencies prioritize the inclusion of community perspectives at all stages of the buyout process, including determining where buyouts are (and are not) implemented and developing viable alternatives with communities and households that reject buyouts. Relatedly, involving the community in planning for recovery prior to a disaster event may prevent post-disaster rebuilding that undermines the efficacy of hazard mitigation projects, including relocations (FEMA, 2009). While examples of success on this front are limited, previous studies have noted the benefit of planning for post-disaster recovery and push

all levels of government to spend the time to create these plans (Berke, Kartez, & Wenger, 1993; Mileti & Passerini, 1996; Paul, Che, Stimers, & Dutt, 2007; Rubin, Saperstein, & Barbee, 1985). In the case of buyouts, recovery planning presents an opportunity to identify high-risk areas, begin a conversation with the community about buyouts as a possible mitigation measure, and evaluate the potential social, economic, and environmental impacts of a buyout program, *before* a crisis occurs.

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Conflict of Interests

The authors declare no conflict of interests.

References

Badri, S. A., Asgary, A., Eftekhari, A. R., & Levy, J. (2006). Post-disaster resettlement, development and change : A case study of the 1990 Manjil earthquake in Iran. *Disasters*, *30*(4), 451–468.

Berg, B. L., & Lune, H. (2012). *Qualitative research methods for the social sciences*. NJ: Pearson Education.

Berke, P., & Campanella, T. (2006). Planning for postdisaster resiliency. *Annals of the American Academy of Political and Social Science*, *604*, 192–207.

Berke, P., Kartez, J., & Wenger, D. (1993). Recovery after disaster: Achieving sustainable development, mitigation and equity. *Disasters*, *17*(2), 93–109. doi:10.1111/j.1467-7717.1993.tb01137.x

Blaze, J. T., & Shwalb, D. W. (2009). Resource loss and relocation: A follow-up study of adolescents two years after Hurricane Katrina. *Psychological Trauma: Theory, Research, Practice, and Policy*, *1*(4), 312–322. doi:10.1037/a0017834

Davenport, C., & Robertson, C. (2016, May 2). Resettling the first American "Climate Refugees". *The New York Times*. Retrieved from http://www.nytimes.com/2016/05/03/us/resettling-the-first-american-climate-refugees.html?_r=0

David, E., & Mayer, J. (1984). Comparing costs of alternative flood hazard mitigation plans: The case of Soldiers Grove, Wisconsin. *Journal of the American Planning Association*, *50*(1), 22–35.

de Vries, D. H., & Fraser, J. C. (2012). Citizenship rights and voluntary decision making in post-disaster U.S. floodplain buyout mitigation programs. *International Journal of Mass Emergencies and Disasters*, *30*(1), 1–33.

Dillman, D. A. (1978). *Mail and telephone surveys: The total design method*. New York, NY: Wiley.

Federal Emergency Management Agency. (2009). *National disaster housing strategy*. Retrieved from https://www.fema.gov/media-library-data/20130726-1747-25045-0314/the_national_disaster_housing_strategy.pdf

Fox Beach 165. (2013). About us. Retrieved from http://foxbeach165.com/about-us

Fraser, J. C., Doyle, M. W., & Young, H. (2006). Creating effective flood mitigation policies. *Eos, Transactions American Geophysical Union*, *87*(27), 265–270.

Fraser, J. C., Elmore, R., Godschalk, D., & Rohe, W. (2003). *Implementing floodplain land acquisition programs in urban localities*. NC: Chapel Hill Press.

Gotham, K. F. (2014). Racialization and rescaling: Post-Katrina rebuilding and the Louisiana Road Home Program. *International Journal of Urban and Regional Research*, *38*(3), 773–790. doi:10.1111/1468-2427.12141

Governor's Office of Storm Recovery. (2014). *NY Rising buyout and acquisition policy manual*. Retrieved from https://stormrecovery.ny.gov/sites/default/files/uploads/nys_buyouts_policy_manual_20140407.pdf

Green, R., Bates, L., & Smyth, A. (2007). Impediments to recovery in New Orleans' Upper and Lower Ninth Ward one year after Hurricane Katrina. *Disasters*, *31*(4), 311–335.

Green, T. F., & Olshansky, R. B. (2012). Rebuilding housing in New Orleans: The Road Home Program after the Hurricane Katrina disaster. *Housing Policy Debate*, *22*(1), 75–99.

Greer, A., & Binder, S. B. (2016). A historical assessment of home buyout policy: Are we learning or just failing? *Housing Policy Debate*. doi:10.1080/10511482.2016.1245209

Hori, M., & Schafer, M. J. (2009). Social costs of displacement in Louisiana after Hurricanes Katrina and Rita. *Population and Environment*, *31*(1/3), 64–86. doi:10.1007/s11111-009-0094-0

Hurricane Sandy Rebuilding Task Force. (2013). *Hurricane Sandy rebuilding strategy*. Retrieved from http://portal.hud.gov/hudportal/documents/huddoc?id=HSRebuildingStrategy.pdf

Kaplan, T. (2013, February 3). Cuomo seeking home buyouts in flood zones. *New York Times*. Retrieved from http://www.nytimes.com/2013/02/04/nyregion/cuomo-seeking-home-buyouts-in-flood-zones.html

Kennedy, M. (2016, August 18). Threatened by rising seas, Alaska village decides to relocate. *National Public Radio*. Retrieved from http://www.npr.org/sections/thetwo-way/2016/08/18/490519540/threatened-by-rising-seas-an-alaskan-village-decides-to-relocate

Kessler, R. C., Galea, S., Gruber, M. J., Sampson, N. a, Ursano, R. J., & Wessely, S. (2008). Trends in mental illness and suicidality after Hurricane Katrina. *Molecular Psychiatry*, *13*(4), 374–384. doi:10.1038/sj.mp.4002119

Kick, E. L., Fraser, J. C., Fulkerson, G. M., McKinney, L. a, & de Vries, D. H. (2011). Repetitive flood victims and acceptance of FEMA mitigation offers: An analysis with community-system policy implications. *Disasters*, *35*(3), 510–539. doi:10.1111/j.1467-7717.2011.0122226.x

Knobloch, D. M. (2005). Moving a community in the aftermath of the Great 1993 Midwest Flood. *Journal of Contemporary Water Research & Education*, *130*(1), 41–45. doi:10.1111/j.1936-704X.2005.mp13 0001008.x

Mileti, D., & Passerini, E. (1996). A social explanation of urban relocation after earthquakes. *International Journal of Mass Emergencies and Disasters*, *14*(1), 97–110.

Milne, G. (1977). Cyclone Tracy: I Some consequences of the evacuation for adult victims. *Australian Psychologist*, *12*(1), 39–54.

Mortensen, K., Wilson, R. K., & Ho, V. (2009). Physical and mental health status of Hurricane Katrina evacuees in Houston in 2005 and 2006. *Journal of Health Care for the Poor and Underserved*, *20*(2), 524–538. doi:10.1353/hpu.0.0130

New York State Homes and Community Renewal. (2013). *State of New York action plan for Community Development Block Grant program disaster recovery*. Retrieved from http://www.nyshcr.org/Publications/CDBGActionPlan.pdf

NY Rising. (2014). *State announces expanded enhanced buyout area to include the Graham Beach area*. Retrieved from http://stormrecovery.ny.gov/sites/default/files/uploads/graham_beach_release.pdf

Office of Community Renewal. (2013). *State of New York action plan for Community Development Block Grant program disaster recovery*. Retrieved from www.nyshcr.org/Publications/CDBGActionPlan.pdf

Oliver-Smith, A. (1991). Successes and failures in post-disaster resettlement. *Disasters*, *15*(1), 12–23. doi: 10.1111/j.1467-7717.1991.tb00423.x

Paul, B. K., Che, D., Stimers, M., & Dutt, S. (2007). *"Disaster in Kansas": The tornado in Greensburg*. Retrieved from https://hazards.colorado.edu/uploads/quick_report/paul_2007.pdf

Riad, J. K., & Norris, F. H. (1996). The influence of relocation on the environmental, social, and psychological stress experienced by disaster victims. *Environment and Behavior*, *28*(2), 163–182.

Rizzi, N. (2014, April 11). State won't add any more neighborhoods to Sandy buyout program. *DNAinfo*. Retrieved from http://www.dnainfo.com/new-york/20140411/new-dorp-beach/state-will-add-no-more-neighborhoods-sandy-buyout-program

Rubin, C., Saperstein, M., & Barbee, D. (1985). *Community recovery from a major natural disaster*. CO: Institute of Behavioral Science—University of Colorado Boulder.

