Pathways for Transformation:

Disaster risk management to enhance development goals

This photograph depicts key representatives from national government, local authorities, Māori organisations and the Māori community who collaborated in a rapidly nationalised response to address the needs and facilitate recovery of the Christchurch community after the Canterbury earthquakes. The collective are depicted at Rēhua Marae, the Ngāi Tahu tribal urban community centre, which was the initiating centre for the response and operated after the February 22nd earthquake as a emergency welfare and outreach support centre for the entire Christchurch community. Subsequent to the welfare centre being decommissioned, Rēhua has continued to act as a hub for Māori resilience initiatives that address social risk factors associated with poverty. One such is He Toki ki te Rika, a Māori trades training programme that is facilitating youth education and employment in the Canterbury rebuild.

Rehua marae was also registered as a Ministry of Civil Defence and Emergency Management recovery assistance centre prior to the earthquakes, by the recently deceased 'Upoko' or regional tribal leader Mr Henare Rakihia Tau ONZM (pictured centre with his walking stick and flanked on his right by the Cabinet Minister for Māori Development the Hon Pita Sharples). Mr Tau was a fierce supporter of 'transformative' Disaster Risk Reduction planning. He had registered all the marae in his region as welfare centres and more recently led a Māori seminar for the 2013 World Social Science Fellows' Forum in New Zealand, which addressed Maori risk interpretation and related decision- making within the context of disasters. Mr Tau passed away on the June 30 201, it is respectfully suggested that should you decide to use the photo as your cover picture, that you consider including in the report a small memorial acknowledgement of his contribution.

Pathways for Transformation: Disaster risk management to enhance development goals

Editor: Pelling, M. (King's College London),

Lead author: Gibson, T.D. (GNDR),

Case study authors: Ghosh, A (University of Heidelberg), Matyas, D (Save the Children International), Roxburgh, A (Save the Children UK) Siddiqi, A (King's College London), Solecki, W (City University of New York), Johnson, L (independent consultant) Kenney, C (Massey University), Johnston, D (Massey University) and Du Plessis, R (University of Canterbury)

July 2014

This report was undertaken in support of the State of the Science for the Global Assessment of Disaster Risk Management (GAR). Grant number G/82625/2014/02. The grantee was the Institute of Geological and Nuclear Sciences Limited (GNS Science).

Pathways for Transformation: Disaster risk management to enhance development goals

Executive Summary

CONTEXT

Disaster risk and development are intimately linked. Disaster risk is a product of hazard, the exposure of assets and people and their susceptibility to harm mediated by capacity for risk reduction, response and recovery. Who and what is exposed and the degree of susceptibility and capacity is determined by ongoing processes of development. Under climate change and local environmental change, such as deforestation, development also induces and shapes hazard.

Disaster risk management impacts on and is shaped by local development trajectories. Planned disaster risk management weighs up the benefits and costs of investing in safety through choices in economic planning, land-use policy, social sector investment and critical infrastructure. The success of disaster risk management shapes the geography of risk and loss, if is a driver of inequality across societies, communities and individuals with unequal capacity, susceptibility and hazard exposure.

Transformation in disaster risk management opens new policy space for fundamental shifts in development trajectory. Both the speed and trajectory of development can be influenced by transformative disaster risk management. Transformation itself is a policy neutral concept which describes only the depth of change resulting from a disaster risk management intervention. However when combined with a normative framework, such as the Sustainable Development Goals it can open up a policy agenda that identifies the leverage points – and so the responsibility – that disaster risk management has to proactively contribute to moving development pathways in a desired direction, for example – towards resilience or towards sustainability.

As a new policy field, there is yet limited empirical evidence upon which to base transformative disaster risk management policy. Work in sister policy domains, especially in climate change mitigation and more recently in adaptation and to a lesser extent in natural resource management recognise the necessity of transformation if we are to move towards sustainable development. Existing evidence from transformation in climate change adaptation includes that presented in the IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (IPCC 2012). This work focussed on leadership, learning, innovation and adaptive management. The adaptation literature also distinguishes between transformation that is planned, accidental or spontaneous and presents transformation alongside incremental adjustment as two policy sets that can move social and social-ecological systems towards resilient and sustainable futures.

STUDY AIMS, FRAMEWORK AND METHODOLOGY

This study asks if transformation pathways for disaster risk management can be observed, and if so then how and why they unfold as observed. This is an initial, qualitative analysis to establish an empirical basis for policy development that can more actively open strategic transformative action within the disaster risk management field.

The study was built from five case studies: Christchurch (New Zealand), Sundarbans (India), Lower Sindh (Pakistan), Niger and New York Metropolitan Area (USA). Each case study was completed by a local research team already expert in local risk management policy. Case studies followed a common rubric and reporting structure that provided information on context, actors, drivers, outcomes. Case studies were chosen to provide analytical breadth and include richer and poorer country contexts, rural, small and large urban areas, and disaster risk management options led by individuals, civil society, government and international humanitarian actors.

A conceptual framework proposed indicators of transformation to guide analysis. The high level indicators were:

- Intense interaction between actors,
- The intervention of external actors
- Change going beyond efficiency and targets to goals and governance regimes.
- Behaviour exceeding established coping strategies
- Behaviour exceeding that promoted by established institutions (laws and cultural norms)

FINDINGS

New Zealand: individual and structural transformation. On 4 September 2010 Christchurch was struck by a magnitude 7.1 earthquake. The earthquake has catalysed national debate that has brought strong voices from Māori, women's, student and regional groups as well as new business and political interests and into the mainstream.. Structural transformation was observed, for example through the creation of He Toki ki te Rika, a Māori trades training programme that facilitates youth education and employment in the Canterbury rebuild and beyond. Transformation was also observed at the level of individuals brought into positions of influence, enriching city and national policy debates on disaster risk management and more broadly – especially form gendered and Maori perspectives.

India Sundarbans: the local burden of spontaneous transformation. In a context of frequent, extensive risk and episodic catastrophic events pathways of transformation were observed to unfold in parallel at the household level and with regional consequences. Households were seen to transform through crisis migration when in-situ adaptive capacity met its limits. In aggregate household level transformations contribute to a depopulation of the region providing tacit support for an emerging conservation narrative based on reducing population and its pressure on a globally significant ecological resource.

Sindh Floods, Pakistan: Extending citizenship rights through disaster response. The understanding and exercise of citizenship was transformed in the Lower Sindh in the aftermath of large scale flooding in 2010 and 2011. This period reshaped political space for citizen-state interaction in the post-disaster period. These interactions and changes in relationships were moulded by formal processes such as the implementation of disaster response policy, but also by the unplanned actions of individuals that in aggregate have pushed a more progressive form of 'disaster citizenship'. In particular this study reveals a transformation in discourse and in the institutions of citizenship, and its impact on development pathway.

Niger: A moment of critical reflection transforming development and humanitarian practice. Ongoing failure of the international humanitarian sector to reduce risk and for timely response to food insecurity across sub-Saharan Africa led to an agenda for transformative change for the international humanitarian nongovernmental Save the Children, The case study focussed on activity in the NGO and its work in Niger. The intersection of incremental changes in Niger and wider discursive debate in the international aid system led to a moment of critical reflexivity within Save the Children, focussed on the future of responses to slow-onset shocks. The organisation was able to use this moment to consolidate and realign internal, incremental change towards a transformational agenda. Incremental change within the organisation made Save the Children better able to support transformational change in the delivery of food security with its partners in sub-Saharan Africa.

New York: Public transit systems and pathways to transformative flood control strategies. Transportation systems are in many ways the infrastructural backbone of a region's economy. The Metropolitan Transportation Authority (MTA) operates the transit system for New York City (NYC) and the surrounding region. The MTA operates on more than two thousand miles of track and carries more than 2.6 billion passengers per year. This case identified transformation in the process and membership of decision-making circuits post-Sandy, and in the agenda for urban development which

has opened space for transportation's role in decisions for strategic investment These processes in turn are connected to plans for gentrification or retreat in areas of current risk.

DISCUSSION

Core observed characteristics of transformative pathways for disaster risk reduction are:

Pathway competition: Post disaster is a period of potential policy instability where alternative behavioural, organizational and policy forms emerge. Emergent development approaches can be contradictory. Only some new forms will become institutionalized sufficiently to survive and contribute to a revised development trajectory.

Pathway experimentation. Planned, technological and administrative reforms can allow for controlled opening of potentially transformative social and political space. The New York and Sindh cases both led with technological innovation. Both provide scope for a controlled experimentation with social change processes without commitment.

Pathway scale effects. Perhaps the clearest experience across the case studies is the tendency for the local level to carry the weight and costs of transformation. Transformation at the local level can enable resilience at higher systems levels, for example in regional development policy.

Pathway lock-in. Institutional structures are designed to be resistant to organisational transformation. Transformation is most likely when multiple local and external actors are aligned, in critique of established systems elements,

CONCLUSIONS

The core question put to this study – can we observe decision-making processes that lead disaster risk management strategies to impact upon underlying development trajectories can be answered firmly in the positive.

The study has shown that transformative disaster risk management can be both incidental and purposeful. The majority of observed transformations were local – found at the level of households or in organisational decision-making. Even when policy led transformation was also observed to be targeted at affecting strategic change this was worked through in local policy for land-use management, local governance and economic development.

The study has drawn out the importance of policy as a driver of transformative change but more significantly the case studies presented show the potential for individuals and population level behaviour and of organised civil society as agents of transformation. This is a fundamental observation and opens questions on the scaled distribution of the burden of undertaking transformation.

In providing a first systematic analysis of transformative potential in disaster risk management, the report arguably opens more questions than it can resolve. Next steps at shaping a policy agenda for transformative risk management include:

- What kind of disruption is required to open transformative action?
- How do existing structures and dominant actors behave when faced with potential transformation?
- What are the early warning signs of transformation, especially for the poor and vulnerable?

1. Introduction

In its ‘‘Proposed elements for consideration in the Post-2015 Framework for Disaster Risk Reduction’ UNISDR states:

> *“Sustainable development goals cannot be achieved without managing disaster risk. The overall focus of disaster risk management, therefore, has to shift from shielding social and economic development against what are seen as external events and shocks, to one of transforming development to manage risks, sustainably seize opportunities, strengthen resilience, thereby ensuring a sustainable development.”* (UNISDR: 2014)

The shift in focus for risk management from externalising risk to questioning the sustainability of underlying development places disaster risk management squarely at the heart of development processes. While this view has long been championed it has proven difficult to articulate. Current debates on transformation offer a new lens on this challenge. The present report offers an analytical framework and empirical assessment of the range of pathways through which disaster, disaster risk reduction and response have had a transformative impact on underlying development trajectories, processes and values across an international selection of case studies.

Within this lens disaster is conceptualised not as an aberration of, or archipelago to development, but as a moment or period in the unfolding of development history. Disaster is an event that reveals accumulated development failures and vulnerability expressed in damage and loss. Individual development pathways are an expression of specific value sets, reproduced and legitimised by institutions, habituated behaviours and dominant discourses. Individual pathways entwine, sometimes smoothly, at other times producing friction, to produce collective pathways for development. Transformation draws analytical and policy attention to the potential for disaster events, risk reduction and response to provoke a change in pathway trajectory. Transformation describes the depth and reach of development impact, and when combined with a normative framework that provides a specific value position it can indicate who might benefit or lose, or whether such changes in the direction of development pathway are more or less socially desirable. Normative frameworks include sustainable development, economic growth and equitable development with multiple interpretations possible of the same transformative pathway. The Sustainable Development Goals represent a detailed agenda against which transformative pathways can also be judged to assess the potential or actual contribution of disaster risk management.

By highlighting potential transformation makes clear the responsibility for disaster risk management to realise its role as a component of unfolding development. To deny the potential of risk reduction to contribute to unfolding development, to relegate disaster risk reduction to a position of protecting existing development structures, practices, goals and values, is to miss the bigger picture that disaster risk and loss are a product of development decisions and their legacy. Risk management strategy may legitimately choose to support existing development pathways – but transformation demands a justification of this policy choice.

This report offers a basic analytical framework to move from abstract discussion of development pathways to specific actions and responsibilities on the ground. To do this we have elaborated an actor based framework. This view builds on the work of earlier, alternative frameworks that have emphasised component parts of our framework, including work that has focussed on innovation and leadership (IPCC 2012), reflective decision-making (Matyas and Pelling 2014) and the interaction between development sectors as transformation emerges (Pelling et al 2014). Our core concern is to identify the interaction of actors (individuals and organisations) with dominant development pathways and here an actor oriented frame that can open the relationship between policy actors, constraining institutions and the structures that drive development trajectories provides most analytical leverage. Examples are built around five case studies (see Box 1). These are presented in the results section in some detail, this detail necessary to situate these events in respective development pathways and to then draw out the ways in which responding to or preparing for future disaster has touched pathway

trajectory - by accident or design. We then discuss common features observed from these cases to allow some general comments on transformation in disaster risk management.

Box 1: Case Studies

New Zealand
The Canterbury, New Zealand earthquake sequence of 2010-2011 which devastated Christchurch and surrounding districts led to substantial response at local and national government level and significant changes in both risk management and wider public policy, which may transform development in the region, though it is unclear to whose benefit.

India
The Sundarbans, a unique mangrove forest ecosystem, extends along the Indian and Bangladeshi coastline. The impact of the Aila super cyclone of 2009 compounds other development failures in the region. In the wake of the storm transformation is evident but experienced and interpreted in different ways by both resident and external actors.

Pakistan
In the Lower Sindh region of Pakistan the aftermath of large scale flooding in 2010 and 2011 led to an unusual government response in distribution of financial aid which has in turn triggered an apparent transformation in citizen engagement in disaster and development policy fostering increased senses of citizenship through more directed rights claims and public engagement.

Niger
Failures in the strategic response of INGOs and other actors to slow onset food security shocks in Africa over the last decade have raised a desire to transform the delivery of development and humanitarian aid. This case study focusses on the incremental steps being undertaken by some actors towards wider transformative change at a higher systems level.

USA
The impacts of tropical storms Irene and Sandy in 2011 and 2012 are the latest in a sequence of extreme weather events which have triggered debate about the resilience of New York City's development trajectory. This case study focuses on the urban public transport system. Both pressures for transformation and resistance to the deployment and underlying access rights for public transport are revealed post-Sandy.

2. Conceptual Framework

Transforming development through disaster risk management and climate change adaptation is emerging as an alternative to treating risk as external to development – to be addressed by incremental changes that use risk management to protect existing development goals, practices and relations (Pelling 2011). This shift in thinking reflects the increasing recognition that the inexorably growing rate of disaster losses (EM-DAT 2014) has its root causes in failed development. Also that movement towards sustainable development, and meeting agreed Sustainable Development Goals, is unlikely without fundamental changes to development pathways. In short moving towards sustainable and just development requires a recalibration of the disaster risk management-development relationship.

The insufficiency of a 'business as usual' approach to disaster risk management is not a new observation. Hewitt (1984) and Wisner et al (2004) amongst others have long argued that development itself is a driver for and generative of disaster risk. Transformation for disaster risk management positions this observation alongside a number of parallel debates on transformation. Most notable are those from the climate mitigation community where a considerable expertise and literature exists of transforming society towards low consumption development (as described by working group III of the IPCC's Fourth and Fifth Assessment Reports) drawing on a systems theory framework expressed

through socio-technological transitions literature. A second and closely aligned systems view come from the take up of social-ecological systems (SES) thinking in natural resource management and climate change adaptation literature. The SES approach includes transformation (fundamental change) in its account of systems level shifts from one state to another. Importantly though SES frameworks have been predominantly deployed to understand resilience (stability seeking) and contain, rather than focus on, transformation. Recognising that stability in unsustainable sectors is not desirable, recent work from climate change adaptation and disaster risk management has attempted to address this bias and has attracted attention through extensive peer review in the IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX) (2012). SREX offers transformation as one of seven solutions for adapting to climate change, defined there as:

> "The altering of fundamental attributes of a system (including value systems; regulatory, legislative, or bureaucratic regimes; financial institutions; and technological or biological systems)." (IPCC 2012: 564)

The idea of transformation moves work beyond a focus on coping within and adapting to dominant development contexts to mobilising the potential for risk management to seek change in the structures of development that constrain vision, entitlements and capacity. Where development has systemically failed and produces unsustainable, insecure and unjust outcomes as well as disaster risk it opens policy and public space to think of alternatives and use risk management as a point of leverage in moving towards sustainable, equitable and secure development. This option comes, however, at a cost. Transformation – disrupting the status quo – may be appealing to those concerned with re-directing development toward sustainable pathways; but stability, rather than disruption, is what development organisations are most comfortable with. This can be seen in all spheres, from science to politics and is often strongly held by the poor who have least resources to cope with change and instability as surroundings systems shift (Pelling and Dill, 2010). Political and policy organisations and institutions are built intentionally to be durable and resistant to pressures for transformational change (Clemens and Cook: 1999) including those responsible for disaster risk management and climate change adaptation (Pelling and Matyas, 2011). Alongside this inertia development discourses define 'how things are done round here' normalising dominant values and creating individual as well as organisational and systemic resistance to disruption (Pelling, 2011).

Learning from past Transformations

Transformation remains a young area of work but already empirical cases are emerging to provide some theoretical and policy texture. A case from the Mulwene area in Maputo, Mozambique, shows a transformation in housing provision resulting from an unforeseen event chain (Neilson: 2010). Following severe floods in 2000 the city prepared to establish new housing areas in Mulwene to cater for displaced residents. Plans were drawn up but a lack of capacity meant they were not implemented. However over the following years the local population appropriated the vision and regulatory framework for construction of a model residency area in the wake of the flooding. Through appropriating and developing the targeted land – to which they had no legal rights – the local community have used elements of the government plans and legislative frameworks to create a de facto legitimacy for their actions, and in doing so have transformed local governance and development. The ability for local populations to create systems of governance, decision-making and rule enforcement to transform local development pathways is one which Ostrom (1990) demonstrates in a number of case studies; in her view offering an escape from the tragedy of the commons which suggests a local level race to the bottom in management and exploitation of common pool resources.

Where the initiative for change was taken by the community presented with the inability of authorities to enact their own plans in Maputo, a case from India shows the ability of an individual leader to effect transformation. The city of Bhuj in Gujerat made headlines both because of its dramatic devastation in the earthquake of 2001, and because of its wholesale espousal of the 'build back better' principle. The BBC reported 'Gujerat's astonishing rise from the rubble' (2011) The disruption was a powerful entry point for a dramatic transformation, with the whole city redesigned and reconstructed – reportedly due to the drive of government official Pradeep Sharma. More reflective assessments sound

a note of caution: Tafti and Tomlinson (2013) found that whilst homeowners were well catered for; those in rented accommodation were poorly supported and the expectation that the market would provide suitable and affordable accommodation proved fallacious, this despite over 1800 consultative meetings. A wider study of post-earthquake housing in Gujerat (Sanderson et al: 2012) similarly concluded that the evident transformation did not necessarily take account of the residents' needs: "Very often, reconstruction is seen as a building project delivering products, rather than an opportunity to engage in development".

Experience from the Indian Ocean tsunami shows how gradual and yet persistent pathways for transformation can be identified. Research from the Andaman and Nicobar Islands, India explored the role played by NGOs in opening (or widening) political space – specifically, space for the renegotiation of development priorities in favour of local communities – within local government. One of the most significant changes post-tsunami has been the establishment of an NGO sector where none existed previously. In Little Andaman, only three NGOs now remain out of the huge initial influx. One of these, an Indian NGO that works to promote and enable child rights, has undertaken a variety of initiatives including: establishing child development centres (CDCs), offering trainings and support meetings for parents, managing a child-run newspaper, and delivering health awareness programmes. The NGO is now accepted as a regular stakeholder in the local governance framework. Whilst this NGO's narrow focus on child rights may make this *appear* to be a small step for transformation more widely, it has nevertheless succeeded in widening the space for state-society negotiation around development priorities (Blackburn: pers comm).

These and other case material indicate that while transformation is an intuitively attractive goal when development is manifestly unsustainable and unjust, success at scale requires the support, and leadership of actors across scales from the local up. Perhaps the best documented case of failed transformation – with failure a result of top down leadership without buy in from national or local levels – is the reconstruction and development in Honduras after Hurricane Mitch in 1998. The impact of the storm on Central American countries and the need for massive reconstruction aid opened an opportunity for affected countries and donors to reflect on the root causes of risk production in dominant development pathways – concentrated urbanisation, deforestation, inequality. Transformation was called for in the resulting Stockholm Declaration, 1999, and included an agenda for using reconstruction to:

- Reduce social and ecological vulnerability
- Enhance transparency and good governance in recovery efforts;
- Consolidate democracy and the active participation of civil society
- Respect human rights and equality between women and men
- Reduce the external debt burden of the countries of the region

(Christoplos et al: 2010)

An overarching aim was to avoid the risk of the large international response undermining the capacities and legitimacy of the states of the region. However an assessment produced by the World Bank in 2004 (Telford et al: 2004) found that these transformative goals had not been met. They conclude that short timescales, a lack of social cohesion, high levels of corruption and unfocused efforts by the many agencies involved all contribute to this. They report one G-15 donor stating:

> "Reconstruction more-or-less happened, but transformation has not. Security has deteriorated dramatically, poverty is increasing. The coffee crisis is more devastating than the drought. If we (donors) don't see fundamental transformation we shall leave."