Saldaña, J. (2012). *The coding manual for qualitative researchers* (2nd ed.). CA: SAGE Publications.

Sanders, S., Bowie, S. L., & Bowie, Y. D. (2003). Chapter 2 lessons learned on forced relocation of older adults. *Journal of Gerontological Social Work*, *40*(4), 23–35.

Sedon, M. (2013). First Staten Island home bought out by state after Hurricane Sandy is demolished. *Staten Island Live*. Retrieved from http://www.silive.com/news/index.ssf/2013/10/first_oakwood_beach_home_bough.html

Smith, B. G. (2011). *Planning for post-disaster recovery: A review of the United States disaster assistance framework*. Washington D.C.: Island Press.

Tobin, G. A., & Peacock, T. (1982). Problems and issues in comprehensive planning for a small community: The case of Soldiers Grove, Wisconsin. *The Environmental Professional*, *4*(1), 43–50.

Weber, L., & Peek, L. (2012). *Displaced: Life in the Katrina diaspora*. Austin, TX: University of Texas Press.

Yin, R. K. (2013). *Case study research: Design and methods*. CA: SAGE Publications.

Yzermans, C. J., Donker, G. a, Kerssens, J. J., Dirkzwager, A. J. E., Soeteman, R. J. H., & ten Veen, P. M. H. (2005). Health problems of victims before and after disaster: A longitudinal study in general practice. *International Journal of Epidemiology*, *34*(4), 820–826. doi:10.1093/ije/dyi096

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Article

Disaster Governance and Vulnerability: The Case of Chile

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Abstract
This exploratory work seeks to shed light on disaster governance by looking into potential linkages between the production of vulnerability and disaster governance in Chile. Our point of investigation is the case of post-disaster Chaitén and the Chilean model of Disaster Risk Management. The work begins by situating disaster governance and the production of vulnerability in a broader context of existing governance system that includes a multiplicity of actors and socio-economic, socio-ecological, and political processes. Coming from a multi-scalar perspective, we use the disaster Pressure and Release (PAR) model to enable a differentiated analysis of the multiplicity of actors, rules, and processes related to DRM that participate in the production of disaster vulnerability in the current Chaitén. With this we address the questions as to 'why' the Chilean model of DRM is prominently centralised and 'what' are the effects on the production of disaster vulnerability for the case of post-disaster Chaitén.

Keywords
Chile; disaster governance; disasters; vulnerability

Issue
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1. Introduction

This exploratory work seeks to look into potential linkages between disaster governance and the production of vulnerability in order to shed light on disaster governance in Chile. Our point of investigation is the case of post-disaster Chaitén and the Disaster Risk Management (DRM) in Chile. Firstly, we offer some key definitions on disaster governance and vulnerability that underpin the exploration of potential linkages between these two processes. Secondly, we map different laws, institutions, and Territorial Planning Instruments (TPIs) to offer an overview on the model of DRM in Chile, which is characterised by its high centralisation, top-down approach, and reactive and post-event orientation. The characterisation of the DRM in Chile informs our analysis of the case of post-disaster Chaitén, a remote port-city in Southern Chile that was affected by a volcano eruption in 2008. Post-disaster Chaitén is examined from a multi-scalar perspective where underlying causes of disaster vulnerability in the actual city can be associated with bad disaster governance, especially regarding how policy response and decision-making were applied between 2008 and 2013. Some of the post-disaster processes in Chaitén that inform our exploration are the evacuation, subsidies and benefits schemes, as well as other recovery strategies such as the Chaitén Law and the New Chaitén project. We believe that this case is compelling because it works as a proxy to discuss how governance processes during post-disaster phases are able to influence future disaster vulnerability.

In adopting a perspective of scale, we utilise the disaster Pressure and Release (PAR) model to enable a differentiated analysis of the horizontal and vertical arrangements that participate in the production of disaster vulnerability in the current Chaitén, and through which we address the questions: 'why' the Chilean model of DRM is prominently centralised and 'what' are the ef-

fects on the production of disaster vulnerability for the case of post-disaster Chaitén. In the final section, we offer some reflections on how some unsafe conditions such as the 'erosion of trust in authorities' in Chaitén can be linked to decision-making and policies (dynamic pressures) and political centralising forces (root causes) as applied by temporally and spatially distant actors. We argue that during the progression of vulnerability, the multiplicity of actors, rules, and processes related to DRM at different geographical and social scales are extremely important and themselves reveal the grave significance of disaster governance. In order to best present the case of the DRM in Chile and Chaitén supporting this work in the next sections, the clarification of key concepts is in order.

With the term disaster governance we refer to the set of interrelated regulatory frameworks and norms, organisations, institutions, and practices within the disaster cycle (i.e. disaster response, recovery, reconstruction, mitigation, and preparedness) that are organised at multiple social and geographical scales to anticipate, cope with, resist and recover from the impact of a natural or human-made hazard (Gall, Cutter, & Nguyen, 2014; Tierney, 2012). Disaster governance encompasses organisational and institutional actors from formal governments, private companies, and civil society bodies, to informal organisations such as networks and elites. The relationships between sets of rules, actors, and organisations can be configured in horizontal and vertical governance arrangements (Renn, 2008).

Disaster governance has an important influence on the production and prevention of the growth of vulnerability, and ultimately for the reduction of disaster risks. In simple terms, disaster risk means the possibility of negative effects in the future. That possibility solely surfaces from the interaction of human and natural environments. However, generations of socio-scientific disaster researchers have argued that 'hazards' are not the sole driver of risk and disaster losses, rather that levels of possible negative effects as well as disaster losses are in good part determined by the vulnerability and exposure of people and socio-ecological systems (e.g. Cardona et al., 2012; Voss, 2008). Thus, it is a purely societal or cultural failure to experience horrific disasters like in Haiti 2010 or in Japan in 2011 and not wholly from nature nor from anything else external to the social. Instead, one should place the blame primarily on (bad) governance.

Disaster governance and vulnerability are intrinsically connected through the entanglement of actors and dynamic processes that support and facilitate the production of disasters risks. Whilst disaster governance on the one hand refers to the complexity of multiple elements that are relevant within the never-ending disaster cycle, socio-ecological and political economy perspectives tell us that such 'web' of disaster governance can explain both the production and reduction of vulnerability, risks, and disasters on the other.

An expanded perspective on disaster vulnerability akin to that which is elaborated on in this work, is found in the Pressure and Release (PAR) model (Wisner, Blaikie, Cannon, & Davis, 2004). In it, vulnerability production is modelled by a sequence of social, economic, and political forces at different times in a process called the 'progression of vulnerability'. According to the authors of the model, disaster vulnerability consists of the circumstances and characteristics of an element of interest (i.e. community, system, or asset) that influence said community's capacity to anticipate, cope with, resist and recover from the negative impacts of a natural or human-made extreme event, and likewise make the community susceptible to be affected in a severe manner (Wisner et al., 2004). Moreover, the PAR model offers a chain of causation to interpret disaster responsibilities. As displayed in Figure 1, the social production of disaster vulnerability is based on the idea that a more precise explanation of disasters requires us to backtrack the social relations between the impacts of a hazard on a community and a series of structural factors and processes that facilitate its production (Wisner et al., 2004).

Although the PAR model does not explicitly elaborate it, it does touch upon the multi-scalar dimension of the progression of vulnerability, sketching it as a hierarchically organised process that takes place in differentiated spaces and time. The scalar organisation of the progression of vulnerability therefore has implications for governance. For instance, when viewing the historical evolution of the state territorial organisation of Chile (i.e. from federalist to centralising models, Montecinos, 2005) we can observe how this, as a 'root cause' process, has enabled and facilitated the centralisation of decision-making within the domains of DRM and Disaster Risk Reduction (DRR). We can likewise observe how that ultimately has resulted in forms of 'unsafe conditions' for the people that live distant from political and economic centres, such as for the case of post-disaster Chaitén.