The assessment of progress post-Mitch in Honduras runs counter to the above cases. Whilst transformation may be invoked, its effectiveness depends on persistent drivers over substantial timeframes to achieve transformative tipping points. Disasters as an entry point are a potential but not a sufficient driver for transformative change. The art of transformation is to embed disaster risk

management within development so that responsibility for transformation is a co-responsibility of both communities from the onset.

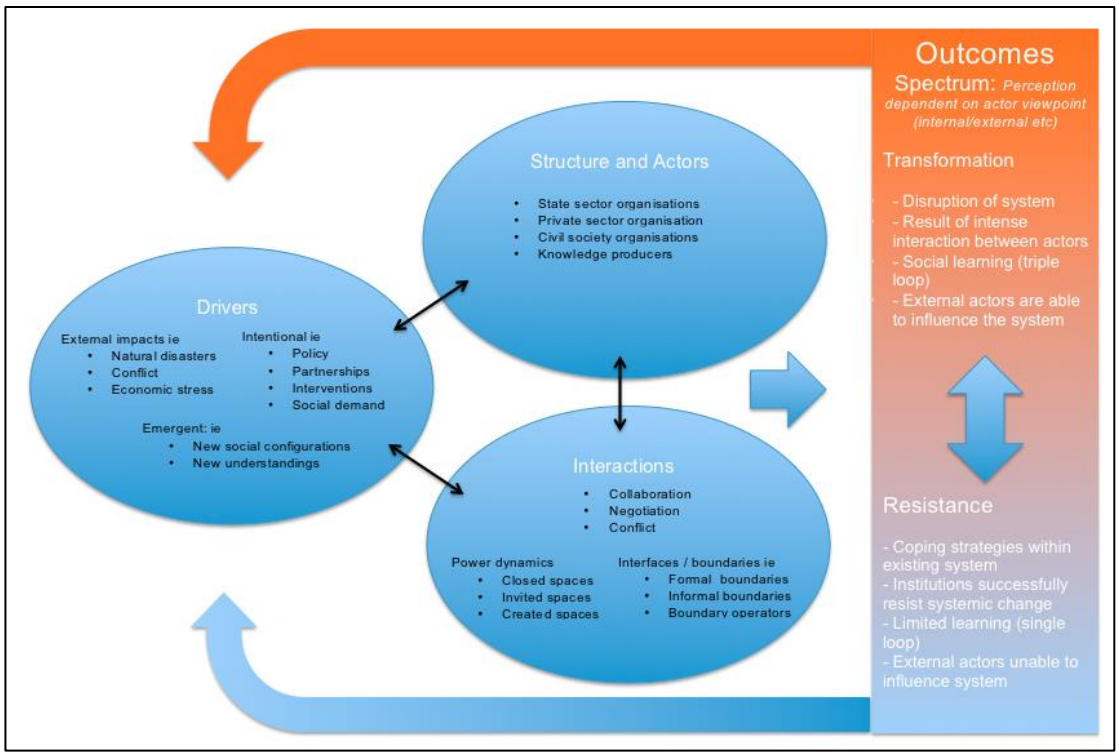
An Actor Framework

To understand the scope for disasters and risk management to open transformative moments in dominant development pathways it is helpful to reflect on those in-built institutional characteristics that resist change. Specific mechanisms for resistance to political change include closing political spaces or more subtly managing 'invited political spaces' (Gaventa: 2005) thereby excluding particular views and actors from meaningful participation even when major disruptions occur. Gaventa (1980) described communities becoming resigned and passive in the face of recognised development deficits as a result of this persistent exclusion.

Social actors may force open the closed political spaces through actions such as campaigns. The trajectory of transformation resulting from disruption depends on the relative power of associated actors. Long (2001) demonstrated that it is not just obviously influential actors who can shape development trajectories, but that other, seemingly less powerful actors could exercise influence. Development interventions, for example, often have outcomes different to those anticipated, due to the unexpected agency of such actors (Mosse, 2004). Outcomes then are determined by which actors, and whose agency, take control of the spaces which are opened for and by risk management and it is here that transformative potential is likely to be found.

If disaster risk management can open new policy space for government, civil society and other public actors, how and where might transformation then come about? Where fundamental, systemic change is approached, it would be useful to know something of the precursors, early warning signals and determinants of change.

Figure 1: Transformation and resistance pathways from an actor oriented viewpoint



This study adopts Long's (2001) actor oriented perspective, focusing on values, intentions, choices, negotiations, conflicts and collaborations between actors (whether groups or individuals) rather than on the mechanic functioning of a 'system'. Taking an actor perspective and holding in mind a range of scales – from local urban and rural through subnational to national and international – several basic

analytical building blocks to help better understand processes of social change can be identified. These include: social **structures** constraining a broad array of individual and corporate **actors** who may have shared or conflicting interests. The **interactions** between these actors are shaped by **institutions** (rules, law, culture) and occur at meeting points which have been described as interfaces (Long: 2001, 2002). Such institutions may be more or less formal in nature, and resultant interfaces inclusive or exclusive, collaborative or conflictual. These encounters are stimulated by a range of **drivers**, both external and internal, including disruptions such as environmental, economic and social shocks, deliberate initiatives of groups and individuals and emerging trends, social shifts and innovations. The interactions between the various actors in response to these drivers will lead to a range of **outcomes**: from resistance (coping with the status quo) through incremental change to transformation (Pelling: 2011). These elements are represented in Figure 1 below, emphasizing our interest in dynamic, unfolding, processes of development, rather than a single historical moment.

Figure 1 indicates that transformative outcomes are indicated by changes associated with a disrupted system, intense interaction between actors, potentially the successful intervention of external actors and of evidence of change going beyond efficiency and targets to goals and governance regimes. Resistance is indicated by a continuation of existing coping strategies, successful continuity within dominant institutions (laws and cultural norms), learning limited to efficiency gains and limited influence of actors external to the system of interest.

The organising framework has at its heart *drivers* – disruptive processes which may be initiated deliberately or may be unanticipated. The dynamic interactions of *actors* impacted by these drivers determine the depth of change (from transformation to resistance) and the direction of that change (regressive or progressive) from a specific actor perspective. Thus, whilst Figure 1 represents a process, we also want to understand normative aspects of outcomes. Who does transformation benefit? Does it contribute to sustainable development?

3. Methodology

The study is built on five original case studies commissioned to examine episodes of potential transformation associated with disaster events. Cases were chosen purposively through a search of recent high visibility projects and drawing on the expert knowledge of the writing team. The study aimed to illustrate the universality of disaster risk management as a contributing factor in development trajectory and its scope for transformation. Consequently we selected as diverse a set of cases as possible (see Table 1). These include examples of everyday, chronic and catastrophic events; of geophysical and hydrometeorological hazards and of vulnerable human systems ranging from low-income resource dependent villages to a global megacity. It was particularly challenging to find experts able to comment on the transformative potential or outcomes arising from risk reduction activities, but these are included alongside response and reconstruction. Finally we sought to recognise the influence of viewpoint and provide accounts from the perspective of citizens at risk, development planners, a humanitarian NGO and disaster risk managers. The case studies are highly context dependant but the analysis is able to draw out some common threads that can help in structuring the emerging policy debate around transformation.

To facilitate comparison, case study authors applied the common framework of drivers, actors, interactions and outcomes described above. In each case data came from a mixture of secondary data and expert interviews, often augmented by the expert local knowledge of the author. Case studies underwent two rounds of review by the lead author and editor. Case study documents run to around 20 pages each. The summary versions presented here were validated by the case study authors in a final review round.

Table 1: The study sample

Study Site	Focussing event	Development context	Disaster-Cycle phase	Actor viewpoints
Christchurch, New Zealand	Canterbury Earthquake Sequence of 2010/11	High-income, urban	Reconstruction	Disaster risk managers
Sundarbans, India	Recurrent, everyday and catastrophic riverine and storm surge floods including super-cyclone Aila, 2009	Low-income, natural resource dependent villages	Whole cycle	Exposed households and regional development planners.
Sindh, Pakistan	Widespread flooding in 2010/11	Low-income, natural resource dependent villages	Relief	Development planners
Niger and the Sahel region	Recurrent drought and slow onset food insecurity shocks (2005/08/10/12)	Very-low-income, natural resource dependent region	Early warning and response	International Non-Governmental Organisation
New York Metropolitan Area	Storm surge floods including Irene, 2011 and Sandy, 2012	High-income, megacity region	Reconstruction and recovery	Transport planners

4. Findings

The following case studies are presented in a common structure: context, actors, drivers, outcomes. The aim is to draw out connections between these elements of the framework and in particular to flag where moments of potential or actual transformation arise, and how. Our conceptual framework (Figure 1) indicates transformative outcomes through:

- Changes associated with a disrupted system,
- Intense interaction between actors,
- The successful intervention of external actors
- Change going beyond efficiency and targets to goals and governance regimes.

Transformation has not been observed when evidence finds:

- Continuity in established coping strategies,
- Continuity in dominant institutions (laws and cultural norms),
- Learning limited to efficiency gains
- Limited influence of actors external to the system of interest.

The viewpoint of actors and system scale are also important themes, the case study teams were asked to identify potential or observed feedbacks between systems across scales from local (eg household or organisational) to local, national or international economic, governance or policy-making systems. This recognises that only rarely do complete meta-systems transform, more likely is the observation of local transformation with incremental impact on the overarching social-ecological system. This has strategic implications for policy when overarching systems constrain local efforts at social and ecological sustainability and security.

1. New Zealand: individual and structural transformation

On 4 September 2010 Christchurch was struck by a magnitude 7.1 earthquake. The earthquake struck in an area considered at relatively low risk and has stimulated a wide discussion in New Zealand about risk management and development governance. This debate that has brought strong voices from Māori, women's, student and regional groups as well as new business and political interests and into the mainstream. Transformation is observed at the level of individuals who have been brought into positions of influence, enriching New Zealand – especially form gendered and Maori perspectives. Structural transformation was also observed through the creation of He Toki ki te Rika, a Māori trades training programme that facilitates youth education and employment in the Canterbury rebuild.

Context

The 4 September 2010 earthquake and the subsequent aftershock series have caused 160,000 residential dwellings to field insurance claims for damage (King et al. 2014). Most buildings in Christchurch's CBD have been damaged beyond economic repair and the CBD was cordoned off and accessed restricted for several months with major effects on businesses (EERI 2011). The total cost for reconstruction is now estimated at $40 billion NZD ($32 billion USD) with the central government estimating its net contribution at $15 billion NZD ($12 billion USD) (The New Zealand Treasury (2013).

The suite of national legislation and key decisions made in response to the Canterbury earthquakes may be viewed as a rapid governance adaptation strategy embedded within an overall trend in governance reforms underway in New Zealand prior to the earthquakes. All the key pieces of legislation in the natural hazard risk management framework are under review or have had reforms introduced to strengthen the national government's role, standardize and streamline policies, curb perceived bureaucracy and shorten decision making processes. There are strong concerns about the retreat from decentralized and collaborative governance approaches and the potential lasting implications for local government and representative democracy.

Disaster recovery is always set within a social context and New Zealand has a sophisticated natural hazard risk management policy framework, with an array of well-established regulatory instruments largely formed by a suite of legislation first adopted during the 1990s and early 2000s, in a period of government reform emphasizing sustainable management and more decentralized and open, collaborative and transparent processes of government including land use, development, and emergency management.

Actors

Like many countries, the framework is designed with a shared system of governance and common and overlapping responsibilities apportioned among layers of government and citizens, both pre- and post-disaster, and structured to engage from the 'bottom-up', with citizens responsible for protecting their assets; local governments having primary responsibility for land use policy to avoid and mitigate hazards and supplying resources when disasters do occur; and regional, subnational and national agencies providing the authorities, guidance, resources, and support as needed. By design, the effectiveness of the framework depends upon the extensive coordination and cooperation among all levels of government and its citizenry, as well as non-governmental organizations, insurers, and other stakeholders who also provide support to the process.

An additional consideration is that Aotearoa, New Zealand is legally and socially a bi-cultural country without a formal constitution, although Te Tiriti O Waitangi (The Treaty of Waitangi), the founding document of nationhood was gazetted in London in 1840 (Royal Commission on Social Policy, 1987, 1988). Further to the Royal Commission on Social Policy's (1987, 1988) translation and legal definition of the articles of Te Tiriti O Waitangi as core principles of jurisprudence, the principles' partnership, protection and participation have been integrated into most legislation. Government agencies, organisations and individuals who receive funding from the Crown have a statutory requirement to act in accordance with the principles. However, Māori engagement with government

disaster risk reduction planning and policy development as well as the national emergency management infrastructure has been minimal (Paton et al. 2014). In contrast, to 'command and control' approaches to disaster management, Māori crisis management practices are characterised by collective authority, agency and action. Māori responses to natural hazards are also shaped by cultural values and incorporate cultural technologies for mitigating the social impacts of adverse events (Kenney et al. 2012). Institutional resistance has prevented the inclusion of Māori and/or communitarian approaches within hierarchical emergency management practices which have encouraged both expert as well as individualised responses to natural hazard risks. The Canterbury earthquakes sequence has facilitated institutional transformation with lessons learnt shaping regional governance (CERA, 2012) and the revised New Zealand Civil Defence and Emergency Management Plan, which was released for national consultation on May 23rd 2014.

When the Canterbury earthquakes sequence commenced in 2010, Māori constituted (25,725) 4.1% of the Christchurch urban population, and the resident tribe Ngāi Tahu comprised a minority of 32% of the Māori community (Statistics New Zealand, 2012a). Māori resided throughout Christchurch but the majority lived in low socioeconomic areas, particularly the Eastern city suburbs (Statistics New Zealand, 2012a, 2012b), which were also the places most severely impacted by the earthquakes. Despite perceived economic marginalisation, a nationalised Māori earthquake recovery network led by the local tribe Te Rūnanga o Ngāi Tahu, was rapidly established following the February 22nd 2011 earthquake. Effective operationalisation of inter-tribal resources, Māori organisations and extended familial networks constituted an exemplar of the values whanaungatanga (relational support) and manaakitanga (hospitality). The immediate activation of marae (Māori community centres) as recovery assistance centres was representative of cultural technologies commonly employed to address risk and facilitate community resilience during adversity (Hudson and Hughes, 2007). Research (Paton et al, 2014) suggests that the Māori earthquake recovery network provided financial grants of NZ$ 953,000.00 (Te Rūnanga o Ngāi Tahu, 2012), social and housing (assessments, repairs and accommodation) support, liquefaction removal, emergency services, acute health care and/or basic necessities to 20,000 Christchurch households

The Drivers

By their very nature, large-scale disasters exceed the capacity and capabilities of policy and management frameworks from the bottom up. They simultaneously deplete capital stock and social services and thus demand an elevated and sustained commitment of funding, information and other critical resources, all within a compressed time period. In New Zealand, they also can serve as focusing events for policy and politics and the primary earthquakes, seemingly relentless aftershocks and resulting damage stimulated a suite of nationally-adopted legislation and Cabinet-level decisions aimed to improve the timeliness and effectiveness of decision making and to reduce uncertainty for residents, businesses, insurers, and other stakeholders in the recovery.

The key interactions resulted from the progressive decisions of the national government to centralize authority for recovery governance, culminating with the creation of a new national department charged with managing recovery—Canterbury Earthquake Recovery Authority (CERA)—and a re-zoning of residential land across the Canterbury region based upon a new understanding of earthquake hazards and future risks. In a span of three years, New Zealand's national government extended voluntary purchase offers to 7,349 properties located in neighborhoods heavily impacted by earthquake-induced ground failures and subsidence and nearly all homeowners have completed their relocation out of the buyout areas.

The Outcomes

Since the Canterbury region is only in its third year of recovery and even the most optimistic estimations project that rebuilding will take several more years to complete, it is not yet possible to fully assess the strengths, weaknesses and outcomes of the legislation and decisions guiding the process. An early analysis shows signs that the centralization may have helped to strengthen coordination among national agencies, expedite policy and decision making, and ensure accountability for the considerable public expenditure; but, the effectiveness of coordination among multiple levels

of government, capacity building at the local and regional levels, and collaborative engagement and empowerment of citizens and key stakeholders in the decision making and implementation are some areas where the changes may not have been as effective.

In contrast, the prompt and effective Māori response to the Christchurch earthquakes has challenged conceptualisations of indigenous peoples as vulnerable populations and acted as the genesis for increased engagement and collaboration between Māori, local authorities and central government. As stipulated in the Canterbury Earthquake Recovery Act (2011), Te Rūnanga o Ngāi Tahu has a statutory role in authorising the urban rebuild and recovery planning (CERA 2012). This public private partnership is the first instance of a Māori entity being engaged as an equitable partner by local and national governance structures in strategizing to ensure regional sustainability and resilience. The earthquake may therefore be viewed as a key driver of institutional change which opened up space for the formal inclusion of Ngāi Tahu in legislation governing the Christchurch recovery. The Canterbury Māori Recovery Plan is ensuring the creation of accessible cultural services and facilities, restoration of significant natural features and rivers, development of housing on Māori land reserves as well as documentation and preservation of sacred tribal sites (wahi tapu). Te Rūnanga Ngāi Tahu tribal initiatives are also shaping the longer term resilience of tribal members, Māori and the wider community in Christchurch. Risk factors that are associated with earthquake vulnerability including financial hardship, unemployment, inadequate insurance, poor housing and natural resources management are being addressed (Te Rūnanga o Ngāi Tahu, 2012).

Unless amended, the Canterbury Earthquake Recovery Act 2011 and the authorities of CERA and the Minister for Earthquake Recovery will expire in April 2016. Ensuring that recovery efforts remain effective after it is disestablished is one of the major challenges facing CERA. Having not been as directly involved in the recovery policy design and implementation, it is also unclear whether local authorities in the Canterbury region have the necessary expertise and capacity to assume the leadership and operational reins for recovery in less than three years' time. Also, the national government' intervention in land use policy and hazard liabilities in the aftermath of disasters, conflicts in many ways with the previous social contract maintained through the responsibilities conferred upon local governments and the nationally-backed insurance program to distribute the risks among property owners, insurers, and government.

The suite of national legislation and key decisions made in response to the Canterbury earthquakes are arguably going to have long-lasting effects on the natural hazard risk management framework for the entire country, but may also be viewed as a rapid governance adaptation embedded within an overall trend in governance reforms underway in New Zealand prior to the earthquakes. All the key pieces of legislation in the natural hazard risk management framework are under review or have had reforms introduced to strengthen the national government's role, standardize and streamline policies, curb perceived bureaucracy and shorten decision making processes. There are strong concerns about the retreat from decentralized and collaborative governance approaches and the potential lasting implications for local government and representative democracy and the rule of law.

2. The India Sundarbans: the local burden of spontaneous transformation

This case study considers pathways of transformation that unfold in parallel at the household level with regional consequences. Households are seen to transform when adaptive capacity meets its limits in the wake of underdevelopment, slow onset, gradual environmental shifts and sudden extreme disaster events in an environmentally vulnerable and fragile ecosystem. In aggregate, these household level transformations contribute to a depopulation of the region providing tacit support for an emerging conservation narrative based on reducing population and its pressure on globally significant ecological resources.

Context

The Sundarbans is a unique mangrove ecosystem – not only because it is the largest of its kind; nursing a critically endangered species diversity valuable both to the global commons and to local ecosystem products and services, but also because of its role as a buffer to over 60 million people

whose lives, properties and infrastructure worth billions are protected from extreme weather events by this barrier across the coastline of India and Bangladesh. Kolkata and Dhaka, and many smaller towns and villages are protected by the Sundarbans.

The Indian part of the Sundarbans, approximately 40% of the entire ecosystem stretches16,000 sq.km, between two countries. It is inhabited by 4.5 million people and threatened consistently and increasingly by climate change and local environmental shifts. Already a hotspot for climate change impacts, this ecosystem has recorded sea level rise, changes in sea surface temperature, cyclone intensity and incidence, temperature and rainfall patterns at a rate far higher than global averages (Mitra et al 2009, Mousavi et al 2011, Pethick and Orford 2013). Set in this context super cyclone Aila hit the Indian Sundarbans in May 2009. The cyclone had a disastrous impact on agriculture, and destroyed the small asset bases the poor possessed. High levels of salinization in soil prevented households from recovering in situ. In India, at least 149 people were killed, at least 100 river embankments were breached by storm surge produced by the cyclone. At least 50,000 hectares of agricultural land was lost during the storm, costing an estimated Rs.125 crore (US$26.3 million). Throughout the state, an estimated 40,000 homes were destroyed and 132,000 others were damaged. At least 350,000 people were affected by Aila, other reports indicated that upwards of 2.3 million were displaced by the storm as 175,000 homes were destroyed and 270,000 were damaged (Dhar 2009).

Actors

For those households with low-income, limited assets and natural resource dependent livelihoods Aila was a tipping point. Households who had reached the limits of adaptive capacity were forced to consider new and fundamentally different livelihood options, migration has been a common response. Out-migration is transformative of life-experience, identity, community and in aggregate of the local economic system and population pressure exerted on local ecosystem services. Migration revealed a gap between the ability of those at risk to switch development pathway, compared to the institutional architecture of the region which has not yet been able to provide support, either to migrants, those potentially likely to migrate in the future, those left behind or in receiving communities.