In terms of methodology, we adopt a disaster vulnerability framework as it allows us to look at the structural factors of risks and disasters, associated often to governance, politics, and economic issues. Although we agree

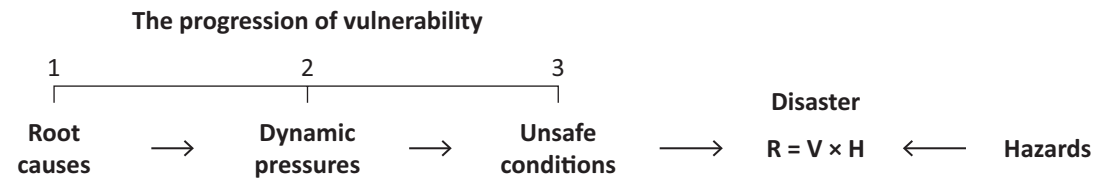

Figure 1. The disaster Pressure and Release (PAR) model.

on the necessity of other studies on resilience and hazards, in our view, the problematique of disasters (i.e. its theoretical and practical conceptualisation, its causality debate, and its factual reduction) cannot be thoroughly understood by means of only such studies. If we are to further understand the causes of disasters, we cannot afford to neglect investigations into the principles that 'govern' their intensity and nature, which themselves are in fact more grounded in the social rather than the natural world. In this manner, this work situates itself in a political economy perspective of disasters through its application of the PAR model as the selected analytical framework in addition to other diverse qualitative research techniques. Principal among these chosen techniques was a policy and documentary analysis supported by in-depth and guided interviewing. As part of a doctoral thesis, one of the authors conducted fieldworks in Chile—including Santiago, Puerto Montt, and Chaitén—between March and September 2013, and in late-2014, to investigate the progression of vulnerability in post-disaster Chaitén. In the analysis of vulnerability drivers, the role of disaster governance emerged clearly as an influential factor. The institutional analysis draws upon the review of more than 60 documents: laws, regulatory frameworks, TPIs, institutional reports, policy papers, press release, and media archives. The documents which were selected and analysed come from (listed from the micro to macro levels): Municipality of Chaitén, Provincial Government of Palena, provincial offices of ministerial representations for Housing, Finance, Public Works, Health, Economy Development, Social Development, Agriculture, and National Property, Fire Brigade, the Government of Los Lagos Region (LLR), and the National Subsecretariat for Regional Development and Administration (SUBDERE), National Office of Emergency of the Ministry of Interior (ONEMI), Ministry of Public Works, Ministry of Housing and Urbanism (MINVU), National Institute of Statistics (INE), National Congress Library (e.g. Chaitén Law), universities, among others. These documents help us to understand the geographical distribution and hierarchical organisation of DRM and DRR in Chile as well as its repercussions on policy response and decision-making for the case of post-disaster Chaitén. In order to find convergence and corroboration, this analysis was then complemented with interviews conducted among the aforementioned institutions and with Chaitén people and community organisations. 66 interviewees were selected in total and they were approached differently using a snowball sampling technique which was also informed by institutional reports in several cases. Since the research was inductive in nature, the questions spanned and evolved from micro to macro levels. We began with 'local' questions that helped to identify some unsafe conditions (e.g. erosion of trust in authorities) for Chaitén city and its population and rounded off with questions concerning the dynamic pressures and root causes of such conditions for interviewees at regional and national levels (e.g. how was the New Chaitén project planned?).

2. Disaster Governance in Chile

Chile developed disaster risk management institutions, legislations, and policies relatively early, perhaps because of its history of disasters. For instance, the 1928 Talca earthquake impressed upon authorities and worker unions to implement disaster risk reduction (DRR) measures (e.g. the identification of disaster-prone areas) within the General Law of Construction and Urbanisation (Presidencia de la Republica de Chile, 1936). In 1939, the Chillán earthquake provided the basis for earthquake-resistant construction standards named the Chilean Standard for Seismic Design of Buildings Nº 429 (NCh429). The 1960 Valdivia earthquake and the 1965 La Ligua earthquake prompted a debate about a better coordination between actors involved in disaster response (firefighters, police, army), relief (Chilean Red Cross), preparedness and planning (Government institutions), that concluded with the creation of the ONEMI in 1974 (ONEMI, 2014).

Today, the constellation of laws, institutions, and other related regulatory frameworks informing DRM is vast and diverse in Chile. Figure 2 maps a number of analysed regulations and bodies that deal with the disaster management cycle and can influence disaster governance. In the figure, they are organised according to their nature into three differentiated categories and subcategories: system of rules (juridical and regulations), institutions, and TPIs. Moreover, these categories are arranged in a Cartesian layout to distinguish the character of the element involved, according to its orientation towards 'pre-event' or 'post-event' disaster. Likewise, they are divided into groupings whether they are more nationally or regional and locally orientated.

The ONEMI takes its place at the centre of the diagram as the primary technical agency of the state responsible for coordinating the National Civil Protection System (SNPC). The ONEMI's mission is to plan, promote, coordinate, and implement preventive actions, response, and rehabilitation against collective risk situations, emergencies, and disasters caused by natural or human action (ONEMI, 2014).

According to the guidelines of the ONEMI, each administrative level (i.e. regional, provincial, and communal) must have a Civil Protection Committee (CPC). Each CPC must internally elaborate a 'plan' to implement prevention, mitigation and preparedness actions in relation to DRM and DRR. CPCs are composed of representatives from public and private agencies and their structure varies according to the territorial level they represent. In some localities such as Chaitén that are commonly isolated and furnished with restricted financial resources and limited access to power, CPCs hardly meet and 'design' or 'implement' DRR strategies. Moreover, the ONEMI's policy establishes that the executional costs are to be covered by each of the ministries, agencies, intendant administrations, regional governments, and municipalities with its own resources (Ministerio del Interior

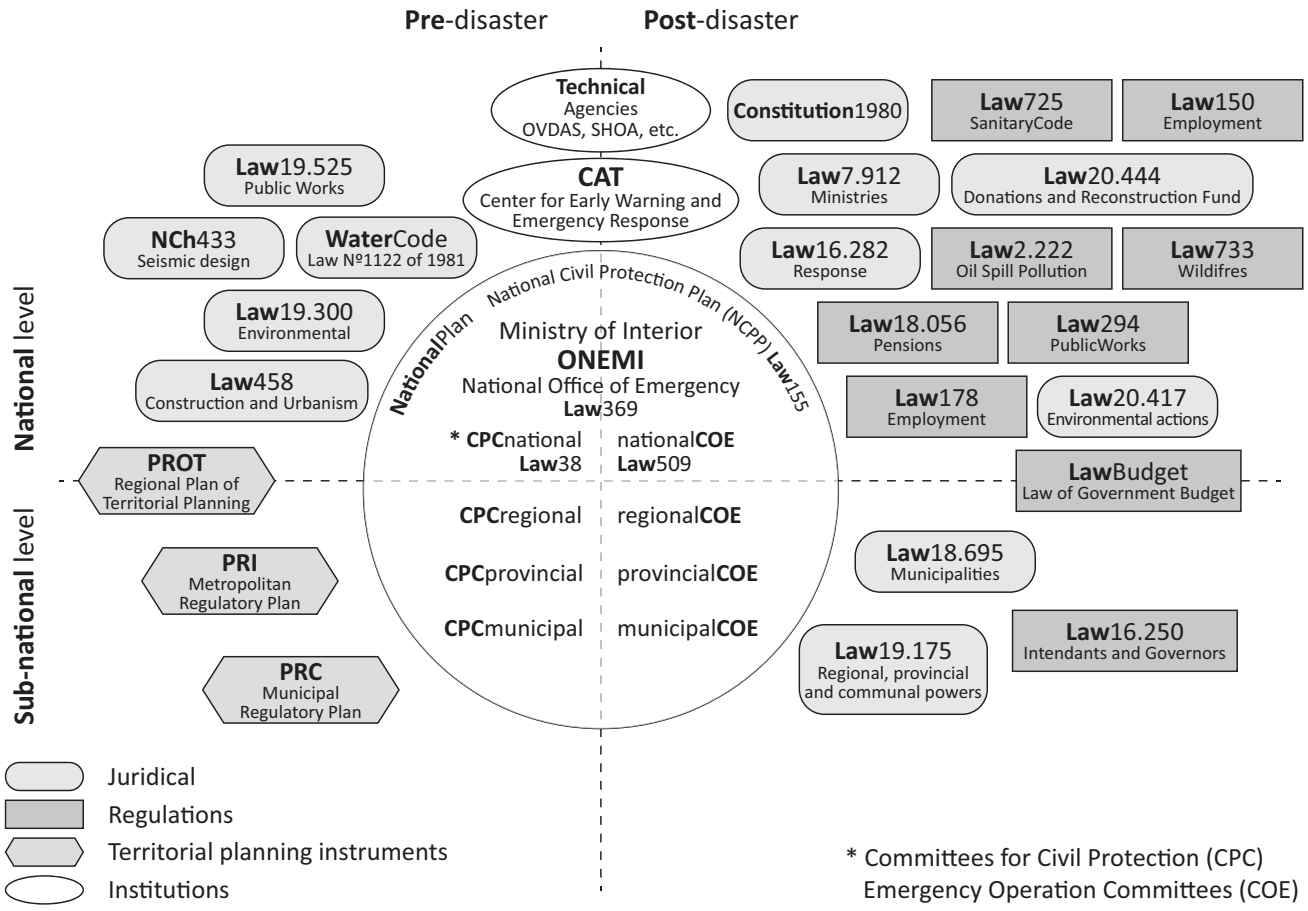

Figure 2. Map of the institutional forms related with DRM cycle in Chile.

y Seguridad Pública, 2002), thus liberating the responsibility of prioritising DRR to the respective local levels and having it compete with other specifically local demands and realities.