Such institutional resistance supported an increasingly imaginary status quo. Disaster risk reduction has not been able to keep pace with the needs of those migrating and instead continues to focus on technical measures; investing heavily in embankments, which can cause substantial social displacement, and the development of saline tolerant crops, which may be incompatible with environmental concerns and also not a locally preferred choice. Environmental interests such as International Union for Nature Conservation (IUCN) and the World Wide Fund for Nature (WWF) have a development vision for the region that prioritises depopulation with a shift towards conservation. Central and federal government has been influenced to support this vision by the projected value of Sundarbans as a global commons and by external environmental interests. Jalais (2007: 4) expresses this poignantly, "Fascination, on the one hand, for the natural aspects of the Sundarbans, but on the other, an unsettling silence on the social and human facet of the region."

Drivers

The Sundarban is already experiencing the impacts of climate change (Mousavi et al. 2011, Jadhav and Munot 2009, Preethi et al. 2011) which put pressure on environmental and livelihood stability. In addition to this underlying pressure, variability and change in regional water regimes exceeds the coping capacity of local water management infrastructure and related land-use (Nandy and Banyopadhyay 2011, Rahman et al. 2011) The resulting frequent, small, discrete hazard events include regular embankment breaches and the erosion of river banks and coasts. Against this background of slow onset and everyday hazard, Cyclone *Aila* was an extreme hazard and loss event that pushed many households to collapse (Pelling, 2011)

The slow onset nature of climate change impacts and extensive risk character of the region potentially allow time and space for families to adjust and adapt autonomously – with or without State support. *Aila* has been critical in destroying this possibility. The rapid and widespread loss of household assets, the overwhelming of government and civil society capacity to support social development has forced

many individuals and households to turn to migration without planning. This has exposed migrants, especially the lowest skilled, to exploitation, as described below. This observation underscores the significance of such extreme weather events in the transformation of social systems with low adaptive capacities and high vulnerabilities.

Migration is not only forced, it also reflects a change in social values and aspirations. The penetration of cable television and mobile phones has extended aspirations. Aspirations are given cultural specificity by social networks that connect individuals in villages with urban migrants. In Kolkata for example, new settlements bear the names of villages in Sundarbans as their inhabitants hail from the same village and look to the settlement for community support.

The governance and policy making regime in Sundarbans is top-down. While popular political awareness in the region is high, there is very little direct engagement in the political process or open expression of dissent. Space for participation is very constrained. Apart from *Panchayats*, the self-governance body at the village level, there is little formal negotiating space for local actors. Through the *Panchayat*, it is nearly impossible to influence decision making processes outside of village level issues. Reasons for this include direct involvement of stronger global and national actors who control and shape the dominant discourse about management of the region and top-down policy processes with little concern for local social justice or needs (Jalais 2010, Mukhopadhyay 2009).

While the region's development pathway is driven from above, it is not the product of a clear vision but rather of relationships between international, national and regional agencies. This matrix of institutions and influences has been described as being locked at cross-purposes, missing opportunities that could be leveraged from involvement of the global community in the Sundarban. Resulting development deficits that lead to maladaptation, poverty, hunger and insecurity are interpreted by local communities as the State's hostility towards them (Jalais 2010, Mukhopadhyay 2011, Ghosh 2012a, 2012b).

Outcomes

Two transformative pathways are revealed through this case study. First, migration emerged as an increasingly dominant choice for the poor and vulnerable who have reached the limits of their adaptive capacity. Migrations of skilled workers, unskilled women in the care industry (nannies, maids and medical attendants), and educated youth are described by households as enhancing wellbeing and life chances. The wellbeing of unskilled labour migrants and of women and children who have stayed behind are associated with declines in wellbeing at the individual and household levels (Ghosh 2012a, Bera 2012). The operating of people traffickers is an extreme form of exploitation to which especially the low and unskilled – men and women - are vulnerable. For these individuals the burden of transformation is very high.

Migration outcomes vary by gender, age, skill (education), economic and social status. The wealthier, more articulate and better informed have long used migration as a means to access education opportunity, and employment leading to alternative livelihoods less dependent on fragile agriculture, which they feel will gradually enable them to shift out from the Sundarbans.

A second transformative pressure is less deliberate but a result of the aggregate impacts of migration at the regional level. Whilst there is little in existing social development policy to actively encourage or support migration it fits well with the dominant development narrative of conservation and depopulation. In this way outmigration not only places the pressure of transformation on the poor but also supports the dominant development narrative of the region and of its most influential external actors. The inability of institutions, including regional development policy and social investments to identify migration as a development driver and pathway, and to invest resources in enhancing the prospects of migrants is an important finding. This flags clearly the challenge of those local actors entering into transformative spaces that are already marginalised from dominant development investment. In this case limited investment in education first constrains the livelihood options of the local population, making migration more attractive. At the same time, without investment in skills

migrants are only able to work in poorly paid and exploitative sectors. In the Sundarbans this is exacerbated by the behaviour of private labour scouts, who, mostly migrant workers themselves, supply labour to their place of work. While this helps them with some extra cash, it also offers certain security and a point person for those trying to migrate or need to migrate, as well for the families of migrant workers who stay back. An informal arrangement, they constitute an extended social network. There is no policy instrument except rapid improvements in mobile communication and telephony networks that has facilitated and fostered migration.

3. Sindh Floods, Pakistan: Extending citizenship rights through disaster response

Contestations and negotiations in citizenship and the understanding of citizenship were transformed in the Lower Sindh in the aftermath of large scale flooding in 2010 and 2011. This period has reshaped political space for citizen-state interaction in the post-disaster period. These interactions and changes in relationships were shaped by formal processes such as the implementation of disaster response policy, but also by the unplanned, experiences of individuals that came together to result in an outcome that was able to push a more progressive form of 'disaster citizenship'. In particular this study reveals a transformation in discourse and in the institutions of citizenship, and its impact on development pathway.

Context

The state in Pakistan passed the National Disaster Management Act (NDMA) just a few months after the first floods in December of 2010. The Act refers to disaster relief as *ex-gratia* assistance; in other words not an obligation but an act of generosity. It complicates this further by also establishing a basic minimum right to disaster relief, while leaving unclear in the text whether this "minimum" is a responsibility or a goodwill gesture. At the same time however, in the aftermath of the floods in 2010 and then again in 2011 the state implemented a universal cash transfer policy for each household affected by the disaster.

The Pakistani state used the National Database and Registration Authority (NADRA) to identify households domiciled in the disaster affected area and then dispensed money to them using cash cards called Watan and Pakistan cards. Hence it was not just a universal cash transfer but also a government-to-citizen (G2C) money transfer taking place through the NADRA registration system, using the Computerised National Identity Card (CNIC) number of the head of each affected household. The 'universal' nature of such disaster relief meant that people did not have to show that they were deserving of such state support, rather all households who had been affected by the disaster were provided this cash transfer. Additionally the mechanism of connecting this disaster relief with citizenship numbers meant that people understood this form of state disaster response as an 'entitlement' of citizenship. It therefore became discursively and in reality extremely difficult to divorce this form of disaster response from what people understood as legal citizenship, even though disaster response has not been institutionalised in the legislation as such.

Actors

Evidence from the field demonstrates that even political representatives (a Member of Provincial Assembly [MPA] from Badin) and state functionaries (the District Coordination Officer [DCO] of Thatta) articulated cash transfers through the ATM cards as a *de facto* right of citizenship. This suggests that the transformation in citizenship that emerged as a result of the disaster response policy interacting with various socio-political processes was not entirely intended by the state. Rather it fell between the intentional and unintended spectrum of transformation. While the state did not intend to make disaster relief a legal right of citizenship, the design and implementation of the cash transfer programme resulted in citizens understanding it in these terms.

Despite considerable development literature discussing the absence of the state and the gap between state and citizens in Pakistan, evidence from three districts in Lower Sindh clearly demonstrated that in times of disaster, when individual and even community capacity to overcome the challenge brought on by the floods was overwhelmed, people immediately expected help from the state. This research indicates that while the words for rights and entitlements were not used, citizens saw the cash transfers

through ATM cards – the Watan and Pakistan Cards – as a fundamental right. A certain minimal disaster response is already conceptualised as an important part of citizenship in Lower Sindh.

Drivers

The internal context within Pakistan, especially Sindh was enabling and allowed a range of socio-political factors to be catalysed by the flooding disaster of 2010 and 2011. The principle factor among these was that the centre-left government of Pakistan People's Party (PPP) had been elected into office in 2008, in the first democratic elections to be held in the country, after nine years of military rule. The PPP leadership, the Bhutto family, is Sindhi and also seen to be particularly sympathetic to the interests of its working class and rural vote bank. The political environment in the country when the banks of the Indus River were first breached by flood waters was one where large scale state interventions were being implemented to address poverty and vulnerability amongst the most marginalised and excluded populations. In addition to the state directly reached out to address people as citizens through various social and technological changes creating civic and social spaces for change.

An enabling international environment also helped to drive this momentum. Over the last decade governments in the Global South have been reaching out to marginalised and vulnerable citizens through state interventions, such as *Bolsa Familia* (Brazil), *Oportunidades* (Mexico) or even the *National Rural Employment Guarantee Scheme* (India). In such a global political climate the World Bank, an institution that holds considerable sway in Pakistan's economic policies also supported rather than blocked this transformative trajectory in state-citizen relations.

Outcome

The outcome of this intervention was that the state was able to engage citizens, demonstrating their stake in a modern state. The disaster citizenship that emerged in the aftermath of the 2010 and 2011 floods also resulted in a more long-term and extensive transformation. Despite the National Disaster Management Act of Pakistan shying away from declaring disaster response an entitlement or a right of citizenship, the discursive framing of the state's interventions in the post-disaster context were commonly being constructed by people in Lower Sindh as a right. Once disaster response or state led adaptation interventions are understood as a right, they cannot be taken back, making this post-disaster moment a truly transformative one in post-independence Pakistan, extending perceptions and understandings of citizenship rights as well.

4. Niger: A moment of critical reflection transforming development and humanitarian practice

This case study illustrates how the intersection of two processes – incremental changes in Niger and wider discursive debate in the international aid system—led to a moment of critical reflexivity within the Save the Children organisation, focussed on the future of responses to slow-onset shocks. It demonstrates how the organisation was able to use this moment to consolidate and realign incremental change processes towards a transformational agenda. Delving into the case study of Niger, it highlights the complexities and challenges faced as such an undertaking unfolds.

Context

Niger is a landlocked country situated in the Sahel eco-climatic zone of West Africa. It is impacted by a number of natural hazards including recurrent droughts, floods and locust invasions. It can experience extreme fluctuations in the price of staples and in terms of trade and has seen a general degradation of traditional coping mechanisms. In times of stress, vulnerable households may resort to strategies such as removing children from school, unplanned migration and forced changes in livelihood that can have immediate and long-term consequences for individual, household and community wellbeing. These challenges are intensified by longer-term processes of change including climate change, population growth (currently at 3.8% per annum) and urbanisation (currently at 4.9% per annum) (World Bank 2012; UN DESA 2011). Facing socio-economic and cultural vulnerabilities, women and girls are disproportionately affected.

Since the 1990s, and notably following the food crisis of 2005, there has been a gradual effort by a variety of actors to confront the underlying vulnerabilities associated with slow-onset shocks in Niger. While this change has taken place across a variety of sectors from social protection to nutrition to livelihoods, the case of early-warning provides a central and representative example of the pathway through which broader change has taken place.

Actors
Save the Children has been operating a country programme in Niger since its response to the food crisis of 2005. During this time it has engaged in multiple development programmes and humanitarian responses, including the subsequent food shocks of 2008, 2010 and 2012. Throughout this time the organisation has worked with a number of actors such as the Nigerien Government, the national early-warning system (SAP), regional bodies (e.g. CILSS), UN structures, research bodies (e.g. Aghrymet) and other NGOs on improved approaches to slow-onset shocks. Parallel to the work being undertaken in Niger, at the international level, Save the Children also has teams engaging in technical programmes, policy, advocacy and humanitarian research and debates related to slow-onset shocks.

Drivers
Slow-onset shocks such those related to food insecurity in the Sahel are not a new phenomenon. In Niger, in recent years, major events have impacted the country in 2005, 2008, 2010 and 2012. Developments in the international humanitarian system and governments' ways of working have demonstrated incremental changes in the institutional and organisational management of these shocks, but nonetheless, studies have pointed to a marked increase in numbers affected in recent years (Bailey, 2013). Amidst these currents of incremental adjustment, large-scale events such as the drought in the Horn of Africa in 2010-2011, Haiti earthquake in 2010, Pakistan floods of 2010, and Sahel drought of 2013 led to increasing discursive attention within the international aid system focussed on the continuous failure to adequately respond to these crises.

Outcomes
Drawing on the incremental programmatic experience in country programmes and provoked by the large-scale events described above, a cross-divisional international task team within Save the Children was formed known as the Slow Onset Task Team (SOTT). This group has drawn together personnel from multiple divisions (development, humanitarian, advocacy, etc.) in order to reflect on the root challenges of slow-onset shocks and to develop an agenda to better address them. Four Activity Strands outlined by this process, are currently being advanced within the Niger country programme:

A) Improving internal (Save the Children) Early Warning and Response Systems: Save the Children in Niger has been working to develop the processes and procedures for a flexible delivery platform that is capable of adapting programming in the event of deteriorating situations.

B) Strengthening external (national, regional and global) Early Warning and Response Systems: Working in partnership with the Government of Niger, UN structures and other NGO actors, Save the Children has been supporting to develop a harmonised local level early-warning information system that can provide high resolution information on degrading food and nutrition security across the country.

C) Bridging the relief-development gap through flexible programme design: Linking together early-warning information (B) with processes and procedures for a more effective decision making in slow-onset shocks (A) plans are underway to operationalise a flexible delivery platform in programmes and activities.

D) Promoting reform of the international humanitarian system: Experiences from this process of change are being shared with national and regional bodies and forums to foment further reaching change.

These efforts to transform development visions and trajectories related to slow-onset shocks in Niger permits several reflections on the challenges, constraints and opportunities that can arise as an actor works to undertake an intentional agenda of transformational change.

External events can create opportunities for critical reflexivity within an organisation. Whilst significant of their own accord, the existence of ongoing processes of incremental change can help an organisation to use these moments to consolidate and redirect change towards a transformational agenda. Within Save the Children, shocks in the Horn of Africa and Sahel opened a discursive space for critical reflection on slow-onset emergencies. Establishing a cross-divisional task-team at the international level (The SOTT), the organisation was able to build on incremental changes already occurring related to early-warning information systems in Niger and redirect these to a transformational agenda.

In undertaking a transformational change agenda, the speed of change in some spaces may need to be brokered with other change agendas to accommodate wider system outcomes. To achieve an institutional transformation with regards to having a slow-onset capable delivery platform, Save the Children could have developed its own independent early-warning information system relatively quickly. However, to ensure that sustainability of the local early-warning information system and to guarantee ownership by the national government and local actors, it was important to delay this process. Had this process not been followed, the transformation of institution could have occurred but at the expense of a transformation in the broader system. Accordingly, change champions may need to broker agendas and prioritise activity spaces.

There can be challenges in adopting change within an organisation due to institutional legacies and processes. In Niger for instance, the development of a flexible delivery platform within Save the Children required reflection on the possibility of retrofitting programmes with new processes or if flexibility could only be applied to new grants. Furthermore, other organisation wide essential standards such as the requirement to develop emergency contingency plans (known as Emergency Preparedness Plans (EPPs)), were found to overlap with planned work, creating possible redundancies in contingency planning activities.

Investing financial and human resources can be essential for bringing about transformational change. As seen in the case of Save the Children's investment to kick-start the local early-warning systems, this initial seed funding need not be substantial, but without it change may be slow to start. Given priorities and time constraints of existing staff, it can also be very helpful to invest in human resources that can be dedicated to advancing the change agenda. Additionally, it is important to acknowledge that financing a transformational agenda may require a bricolage of complementary funds. Internal 'breakthrough funds' contributed to the work on 'sentinel sites' while an ECHO funded project supported the work on response analysis and slow-onset processes and procedures. In order to capitalise on different funding opportunities and to stitch these together coherently, it is important that there is an overarching vision of change.

Finally, to effect transformational change in development trajectories, visions and outcomes the role of donors is of central importance. The disconnection between humanitarian and development funding mechanisms means that there are often gaps in programme finance. In cases of chronic insecurity, long-term development programmes often do not exist, and where they do, they do not normally have the capacity to respond to changing circumstances. Long-term finance is necessary to realise the types of change outlined in this case study as is flexible finance that allows for crisis modifiers in the case of degrading situations. Without major reforms in donor approaches towards funding for early, preventative action, scope for deep-rooted change will be impaired. Case studies demonstrating effective interventions and studies into the cost-effectiveness of early and preventative approaches may be tools for successful advocacy with donors in these areas.

5: New York: Public transit systems and pathways to transformative flood control strategies

Transportation systems are in many ways the infrastructural backbone of a region's economy. The Metropolitan Transportation Authority (MTA) operates the transit system for New York City (NYC) and the surrounding region. The MTA operates on more two thousand miles of track and carries more than 2.6 billion passengers per year. The focus of the case study is on empirical or inferential examples of where flood control strategies as disaster risk reduction (DRR) trigger two types of social-political transformations—defined here as process and product transformation.

Context

A large fraction of NYC and the surrounding infrastructure lies less than ten feet above mean sea level. The transit infrastructure in these areas is vulnerable to inundation during major storm events due to coastal surges and inland flooding caused by concurrent rainfall that is prevented from draining to the sea by the accompanying surge. Prior to the industrial revolution, sea level had been rising along the East Coast of the United States at rates of 0.35 to 0.43 inches per decade. Currently, rates of sea level rise in the NYC metropolitan region range between 0.98 and 1.57 inches per decade, with a long-term rate for NYC from 1901 to 2006 averaging nearly 1.2 inches per decade (NOAA, 2012). Prior to Irene and Sandy, on August 8, 2007 a severe and largely unpredicted thunderstorm swept through the city resulting in major and in some areas prolonged service disruptions of the MTA's transit system. Three and a half inches of rain fell in 2 hours. The heavy rain overwhelmed the regional drainage system along with the MTA pumps that were designed to handle no more than 1.75 inches per hour.

The flash flooding rendered almost the entire subway system inoperable, affected over 2 million transit users, and caused significant economic losses that day because employees and customers could not get into the city's central business districts. Suddenly the prospect of climate change impacts seemed more immediate and relevant to the everyday. The trajectory of economic development within the City was unaffected but policy leaders became alerted to the potential connection between climate change and economic loss. The event became a policy window for the initiation of climate change adaptation policy in NYC and marks a transition in the city's climate action (Solecki: 2014).

Actors

> "I strongly believe we have to prepare for what the scientists say is a likely scenario. Whether you believe climate change is real or not is beside the point - we can't run the risk. And as New Yorkers, we cannot and will not abandon our waterfront. It's one of our greatest assets. We must protect it, not retreat from it." Mayor Bloomberg, Announcing the Special Initiative on Rebuilding and Resiliency report, 11 June 2013

Flooding and climate change discourses have evolved over the last two decades. Government agencies began to include more climate change-driven considerations into decision-making. Particularly important were several flooding and storm events such as the August 8, 2007 intense rainstorm, which caused flooding and damage to many components of the MTA transit system. At the same time, then Mayor Michael Bloomberg convened the New York City Panel on Climate Change and the Climate Change Adaptation Task Force to develop adaptation strategies for critical infrastructure—including the transit system. In August 2008 Mayor Bloomberg announced the creation of the New York City Climate Change Adaptation Task Force, a group made up of representatives from the city's Departments of Environmental Protection, Planning, Public Health, and Transportation, among others, as well as state and regional transportation agencies including the MTA and private railroad and telecommunication companies. The primary focus was on what steps could or should be taken to ensure the continued function of the city's critical infrastructure. The effort was defined as "…one of the most comprehensive and inclusive strategies ever launched to secure a City's critical infrastructure against the effects of climate change" (NYC Office of the Mayor, 2008). At the same time, the Mayor brought together the New York City Panel on Climate Change (NPCC). The panel was composed of experts from the academic, legal, insurance, and engineering sectors and was convened to advise the Climate Change Adaptation Task Force (CCATF) on the development of adaptation strategies to

secure the city's infrastructure from the effects of climate change. The CCATF included representatives from the MTA and other regional transit agencies and private railroad companies.

The 2010 report of the NPCC established the foundation for climate change adaptation in NYC and guided the Adaptation Task Force members in their climate change adaptation planning process. The recommended climate action focused on the concept of Flexible Adaptation Pathways allowing decision-makers and stakeholders to adjust their plans and activities as new and assumedly more sophisticated science information emerges in the future. Other important elements of the NPCC efforts included developing potential adaptation decision tools and processes to evaluate existing codes and standards and discern whether they need to be adjusted in the face of climate change.