Despite the declaration of the ONEMI regarding 'preparedness' and 'mitigation', the office focuses mainly on 'emergency management' and response. The first indication of the latter is the level of attention paid to 'emergency issues' rather than to 'prevention' and 'preparedness'. A quick textual analysis of the Supreme Decree (DS) Nº 156 shows that the word 'emergency' is used twice as often in comparison to the phrases 'risk reduction', 'prevention' and 'preparedness' all together (Ministerio del Interior y Seguridad Pública, 2002).

During emergency periods, the ONEMI are configured by Emergency Operations Centres (COEs). These centres are organised at each level of the political-administrative order and they are responsible for decisions and actions coordinated to response and rehabilitation. COEs are headed by representatives of territorial governments that are part of the CPCs; the President of the Republic and Minister of Interior, Intendant, Governor, and Mayor respectively (see Figure 3).

The figure above reflects the hierarchical organisation of the decision-making process within the ONEMI. Officially, the command hierarchy in the decision-making process within the ONEMI is at first 'political' in nature, then 'administrative', and lastly 'technical' (Ministerio del Interior y Seguridad Pública, 2013)[1].

Apart from other individual analyses of the elements displayed in Figure 2 and 3, our intention is to map these laws, institutions, and plans to shed light on the centralisation of DRM in Chile, and highlighting its top-down approach as well as its reactive, post-event orientation (Sandoval, González-Muzzio, Wagemann, Mena, & Ejsmentewicz, 2015). The question as to 'why' the Chilean model of DRM is prominently centralised and 'what' effects this centralisation has on the production of disaster vulnerability will be addressed in the following sections.

2.1. Centralisation of the DRM in Chile

A centralised model of DRM will influence the way in which disaster governance operates. Structural factors in national politics and economy affect the system of rules (Mitnick, 1980) from which the actors, institutions, and people participate in the disaster governance process. A reason why the model of DRM in Chile is highly centralised can be found in the idea that government's institutions tend to mirror or reproduce the state terri-

[1] The referential document was obtained via the Transparency Law and is not available to general public.

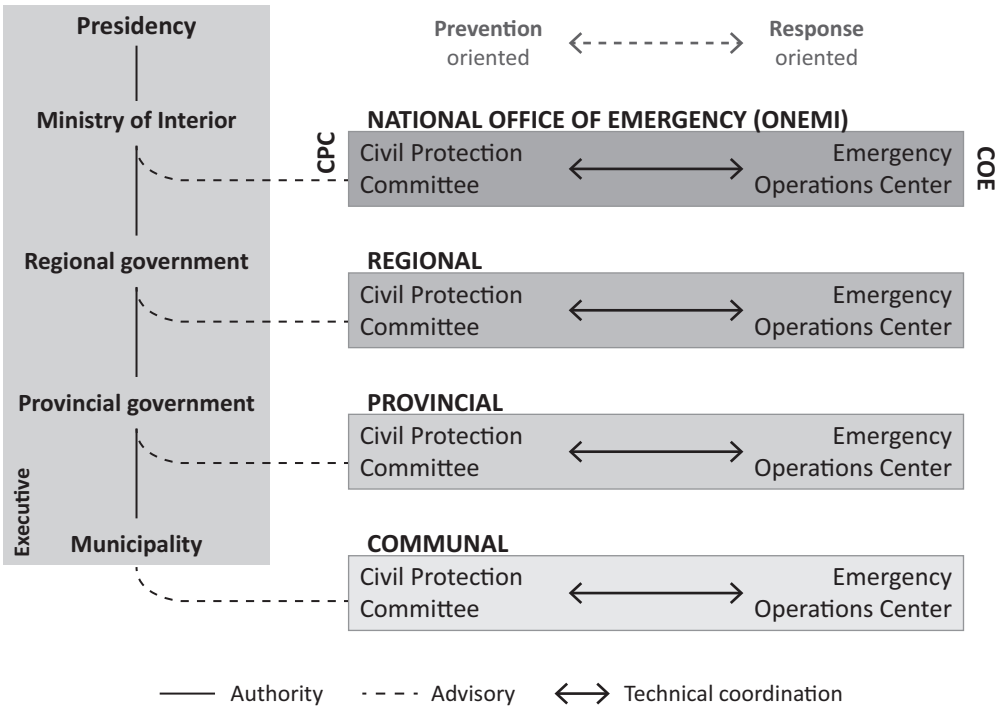

Figure 3. Structure of the National Civil Protection Plan, Chile.

torial organisation of countries (Brenner, 2000). As we have discovered, it is then not surprising that disaster related institutions assimilate the structure, hierarchical organisation, and spatial distribution of the state territorial organisation in a country politically and economically centralised like Chile: that is, the way in which the territory is spatially organised to be administrated by the government.

In a historical review of the state territorial organisation of Chile, Montecinos (2005) examined how the various geo-political scales of the national, regional, provincial, and communal have evolved since its independence from the Spanish Empire in 1810 up until in the twenty-first century. In the timeline story of the resulting state territorial organisation, mainly referred to the political administration of the state and the economy (i.e. mode of production, structures of domination, and other social relations), one is able to distinguish a dialectical pattern involving decentralisation and regionalist tensions.

Chile's latest significant territorial reorganisation occurred in 1973, months after the *coup d'état* led by the General Augusto Pinochet against the democratically elected president Salvador Allende. The territorial reorganisation was based on a mode of economic poles of development characterised by the designation of 'central spatial units' determined by a city as a hub that were to connect the rest of the region. Santiago and the Metropolitan Area were established as the main centre of national development, whilst the three poles of multi-regional development were Antofagasta, Valparaíso, and Concepción (Boisier, 2000). A 'third level of hierarchy' was composed by another set of 'sub-poles of regional development' which were first politically and then economically subordinated to the aforementioned regional poles (Montecinos, 2005).

On a general level, it seems that the state territorial organisation has an important influence on the geographical and scalar organisation of DRM and DRR in Chile. This is the case as other institutional forms such as in education (e.g. ministries, regional departments, schools, and so forth) are often geographically distributed and hierarchically organised in concordance with the state territorial organisation (Clark, 2014)—e.g. centralist, federalist, among others. As displayed in Figure 2 and 3, the DRM in Chile evidences the apparent centralised and top–down approaches as inherited from those approaches that dominate the actual state territorial organisation. Again, our emphasis is to examine 'centralisation' as a 'root cause' or underlying factor that facilitates the production of vulnerability in the case of post-disaster Chaitén.

From this point, we can now move on to trying to understand 'what' effects (i.e. unsafe conditions) the characteristics of such set of rules and institutions have on the production of disaster vulnerability. Upon this deduction, we will then present some reflections on disaster governance. To do so, we review the case of post-disaster Chaitén to explore disaster governance with a specific look into decision-making, community resistance, and other local-related processes that lead the production of vulnerability.

2.2. The Case of Post-Disaster Chaitén

Chaitén is a remote southern city in Los Lagos Region, Chile, residing about 1,000km away from Santiago, the

nation's capital. Chaitén was severely affected by a volcanic eruption in May 2008 at a time when roughly 8,000 people lived in the commune. Although no fatalities were registered, media and authorities labelled the event a 'disaster' due to its significant economic and social costs. The time span of our analysis encompasses post-disaster events from May 2008 to late 2014 (see Figure 4).