A significant barrier for promoting resiliency and adaptation rests with the complex nature of cities and their extended metropolitan regions, and the administration of urban transit systems and other critical infrastructure. Coordination across these different organizations and associated constituencies is inherently difficult. In such a highly differentiated system landscape, the capacity to develop and implement integrative adaptation plans can be limited. For NYC, a city quite advanced in climate adaptation, the post-Hurricane Sandy resiliency and adaptation planning did not include comprehensive and detailed strategies because the transit system (the MTA) in the city is operated by the state of New York - a distinct governmental entity which was to receive separate post-disaster federal aid. Another barrier, potentially the most profound, is that elements of MTA operations do not formally recognize this as part of a long-term trend and broader-scale climate change (Solecki 2014). It was stated that within many offices especially those associated with facilities operations, the bulk of employees remain sceptical regarding the reality of long-term climate change and in general the term 'climate change' currently is not widely discussed in the context of planning, management and operation. Climate resiliency to extreme weather and climate events has given climate change discussion some purchase within the agency, and it has helped foster the development of newly constituted climate change advisory taskforce with the MTA.

The linkage between short term and long term planning was hampered by the MTA administrators, who were mostly focused on the effects of extreme events and climate variability that could disrupt or influence their systems now, rather than on risks more distant in the future. While the administrators recognized that future climate change would involve greater temperature and precipitation shifts, a variety of factors including the traditional focus of transit agencies operations and management on near-term timeframes (next 10 to 20 years) and the general lack of confidence in long-term climate projections and the uncertainties associated with them forced attention to be on the short-term.

Drivers

Hurricane Irene (August 2011) resulted in extensive flooding into distant suburban and exurban areas north and west of NYC and slight storm surge flooding in the City itself. It caused approximately $65 million USD of damage for the MTA and most important the loss of a section of commuter train line north of NYC from a rain-induced railway bed washout (MTA, 2012). Fourteen months after Irene, Hurricane Sandy hit the metropolitan region causing catastrophic damage, the most significant of which came from a record storm surge and coastal flooding. In the aftermath of Hurricane Sandy, Mayor Bloomberg created the Special Initiative of Rebuilding and Resilience (SIRR) and reconvened the NPCC. The SIRR focused on assessing the damage from Sandy, understanding how future climate change might influence the level of coastal risk, and promoting resiliency efforts in the City's neighbourhoods most at risk to current and future flooding. The SIRR released its report in June 2013 and the NPCC released its climate projection updates at the same time.

Hurricane Sandy dealt New York's transit system a massive blow resulting in approximately $4.75 billion USD of damage (MTA, 2013). Almost all of the major underground transit (subway) tunnels flooded with the record storm surge. The majority of systems were shut down for the remainder of the workweek after the landfall of Sandy on a Monday evening. Significant loss and damage reduction resulted from the fact that the entire transit system was closed well in advance of the storm's full

impact and that mobile assets such as subway rail cars and buses were relocated to higher elevation sites away from storm surge zones.

Outcomes

Extreme events constitute learning opportunities to review all aspects of the transit system's operation and management including an assessment of every individual's responsibility during a system crisis. While it is clear that many of the extreme events which impacted the MTA system in the past decades have led to advances in disaster risk reduction operations and management, the post-disaster learning process has been ad hoc and incomplete and has not taken advantage of all the possible lessons for future action. The story of the South Ferry station is an interesting case in point. From 2005-2009, an extensive construction took place and a nearby new South Ferry station was opened at a cost of $527 million USD. Renovated without extensive thought to storm surge and flood risk, the new station was severely damaged from Sandy flooding, Roughly six months after the storm the MTA reopened the mothballed old station to provide service at the site and began the process of restoring the new station at an estimated cost of an additional $600 million USD. A crucial question, yet to be fully answered, is to what extent is the new information on dynamic climate risk including accelerated rates of sea level rise and increased flooding periodicity are being integrated into the current efforts. A strong commitment to rebuild and restore is evident through the MTA, the City and the state Governor's office. Yet, the connection between rebuilding, restoration and resiliency to future climate change is not well defined (MTA 2012, MTA 2014).

The mantra of the post-Sandy era in the New York Metropolitan Region has been one of defiance – "no retreat" and "stronger than the storm." The disaster risk reduction and climate change adaptation strategies that have emerged reflect these sentiments. It is during the year and half since Sandy that discussion and action with respect to redevelopment of the storm surge affected areas has begun to emerge. Parallel to this process has been an examination of the role and importance of public transit in advancing disaster risk reduction but also implicitly with respect to potential development shifts.

The reclaiming of the waterfront for recreation and residential development will be one of the great legacies of the Bloomberg era. The water's edge was heralded as a great amenity just at a time that the vulnerability of the waterfront to storm surge and sea level rise became more widely understood. Hurricane Sandy dramatically accelerated this understanding. After the hurricane it was recognized that during an extreme flooding event the NYC's vital transit lifelines and infrastructure were highly susceptible to disruption and that the shoreline areas particularly of the outer boroughs (those excluding Manhattan) were especially at risk. When Sandy struck, the Jamaica Bay and the Rockaway Peninsula area maintained a disproportionate share of the public housing and government-run senior citizen housing, and mental health/special medical service facilities, as well as some of the most disadvantaged populations in the city. These regions were significantly affected by Sandy and not only by the immediate storm surge and damage but also by the relatively slow pace of recovery. Several months after the storm while almost all public services and businesses were back in operation in other parts of the city, these areas continued to suffer with stores shuttered and residences uninhabitable. While the focus has been on helping residents rebuild and promote resiliency, in many cases, the financial assistance was slow in coming or not sufficient.

The impact of Sandy in these most vulnerable neighbourhoods has fostered a public discussion of the long-term future for these locations. While arguing that options other than retreat should be available and that new construction must be more resilient, the process of redevelopment has raised issues of public policy, equity, and public participatory governance, and a possible re-imagining of these coastal areas. For example, discussion has emerged on whether the public housing and government senior and health service facilities should be relocated away from the shore and on how to provide a revised flood insurance mechanisms which will provide benefits to home owners who put into place flood resilience measures. Simultaneously, an ongoing push within the city for public participatory budgeting was greatly accelerated by recovery debates that followed Sandy within some of the most affected neighbourhoods. Community meetings and opportunities for communities to make decisions regarding redevelopment funds and in some cases to seek a government buy-out for their

neighbourhoods were part of the post-Sandy experience. These processes can be connected to a broader set of shifts in New York that are promoting increased use of citizen science data collection and analysis and principles of enhanced localism (e.g., a focus on locally sourced food, distributed alternative power generation, and reduced commuting distances).

The full outcome of these pressures has yet to be realized, but influencing all are market forces. Hurricane Sandy revealed that many communities at the water's edge, distant from the urban core and lacking good transit access were also highly at risk to flooding. The need for heightened resiliency and redevelopment was clear. Providing better transit access and more new flood protection structures were seen as mechanisms to provide added value to otherwise relatively high amenity value waterfront adjacent locations. In this situation, transit is used a mechanism to promote disaster risk reduction and economic growth. The questions that remain are: will the redeveloped neighbourhoods still have places for their less economically advantaged residents or will the resiliency-driven construction spur a process of gentrification and set in motion larger social-political transformations that create new risk profiles in advance of the next storm?

5. Discussion: In what circumstances can disaster risk management open space to address accumulated development failures or gaps?

This section discusses the key findings from the report case studies. Results are summarized in Table 3 which draws out six key characteristics of transformation introduced by our conceptual framework. Each case study presents a distinct historical context and development trajectory but common lines of influence can be seen that can help derive some core principles for the interaction of disasters and risk management with development.

Table 3: Pathways for Transformation

Indicators of Transformation	Christchurch	New York	Sundarbans	Sindh	Niger
Disruption	**Yes** to physical infrastructure, local economy, population and development narrative	**Yes** to infrastructure performance and physical assets and business continuity	**Yes** to life and livelihoods	**Yes** to life, livelihoods and infrastructure	**Yes** to lives, livelihoods and organisational efficacy
Intense actor interaction	**Yes**, at local and national levels.	**Yes**, between administrative interests	**No**, strategy is isolated by sector and scale	**Yes**, at the technical level	**Yes**, within the INGO, donor communities and government
External intervention	**Yes**, increased central state and corporate private sector in reconstruction and Maori led initiatives	**Yes**, from science in planning for future risk	**No**, firmly set within state and national risk management and development planning	**Yes**, with expert interventions	**Yes,** shaped by external thinking.
Triple loop learning	**Yes**, insertion and enactment of Maori values in response and reconstruction	**No**, focus on efficiency not major redesign or revised social role for transport.	**Yes**, amongst household livelihood and identity	**No**, mode of delivery and extension of citizenship.	**Yes**, new orgsanisation goals and processes to reduce risk.
New forms of coping	**Yes**, emergent social forms	**Yes**, new technology and user management investigated to	**Yes** amongst households and for individuals	**Yes**, based on new entitlements claims	**Yes**, new organisational forms and processes

		enhance future risk management	who meet adaptation limits		under development.
Failure of institutions	**Yes**, new legislation in place	**No**, institutions robust and flexible	**Yes**, at the household level but reinforcing state level	**No**, institutions robust and flexible	**Yes**, at the organisational, government and policy community level.

Pathway competition: The Christchurch event provides a clear of example of two development models coevolving. Liberal and Maori response and reconstruction efforts have involved individual and structural transformations. Both approaches have their roots in pre-earthquake society and both have gained ground in the response and reconstruction period. However, the discourses around each trajectory and their methods of operation are distinctive (centralization and the introduction of public-private partnerships compared to collective and communitarian action), potentially conflictual. Both also challenge some of the institutional foundations of New Zealand's Anglophone and welfare state oriented social democracy. These two pathways seem to be pulling in contrasting directions, towards more market oriented and collectivist development strands. Legislation, organizational structures and social development interventions institutionalise these pathways producing an increasingly multifaceted development trajectory post-earthquake.

Pathway experimentation. Planned, technological and administrative reforms can allow for controlled opening of potentially transformative social and political space. The New York and Sindh cases both led with technological innovation. Both provide scope for a controlled experimentation with social change processes without commitment. In New York, planned revision of public transit may include significant redesign and revision of transport management structure. In Sindh, cash transfers extended citizenship rights, claims and stakes. Both the Christchurch and the Niger case consider the management of the pace of change. Time compression in response to the Canterbury earthquake sequence constrained involvement of the community and local government actors in response. In contrast, and perhaps because changes have unfolded in a pre-disaster space, the Niger case has explicitly identified the need for critical reflection and consideration of a range of alternatives, allowing time for diverse actors to engage with the change process.