It all began with tremors felt by *Chaiteninos* (as people from Chaitén call themselves) the night of 30th April 2008. During the following 24 hours, regional and local authorities, and specialists met people in Chaitén explaining to them that the shakes were probably the result of 'tectonic movements'. According to community leaders that attended those meetings:

> "These meetings were very strange because from the beginning they [authorities] said that is 'only seismic' activity without risks, they explained us about the 'tectonic' movements. But in reality they had no idea…because there was an eruption the days after these meetings." (Pablo, Community leader, interviewed in July 2013)[2]

Effectively, a day after, on 1st May at 23:38 these quakes culminated in a violent eruption. The first official statement asserted that the eruption could be attributed to the Michimauida volcano. However, flyovers during the next morning confirmed that the rash of activity corresponded to an unknown volcano, which was immediately named 'Chaitén', about 10km north of the city. Due to the high probability of *lahars* and mudflows from the volcano, the ONEMI in Santiago declared 'Red Alert' to immediately initiate the evacuation of the entire city on 2nd May. Between 2nd and 4th May, 8,119 people were evacuated to surrounding locations within Los Lagos Region, mainly by sea routes using private and Chilean Navy ships. According to interviewed local leaders who participated in the evacuation, there were two negative and still conflicting issues regarding the evacuation: families were split, women and children were evacuated first, followed by men. *Chaiteninos* were unable to know where their family members were, neither being able to communicate to one another during the first days. Destinations of evacuated people were not pre-established, nor was there a plan to act during the evacuation. The sole objective was to preserve life and secure basic subsistence (Sandoval, Boano, González-Muzzio, & Albornoz, 2015). The second issue was that people were told that the evacuation would last a maximum of two weeks, after which they supposedly could return to the city for their belongings and valuables. That never happened because national authorities later on decided to ban Chaitén from being inhabited for at least two years. According to Marcela, a local leader interviewed in July 2013: 'We lost all our personal belongings [referring to pictures, memories, personal valuables] because they told us that we will come back in few weeks…many left their animals and pets, they all died because we trust we could came back'. This discourse is often found in similar forms in other interviews, where the feeling of 'abandonment' and 'distance' from authorities was starting to take shape. The 'interpretation of the tremors' by authorities and specialists and the way the evacuation was conducted are conflicting issues for the *Chaiteninos* because these still persist in their memory and exist as a powerful reminder to not fully believe in authorities in the future. This erodes people's trust in the government: 'In case of a new evacuation I will stand firm here, I will not leave my land, my house, my assets…I do not let them take me nowhere…I prefer to die here than to live how we lived during the our time in Puerto Montt [city where she was evacuated with her family]', (Roberta, Community leader, interviewed in July 2013). Such discourse, however, does not limit itself to the experience with the first days of the emergency. The process of recovery was activated by national and regional authorities shortly after the people were evac-

[2] Names used are fictional in order to protect interviewees privacy, although gender and position or job are provided.

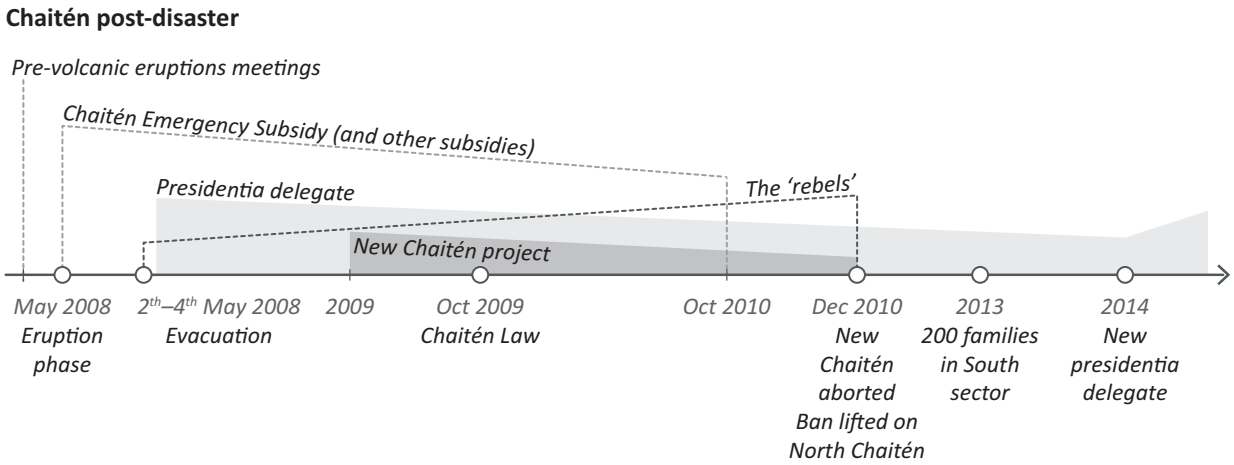

Figure 4. Chronology of events in Chaitén post-disaster from 2008 to 2014.

uated. Several government agencies allocated special resources to support and compensate Chaitén families during the relocation processes. The main measure implemented was the 'Chaitén Emergency Subsidy'. This subsidy encompassed a monthly payment of up to US$ 1,000 per family and it was delivered between May 2008 and October 2010. During the first year, more than 3,200 families benefited from it, and about 1,800 families in the second and third year. Another important compensatory measure utilised were housing subsidies. 2,235 families received a one-off housing subsidy of about US$ 20,000 each (Gobierno Regional de Los Lagos, 2009). The subsidy offered special financial support to displaced people from Chaitén to resettle them in other cities such as Castro, Puerto Montt, and Puerto Varas. In some places, such as in Puerto Varas, a new 'neighbourhood' was constructed (MINVU, 2008). Likewise, other subsidies for entrepreneurship and psychological support were given (Gobierno Regional de Los Lagos, 2009; Presidencia de la República de Chile & Narváez, 2009). As a part of the national government's strategy to encourage people to leave Chaitén definitively, the Law Nº 20,385 was promulgated (also called the 'Chaitén Law'). The 'Chaitén Law' allowed the state to purchase properties paying for them their market price prior the eruption. According to experts and local authorities, this strategy's objective was twofold: first, to restrict the habitability and occupancy of Chaitén because of its high risk, and second, to compensate the losses of the affected population by transferring more financial resources to them. Once the Chaitén Law was approved in October 2009, the state bought 889 properties for a total of US$ 30 million—more than 80% of the total property in Chaitén (Senado de la República de Chile, 2013).

Subsidies, benefits, and other compensatory measures aimed to reduce suffering and give more opportunities to the affected people. Nevertheless, the lack of control and supervision over the benefits may have produced other undesirable effects and perhaps contributed to the production of unsafe conditions in the current Chaitén. One unforeseen effect of such subsidies may be the production of a kind of 'welfare dependency': 'People were reliant on government benefits for more than two years….I know some of them did not receive any other income…when those [benefits] ended up, they found themselves with no savings and debts…eventually, these people returned to Chaitén despite the ban' (Rosa, Local government official, interviewed in September 2013). Although 'welfare dependency' is difficult to trace in this case, a dominant narrative among specialists in Chaitén points out that debt and economic constraints (derived from mismanagement of recovery resources) were common among *Chaiteninos* that decided to return the city since 2010.

Next to the on-going recovery, other important processes were taking shape such as the relocation of the city itself with a project named 'New Chaitén'. Technical and planning reports supported the idea of relocating the entire city to Santa Barbara—50km north of Chaitén (Pontificia Universidad Católica de Chile [PUC], 2009). Evacuated people were consulted, a master plan was devised, and housing designs were tendered between 2009 and 2010 (MINVU, 2010). There were even some buildings constructed for the Police and Navy in Santa Barbara, but the New Chaitén project was finally aborted in December 2010 by the then recently elected President Sebastian Piñera in opposition to the previous President Bachelet's plans. This situation further frustrated *Chaiteninos'* trust in authorities.

Another important process was that by late 2010, around 1,000 to 1,500 people had in fact returned to Chaitén despite the ban on inhabiting the city. The initial group was named 'the rebels' (Rojas, 2013) by the media. They were well organised (they even had a radio station with which encouraged other Chaiteninos to return to the city) and fought for their 'right' to stay in the city; 'it was a tremendous struggle against government's intentions to relocate us definitively…we stayed firm and strong because Chaitén has always been our land, we did not want to live anywhere else' (María, Community leader, interviewed in July 2013). The rebels demonstrated several times in Santiago, Puerto Montt (the regional capital), and Chaitén, gaining support from media and politicians. Thus, political shifts, community resistance, a lack of supervision on delivering benefits, the slowness and the high costs of the New Chaitén project estimated at US$ 300 million (Silva, 2010), were some of the reasons which compounded and led to the government announcing the lift of the ban on inhabiting Chaitén in December 2010.

This decision, nevertheless, triggered some other unforeseen effects. First, it included only the North sector of Chaitén, keeping the South firmly excluded for habitation. With limited land in the North—where about 2,500 people live—and a lack of investment for expanding the housing market, today there are about 200 families informally inhabiting South Chaitén. Implications for living in the South sector are not negative *per se*, however, when one considers Chaitén (North and South sectors) as an entire community (as the Chaitén people do), the South sector's people found themselves comparatively helpless against future extreme events. Whilst the North sector has somehow 'resurrected' by attracting private investment and government's support in terms of schools and hospitals, also generating income opportunities for the people, and securing civil protection through mitigatory measures such as the flood barrier for the Blanco River's north bank, the South sector lacks all of these services and opportunities (Sandoval, Gonzalez-Muzzio, & Albornoz, 2014).

3. Final Reflections

The post-disaster processes reviewed in the case of Chaitén indubitably occurred within a disaster governance structure. The architecture of rules, actors, and

processes that constitute disaster risk management in Chile facilitates and limits the opportunities for disaster risk reduction, building resilience, and enables us to understand the progression of vulnerability.

One unsafe condition detected in Chaitén was the 'erosion of trust in authorities'. This facet can be linked to decision-making and policies (dynamic pressures) and political centralising forces (root causes) as applied by temporally and spatially distant actors: ONEMI in Santiago, the Presidential Delegate, parliamentary members, among others. We know that a lack of 'trust' can negatively shape vulnerability (Cutter, Boruff, & Shirley, 2003) by altering evacuation strategies as well as by diminishing the effect of compensatory and recovery policies. Several of the testimonies collected during interviews and focal groups pointed towards one ubiquitous idea: in an eventual volcanic eruption, Chaitén's people will not follow authorities' instructions and it will likewise be difficult for them to 'believe' again in what authorities say. In other words, Chaitén's people may react negatively to the idea to 'evacuate' the city again in the future should they be called to. Upon review, it is possible to link the arguments from local leaders and Chaitén people and the 'erosion of trust in authorities' to multiple particular and specific situations which solely involved national and regional authorities: the 'misunderstanding' concerning the existence of a volcano in the area by the authorities, further specific 'negligence' concerning early and wrongly conclusions on the 'tremors' before volcano eruption; the unplanned evacuation that produced the splitting up of families and the lack of coordination between regional and local authorities; ineffective recovery process which includes poor subsidies' spending supervision; decision-making on the inhabitability of North and South sectors in Chaitén; the abandonment of the New Chaitén project after two years of planning, 'spending', and consulting efforts; and the creation of the 'parallel' authority in the Presidential Delegate which bypassed local and regional authorities.

A multi-scalar perspective on these aforementioned situations tells us that these are indeed nested in major processes or underlying causes. For instance, the evacuation of Chaitén in 2008 followed a distinct pattern of 'life preservation'. 'Life preservation' as a rule of thumb is found recurrently in the ONEMI's documents consulted on emergency management and its prevalence makes it appear as if other elements of evacuations are not important, such as the 'supervision of the aid provided' and the 'right to information'. This idea, as directed from the ONEMI national office downwards to local authorities and practitioners, may explain the reaction of authorities during the period of evacuation: both the lack of preparation in the destinations of evacuees and the subsequent splitting up of families that occurred. This also reveals a second and perhaps more crucial aspect, the centralised model of DRM in Chile. Most of the recovery strategy was planned and 'imposed' by national authorities, substantially affecting the way in which local people perceive state support during emergencies and recovery. This is not negative per se because people are not passive receivers of support, but considering Chaitén was a city exposed to a rapid onset volcanic hazard and was economically dependent on the state, it seems that the state plays a major role in promoting disaster risk reduction and resilience. The case of post-disaster Chaitén seems to point to the insufficiency in the dominant narrative which emphasises 'life preservation' as the sole indicator for successful evacuations. Rather, when evacuation, recovery and reconstruction measures are not adequately planned it can in fact help to produce other unsafe conditions (i.e. mistrust) that 'increase' vulnerability and risks. In stating this we are not trying to engage in a discussion about 'life preservation' during emergencies in particular, but rather we wish to point out that dominant narratives are not as comprehensive as DRM needs to be, and when these are embedded in a centralised model of DRM as Chile, they may negatively impact people's vulnerability in the future.

Here, it is important to note that disaster vulnerability does indeed materialise in the form of 'unsafe conditions' within specific social groups and spaces, but during its progression disaster governance—i.e. the multiplicity of actors, rules, and processes related to DRM at different geographical and social scales—its takes on an even greater significance. Macro processes such as policy response, decision-making, centralisation, and institutional bodies for DRM and DRR are not directly 'unsafe conditions' but rather the 'root causes' and 'dynamic pressures' which then facilitate the production and progression of vulnerability.

Within this paper, we took the discourse on disaster governance as a point of departure with the hope that other forms of polycentric-, adaptive-, bottom-up- and sundry-forms of governance may prevent the growth of vulnerability and risks, and stimulate the debate around this so that more optimal formats can be sought out. We argue that societies are everything but static, linear functioning, homogeneous systems but are rather highly complex, adaptive, dynamic and nonlinear developing spheres with a very heterogeneous population. This snapshot of complexity is then compounded by the history that comes with it. We believe that our conception of disaster governance can only be as good as the basic notions of these sociocultural, historic conditions are understood and the governance practices are accordingly adapted to this specific situation in space and time. There is no 'one-fits-all' approach for disaster governance. Rather, there is in fact the need to historicise and contextualise governance practices to reduce the occurrence and, if nevertheless unavoidable, the outcome of disasters.

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Conflict of Interests

The authors declare no conflict of interests.

References

Boisier, S. (2000). Chile: La vocación regionalista del gobierno militar. *EURE*, *26*, 81–107.

Brenner, N. (2000). The urban question as scale question: Reflections on Henri Lefebvre, urban theory and the politics of scale. *International Journal of Urban and Regional Research*, *24*, 361–378.

Cardona, O. D., van Aalst, M. K., Birkmann, J., Fordham, M., McGregor, G., Perez, R., . . . Sinh, B. T. (2012). Determinants of risk: Exposure and vulnerability. In C. B. Field, V. Barros, T. F. Stocker, D. Qin, D. J. Dokken, K. L. Ebi, M. D. Mastrandrea, K. J. Mach, G.-K. Plattner, S. K. Allen, M. Tignor, & P. M. Midgley (Eds.), *Managing the risks of extreme events and disasters to advance climate change adaptation. A special report of working groups I and II of the Intergovernmental Panel on Climate Change (IPCC)* (pp. 65–108). Cambridge and New York: Cambridge University Press.

Clark, G. L. (2014). *The geography of the Euro crisis: The ECB, its institutional form, functions, and performance* (SSRN Working paper series). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2456154

Cutter, S. L., Boruff, B. J., & Shirley, W. L. (2003). Social vulnerability to environmental hazards. *Social Science Quarterly*, *84*, 242–261.

Gall, M., Cutter, S. L., & Nguyen, K. (2014). *Governance in disaster risk management* (IRDR AIRDR Publication No. 3). Beijing: Integrated Research on Disaster Risk.

Gobierno Regional de Los Lagos. (2009). *Criterios en el proceso de asignación del bono de desplazamiento víctimas del Volcán Chaitén*. Puerto Montt: Ministerio del Interior.

Ministerio de Vivienda y Urbanismo. (2008). *Millonario plan de inversiones en zonas cercanas a Chaitén*. Retrieved from http://www.minvu.cl/opensite_det_20080625190648.aspx

Ministerio de Vivienda y Urbanismo. (2010). *Plan maestro ciudad de Chaitén: Informe final*. Santiago de Chile: MINVU.

Ministerio del Interior y Seguridad Pública. (2002). *Aprueba plan nacional de proteccion civil, y deroga decreto Nº 155, de 1977, que aprobo el plan nacional de emergencia*. Santiago de Chile: Subsecretaría del Interior. Retrieved from http://bcn.cl/1m1dw

Ministerio del Interior y Seguridad Pública. (2013). *Aprueba instructivo sobre dependencia, misión, organización y funcionamiento de las direcciones regionales de protección civil y emergencia*. Santiago de Chile: Ministerio del Interior.

Mitnick, B. M. (1980). *The political economy of regulation: Creating, designing, and removing regulatory forms*. New York, NY: Columbia University Press.

Montecinos, E. (2005). Antecedentes sobre la relación histórica centralismo y descentralización en Chile. *Revista Venezolana de Gerencia*, *10*, 433–462.

Oficina Nacional de Emergencia de Chile. (2014). *Misión y visión*. Retrieved from http://www.onemi.cl/mision-y-vision/

Pontificia Universidad Católica de Chile. (2009). *Consultoría para el desarrollo de lineamientos estratégicos de reconstrucción/relocalización y Plan Maestro conceptual post-desastre Chaitén*. Santiago de Chile: PUC.

Presidencia de la Republica de Chile. (1936). *Ley y ordenanza general sobre construcciones y urbanización*. Santiago de Chile: Parlamento de Chile.

Presidencia de la República de Chile, & Narváez, P. (2009). *Cuenta pública de la delegada presidencial paula narváez en Chaitén*. Santiago de Chile: Gobierno de Chile.

Renn, O. (2008). *Risk governance: Coping with uncertainty in a complex world*. London: Earthscan.

Rojas, J. (2013, July 23). La reconquista de Chaitén. *The Clinic*. Retrieved from http://www.theclinic.cl/2013/07/23/la-reconquista-de-chaiten/

Sandoval, V., Boano, C., González-Muzzio, C., & Albornoz, C. (2015). Explorando potenciales vínculos entre resiliencia y justicia ambiental: El caso de Chaitén, Chile. *Magallania (Punta Arenas)*, *43*(3), 37–49.

Sandoval, V., Gonzalez-Muzzio, C., & Albornoz, C. (2014). Resilience and environmental justice: Potential linkages. *Procedia Economics and Finance*, *18*(1), 416–424.

Sandoval, V., González-Muzzio, C., Wagemann, E., Mena, C., & Ejsmentewicz, D. (2015). *Nueva institucionalidad para la gestión de riesgos y emergencias en Chile—Virtual roundtables*. London: UCL Chilean Society. Retrieved from https://www.researchgate.net/publication/283045692_Nueva_institucionalidad_para_la_gestion_de_riesgos_y_emergencias_en_Chile

Senado de la República de Chile. (2013). *Recuperación de Chaitén*. Retrieved from http://www.senado.cl/recuperacion-de-chaiten-fisco-ha-adquirido-889-inmuebles-e-invirtio-cerca-de-191-millones-de-dolares/prontus_senado/2013-08-01/162329.html

Silva, S. (2010). Piñera asegura que Chaitén será reubicado en localidad de Santa Bárbara. *Diario Uchile*. Retrieved from http://radio.uchile.cl/2010/05/28/pinera-asegura-que-chaiten-sera-reubicado-en-localidad-de-santa-barbara

Tierney, K. (2012). Disaster governance: Social, political, and economic dimensions. *Annual Review of Environment and Resources*, *37*(1), 341–363.

Voss, M. (2008). The vulnerable can't speak. An integrative vulnerability approach to disaster and climate change research. *Behemoth: A Journal on Civilisation*, *3*(1), 39–56.

Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). *At risk: Natural hazards, people's vulnerability, and disasters* (2nd ed.). London and New York: Routledge.

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Commentary

Conceptualizing Resilience

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Abstract
This commentary provides an overview of the idea of resilience, and acknowledges the challenges of defining and applying the idea in practice. The article summarizes a way of looking at resilience called a "resilience delta", that takes into account both the shock done to a community by a disaster and the capacity of that community to rebound from that shock to return to its prior functionality. I show how different features of the community can create resilience, and consider how the developed and developing world addresses resilience. I also consider the role of focusing events in gaining attention to events and promoting change. I note that, while focusing events are considered by many in the disaster studies field to be major drivers of policy change in the United States disaster policy, most disasters have little effect on the overall doctrine of shared responsibilities between the national and subnational governments.

Keywords
community; disasters; governance; resilience; sustainability

Issue
This commentary is part of the issue "Disaster Policies and Governance: Promoting Community Resilience", edited by Naim Kapucu (University of Central Florida, USA) and Abdul-Akeem Sadiq (Indiana University–Purdue University Indianapolis, USA).

Resilience has come into vogue in the disaster research field—and in governance in general—as a shorthand, intuitively comprehensible term to describe the ideal sort of community level response to disasters: that of "bouncing back" or "rebounding" from a shock (Aguirre, 2007; Comfort, 1994; Manyena, 2006). The term resilience, in the disaster research setting, borrows from the concept in ecology, in which we define a resilient ecosystem as one that can absorb a short-term shock to the system, and then can, in a reasonable span of time, return to the state of the ecosystem before the shock.

The problem with terms like "resilience" is that they become uncoupled from their intellectual and technical origins, and simply become catch-all terms or nostrums uttered by politicians, civil servants, and technical experts, with little or no shared understanding of what we mean. Still, the idea of resilience has considerable promise as an organizing principle, because it lends itself to some relatively measurable aspects that we can compare across communities from the local to the global level. And if we can understand the basic components of functionality, we can relate typical efforts to prepare for, respond to, recover from, and mitigate disasters.

A group known as MCEER (formerly the Multidisciplinary Center for Earthquake Engineering Research) at the University at Buffalo provided a simple but powerful conceptualization of resilience it called the resilience delta (see, for example, materials in MCEER, 2016). In a community, we can conceive of its resilience—and that of its individual components—along two dimensions: the size of the shock that the community or system withstands, and the speed at which the community returns to the status quo ante. Figure 1 illustrates this idea. Consider, for example, two communities, both of which are exposed to the same "size" shock (say, the same size earthquake or same degree of wind and water damage from a coastal storm). These are indicated as lines A and B. While both communities recover at the same rate, the

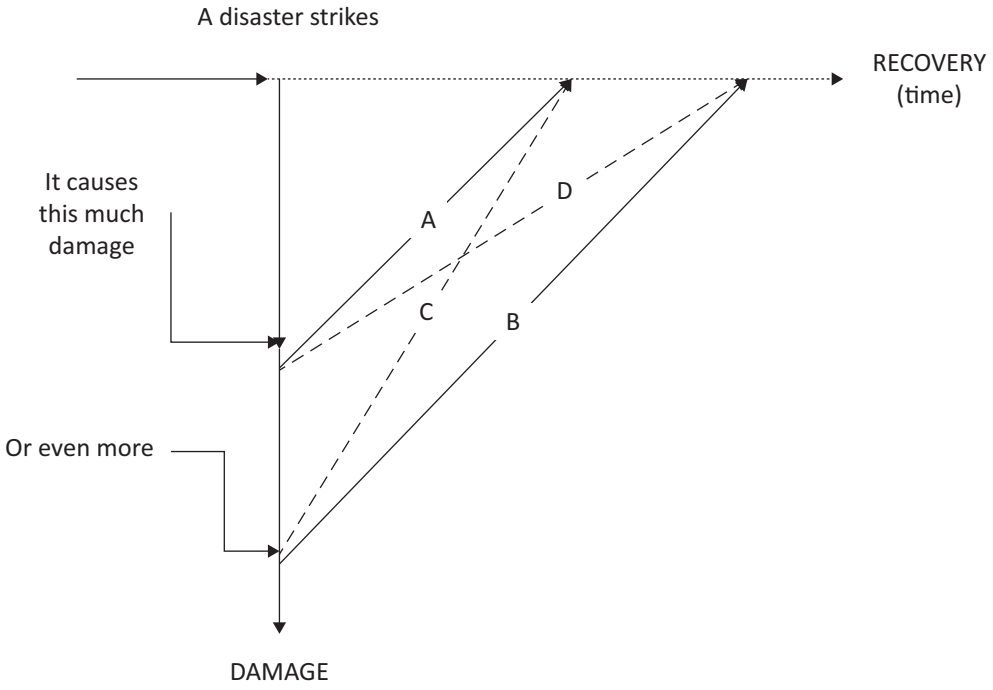

Figure 1. The Resilience Delta.

extent of damage to community B is such that it takes longer for that community to recover, even if their pace of recovery is quicker.

Next, consider two communities that sustain different levels of damage, communities C and D. Community C receives more damage than does community D, yet recovers more quickly because that community has made an investment in the things that communities need to recover quickly from disasters, such as making recovery plans or understanding the role of interdependent infrastructure systems and how they can promote recovery. We can therefore see two dimensions of resilience: efforts to reduce damage, which characterizes communities A and D, and a strategy to speed recovery, as exemplified by community C. We therefore might conceive of making communities more resilient by adopting policies that reduce the amount of damage that a community withstands in the first place, and that put measures in place to allow for rapid recovery of community functions after a shock has occurred; this is exemplified by community A in this diagram.

On this first dimension, communities such as Tulsa, Oklahoma, or Grand Forks, North Dakota, in the United States, have learned that leaving some land open and undeveloped means less property is exposed to flooding when it occurs. Similar measures have been undertaken in coastal communities worldwide, which attempt to, for example, retain natural features along the ocean, such as mangrove forests, that better withstand damage than would engineered disaster mitigation systems. Of course, this resilience delta is an oversimplification; in an actual community, there are multiple resilience deltas that describe the shock to and recovery of multiple systems, including water, power, transportation, education, health care, trade, industry and commerce, to name a few. In many cases, these resilience deltas are interdependent, because infrastructure is interdependent (Barker & Haimes, 2009; Leavitt & Kiefer, 2006).

Additional features of the resilience delta deserve attention. First, we know from the literature on disaster recovery that slow recovery can mean that a community fails to return to its original functionality. Managua, Nicaragua, for example, did not function as well as a city after the 1972 earthquake as it did before the quake, a result of a corrupt national government that stole disaster recovery resources to benefit its leaders (Birkland & Warnement, 2014). But corruption is only an extreme example of how slow efforts to recovery can cause community functionality to, over time, decline. On the other hand, one can conceive of truly resilient disaster recovery as including the ability of a community to rebound and, as is often said, built back better than the community was before. After a series of damaging earthquakes in California from the 1930s to 1990s, public policy in California was designed to improve the resilience of key systems through improvements to building codes in general, and with specific attention paid to schools, hospitals, roads, and utility and other lifeline systems. When "the big one" strikes California, it is likely to do substantial damage, but these efforts will, to some extent, mitigate the worst effects of large earthquakes, thereby improving community resilience (Birkland, 2006).

The policy tools used to improve resilience will vary based on the nature of the community and the resources available to it. But we must not assume that poorer areas of the world are, simply because of poverty, not resilient, nor should we assume that richer communities are necessarily more resilient.

Most jurisdictions use a variety of tools to mitigate disasters and to respond to them when they occur. In the United States, the adoption and use of these tools is primarily focused at the local level, either in local governments (cities, counties, and the like) or the subnational (state) governments. For simplicity's sake, we can broadly categorize such tools as informational, regulatory, and engineering. Informational tools include efforts such as mapping floodplains and inundation zones, informing people of what they can do to mitigate hazards in their homes and communities, or engaging in public information campaigns to inform people how to prepare for disasters by stocking food, water, batteries for radios and lights, and so on. More coercive regulatory measures include building codes and land use planning regulation; stringent building codes have proven their worth in reducing damage from earthquakes, hurricanes, and tornadoes. Land use tools involve prohibiting development in hazardous areas, such as in floodplains or tsunami inundation areas. These tools, however, are often viewed unfavorably by property owners, who would rather have the freedom to use their property as they see fit. Indeed, the pressure to develop land motivates communities to use engineered solutions to mitigate the harms done by disasters. Examples include levees along rivers, hardened shorelines and "beach nourishment" projects, and flood control dams. In some cases, engineered solutions make a community more robustly protected against flooding, but, when such systems fail, as in New Orleans in Hurricane Katrina in 2005, these systems fail catastrophically. The very land they "protect" is thereby made more vulnerable to disaster and the community is less resilient.

It is an article of faith in the literature about the United States that sudden, attention-grabbing "focusing events" drive changes in policy. One might assume that such events—major disasters, in this case—would provide opportunities for policy makers and communities to "learn" from disaster and to improve policy. But this does not happen all the time. In the United States, the focusing event of September 11 led to policy changes its emergency management system that made the country less resilient to natural disasters; these errors were only corrected when Hurricane Katrina demonstrated the fundamental problems with the reorganization of the United States national emergency management based on faulty premises (Birkland, 2004).

Even then, while we can isolate individual examples of "better" policy being enacted after disasters at the sub national level, it is also the case that the fundamental organization of disaster management has not greatly changed in the last forty years in the United States. The major premises of emergency management and hazard mitigation—that state and local governments are primarily responsible for these efforts, with some financial and technical support from the national government—remain in place. This means that, in the United States, disaster mitigation and preparedness is variable from state to state, and from community to community within each state. That said, there is some evidence that states and local governments do learn from other states and localities with similar hazards. For example, Florida has long been considered a leader in hurricane preparedness, while California is a world leader in earthquake preparedness (Birkland, 2006). As communities in Washington state and Oregon have come to appreciate the earthquake hazard, they have begun to take lessons from California to mitigate and prepare for future earthquakes.

Developing countries also can learn from the experience of the developed world. The developing countries may not have the resources to invest in expensive engineered systems to protect against floods and storm surges. But developing countries can learn from, for example, the City of New Orleans. Some scholars believed that New Orleans was characterized by low levels of social capital, and therefore could not count on community solidarity and social capital to recover from the storm. This was not true (Hawkins & Maurer, 2010); New Orleanians could harness local efforts to shape disaster recovery and to parry some of the more impractical ideas of out of town "experts". Similarly, efforts to promote resilience in developing countries will likely be much more successful if they are conceived as bottom-up programs that are developed by local people, with expert assistance as needed, to meet the needs of the community. Well-meaning efforts to impose solutions from outside the community are not likely to successful. After the 2011 Haiti earthquake, most aid came from international non-governmental organizations (INGOs) that have largely provided things that have little to do with building community resilience (Klarreich & Polman, 2012). Haiti has long been dependent on NGO and international development assistance (Booth, 2011; Klarreich & Polman, 2012), even well before the earthquake, and needs are largely assessed without popular participation. This type of recovery is unlikely to succeed either as recovery or as means for promoting resilience.

Of course, it is simple to isolate the problems that governments and communities must address, often with limited time, few resources, and remarkable pressures to promote recovery. This thematic issue will go a long way to helping us to understand how developed and developing countries are similar and differ in their approaches to disaster governance and resilience. We will learn about how this governance may be improved, with attention to collaborative work among multiple stakeholders—from the neighborhood level, to regional and national governments, to NGOs. The goal of such efforts should not be to collaborate for its own sake—rather, these efforts need to assess who should collaborate, and to what end. Potential collaborators whose participation will not serve to improve disaster resilience should be deemphasized in favor of collaborators who have a demonstrated goal and track record in promoting resilience. I hope that the articles contained in this special issue move us toward this goal.

Conflict of Interests

The author declares no conflict of interests.

References

Aguirre, B. E. (2007). *On the concept of resilience*. Newark, DE: University of Delaware.

Barker, K., & Haimes, Y. Y. (2009). Assessing uncertainty in extreme events: Applications to risk-based decision making in interdependent infrastructure sectors. *Reliability Engineering & System Safety*, *94*(4), 819–829. doi:10.1016/j.ress.2008.09.008

Birkland, T. A. (2004). "The world changed today": Agenda-setting and policy change in the wake of the September 11 terrorist attacks. *Review of Policy Research*, *21*, 179–200. doi:10.1111/j.1541-1338.2004.00068.x

Birkland, T. A. (2006). *Lessons of disaster: Policy change after catastrophic events*. Washington DC: Georgetown University Press.

Birkland, T. A., & Warnement, M. K. (2014). Focusing events in disasters and development. In N. Kapucu & K. T. Liou (Eds.), *Disaster and development: Examining global issues and cases* (pp. 39–60). Cham: Springer International Publishing. doi:10.1007/978-3-319-04468-2_3

Booth, W. (2011, February 2). NGOs in Haiti face new questions about effectiveness. *The Washington Post*. Retrieved from http://www.washingtonpost.com/wp-dyn/content/article/2011/02/01/AR2011020102030.html

Comfort, L. (1994). Risk and resilience: Inter-organizational learning following the Northridge earthquake of 17 January 1994. *Journal of Contingencies and Crisis Management*, *2*(3), 157–170. doi:10.1111/j.1468-5973.1994.tb00038.x

Hawkins, R. L., & Maurer, K. (2010). Bonding, bridging and linking: How social capital operated in New Orleans following Hurricane Katrina. *British Journal of Social Work*, *40*(6), 1777–1793. doi:10.1093/bjsw/bcp087

Klarreich, K., & Polman, L. (2012, October 31). The NGO republic of Haiti. *The Nation*. Retrieved from http://www.thenation.com/article/170929/ngo-republic-haiti#

Leavitt, W. M., & Kiefer, J. J. (2006). Infrastructure interdependency and the creation of a normal disaster the case of hurricane Katrina and the city of New Orleans. *Public Works Management & Policy*, *10*(4), 306–314. doi:10.1177/1087724X06289055

Manyena, S. B. (2006). The concept of resilience revisited. *Disasters*, *30*(4), 433–450. doi:10.1111/j.0361-3666.2006.00331.x

MCEER. (2016). MCEER's resilience framework. Retrieved from https://www.buffalo.edu/mceer/research/resilience-framework.html

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