Pathway scale effects. Perhaps the clearest experience across the case studies is the tendency for the local level to carry the weight and costs of transformation. In the Sundarbans scale effects were not planned. Households self-transformed using migration as a survival and development strategy faced with region wide flood risk. The resulting population movements supported regional strategies for depopulation. Scale effects can also be reversed. In Niger, purposeful local but incremental action by Save the Children changed operating procedures and goals with a view to transforming the delivery of drought and food crisis management. In New York discussion of risk management combined with gentrification of water front neighbourhoods shows just how tightly coupled development trajectories for risk management can be to urban planning.

Pathway lock-in. Institutional structures are designed to be resistant to organisational transformation. Transformation is most likely when multiple local and external actors are aligned, in critique of established systems elements,

Distinctive, disruptive drivers resulting from disasters of differing scales characterise all cases: In the Sundarbans the failure to open a transformational policy space to support transforming households has constrained space for institutional transformation. This increases the likelihood that self-transformation at household level may have negative outcomes for those electing to pursue it. Environmental actors such as WWF and IUCN may see out-migration in the Sunderbans as an attractive demographic transformation in line with their preference for depopulation and conservation in the region.

By contrast the Canterbury earthquakes have proved a driver for transformation at organisational level, potentially shifting development trajectories, but for whom, and in what ways? The shift towards centralised and de-bureaucratised decision-making represents an institutional transformation. A further institutional transformation has resulted from awareness of the response strategies of the Māori, leading to the involvement of local tribe Te Rūnanga o Ngāi Tahu as a partner, a new departure in disaster risk management. It is not clear at this stage whether these institutional transformations have led to significant adjustment of core developmental pathways.

Hurricanes Sandy and Irene in New York created dramatic disruption, but the institutional structures under consideration appear more resistant to organisational transformation than was the case in Canterbury. The complex array of interlocking institutions displayed 'institutional interlock' limiting the effect of the disruptive events, on their behaviour. The study questions, for example, whether climate change information has been taken account of in the expensive reconstruction of South Ferry station after serious damage due to Sandy. The then Mayor's strident statement that "… as New Yorkers, we cannot and will not abandon our waterfront. It's one of our greatest assets. We must protect it, not retreat from it." represents an institutional schema defining the direction of development. As in the Canterbury case the impact of these incipient transformations may be negative to the local populations, who in both cases may have reduced voice or agency. The underlying question, as David Harvey (2012) poses, is about who gets to shape and define the city.

Agency amongst local actors is displayed in Pakistan, where external institutional pressures from the World Bank have played a part in triggering innovative cash payments via Watan cards, which have in turn influenced discourse at the local level, increasing individuals' awareness of rights. This signals a potential shift in the social contract which may redirect the development pathway.

Moving away from external disruptions, can institutional structures transform themselves intentionally? In the Nigerien case the prevalence of slow onset disasters has triggered an intentionally transformative response. The key question is whether the transformative outcome matches intention, and who the transformation benefits. The study anticipates the possibility of a transformative change breaking down the humanitarian/development barrier impairing effective developmental response but it is yet to be seen whether this historically intractable barrier can be removed.

The Sunderban case study documents not only the impact of Aila, but the increasingly unsustainable lifestyle resulting from the impacts of climate change. Similarly in Niger livelihoods are fragile, though the precise impact of climate change is less clear (UNEP: 2006, Black et al 2013). In both cases a key determinant of transformative outcomes in response to vulnerability and disaster is the responsiveness of institutions. The phenomena of institutional lock-in was identified in the New York case, and the authors of the Nigerien case study note that the need to manage the pace of anticipated organisational change must be adapted to take account of the variable responsiveness of institutions. Deeper anticipated transformation in that case –merging humanitarian and development workstreams and funding – is yet to emerge.

Returning to the Sunderbans, interlocking institutional goals appear to leave the most vulnerable groups with their only option as out-migration from the area. A more transformative outcome is seen in the Sindh, which benefits from the conjunction of a responsive government with specific local ties, the existence of models of direct financial support from other countries, support of the World Bank and the active engagement of communities.

From across the case studies two overarching themes emerge, and reinforce observation made elsewhere in the wider literature: (1) transformation is resisted by established institutional frameworks, (2) transformation is dependent on the relative influence of multiple actors.

6. Conclusions

The core question put to this study – can we observe decision-making processes that lead disaster risk management strategies to impact upon underlying development trajectories can be answered firmly in the positive.

The study has shown that the interaction between disasters, disaster risk management and underlying development trajectory can be both incidental and purposeful. The majority of observed transformations were local – found at the level of households or in organisational decision-making. Even when policy led transformation was also observed to be targeted at affecting strategic change this was worked through in local policy for land-use management, local governance and economic development.

The study has drawn out the importance of policy as a driver of transformative change but more significantly the case studies presented show the potential for individuals and population level behaviour and of organised civil society as agents of transformation. This is a fundamental observation and opens questions on the scaled distribution of the burden of undertaking transformation.

A better awareness of cross-scale interactions as well as cross-sector communication as key determinants of transformative potential and in the distribution of possibilities and trajectories speaks directly to the two likely future scenarios for disaster risk. First where risk becomes more extensive: here as we see from the Sundarbans, Niger and Sindh while extensive risk impacts on widely distributed population's adaptation will be at the household level and it is here that adaptation limits will be reached and forced transformations undertake. It is important that policy actors and institutions are able to anticipate this and prepare to support forced transformation. Such preparations, as Save the Children and the Pakistan Government have found are not easy and not always predictable in their outcomes. The ways in which risk managers have been able to develop anticipatory policy and hedge to contain the unexpected impacts of policy in the transformation solution space are new priorities. Second, as urbanisation and population growth continue and assets become more concentrated so the risk of major catastrophe increases in scale and geography. The likely policy response here is for investment in large scale engineering or social protection schemes. Macro-management also offers scope for transformation – from land-use and market behaviour to the decision-making process itself. Managing risk at scale has been left out of discussions on the procedural justice which have concentrated on local and NGO led activities. This is a missed opportunity and one that will become increasingly evident and risk management scales up to meet likely future challenges.

In providing a first systematic analysis of transformative potential in disaster risk management, the report arguably opens more questions than it can resolve. Next steps at shaping a policy agenda for transformative risk management include:

- What kind of disruption is required to open transformative action?
- How do existing structures and dominant actors behave when faced with potential transformation?
- How best to anticipate and steer transformative pathways to avoid collateral costs, especially to the poor and vulnerable?

This new policy agenda can build on the substantive findings of this study which finds that transformative disaster risk management is:

- instrumental and spontaneous,
- delivered by individuals and in aggregation at the level of population
- led by national and international actors, across the public sector and civil society, and
- felt most strongly at the local level.

References

BERA, M. K. (2013). Environmental refugee: A study of involuntary migrants of Sundarban islands.

BLACK, R, KNIVETON, D AND SCHMIDT-VERKERK, K. (2013). 'Migration and Climate chance: toward an integrated assessment of Sensitivity' in Faist, T and Schade. J (eds.), Disentangling Migration and Climate Change,Springer Science

BLACKBURN, S. personal correspondence, 20 July 2014

CERA CANTERBURY EARTHQUKE RECOVERY AUTHORITY, CHRISTCHURCH CITY COUNCIL and TE RŪNANGA O NGĀI TAHU. (2012b). *Christchurch Central Recovery Plan Te mahere 'Maraka Ōtautahi'*. Christchurch: Authors.

CHRISTENSON, C AND RAYNOR, M. (2013). 'The Innovator's Solution: Creating and Sustaining Successful Growth.' Harvard Business Review Press

CHRISTOPLOS, I. RODRÍGUEZ, T.E. SCHIPPER. L.F., NARVAEZ, E.A., BAYRES MEJIA, K.M., BUITRAGO, R., GÓMEZ, L. and PÉREZ, J.E. (2019) 'Learning from recovery after Hurricane Mitch'. Disasters, 2010, 34(S2): S202−S219.

CLEMENS, E.S and COOK, J,M. (1999). 'Politics and Institutionalism: Explaining durability and change' Annual Review of Sociology, 25:441-66.

DFID (2011) 'Defining Disaster Resilience'. Accessed at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/186874/defining-disaster-resilience-approach-paper.pdf

EERI, EARTHQUAKE ENGINEERING RESEARCH INSTITUTE. (2011). "The M 6.3 Christchurch, New Zealand, Earthquake of February 22, 2011". Learning from Earthquakes. EERI Special Earthquake Report. Oakland, CA: Earthquake Engineering Research Institute. http://www.eeri.org/site/images/eeri_newsletter/2011_pdf/EERI_NewZealand_EQRpt_web.pdf

ELLMAN, M. (1997). 'The Political Economy of Transformation' Oxford Review of Economic Policy (1997) 13(2): 23-32.

EM-DAT (2014) 'Estimated damage (US$Billion) caused by reported natural disasters 1975-2012' Accessed at: http://imgur.com/a/KdyTV#4

GAVENTA, J. (1980) 'Power and Powerlessness: Quiescence and Rebellion in an Appalachian Valley'. University of Illinois.

GAVENTA, J. (2005) 'Reflections on the use of the power cube approach for analysing the spaces, places and dynamics of Civil Society participation and engagement. MFP Breed Network, the Netherlands'. http://www.partos.nl/uploaded_files/13-CSP-Gaventa-paper.pdf. (Accessed 4/05/2011).

GHOSH, A., (2012) Living in Changing Climate, Centre for Science and Environment (CSE), New Delhi

GHOSH, A., (2012) *"Indian islanders seek jobs, husbands outside sinking Sundarbans,"* Reuters Alert Net, Trust, accessed on July 16, 2014

HARVEY, D. (2012) 'Rebel Cities' Verso, London

HEWITT, K (ed) (1983) Interpretations of Calamity, London, Allen and Unwin.

HUDSON, J. and HUGHES, E. (2007). The role of Marae and Māori communities in post disaster recovery: A Case study, *GNS Science Report, 2007/15*, GNS Science, Wellington, New Zealand.

IPCC (2012) 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, Field, C.B., 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, and P.M. Midgley (eds.), Cambridge University Press, Cambridge, UK, and New York, NY, USA.

JADHAV, S. K., and MUNOT, A. A. (2009). Warming SST of Bay of Bengal and decrease in formation of cyclonic disturbances over the Indian region during southwest monsoon season. Theoretical and applied climatology, 96(3-4), 327-336.

JALAIS, A. (2010). *Forest of Tigers: People, Politics, and Environment in the Sundarbans*. Routledge.

JALAIS, A. (2007). The Sundarbans: whose world heritage site? Conservation and Society, 5(3), 335.

KENNEY, C.M., PATON, D., JOHNSTON, D., REID, J. and PHIBBS, S. (2012). Addressing Risk and Resilience: An analysis of Māori communities and cultural technologies in response to the Christchurch earthquakes *IDRC Davos 2012 Integrated Risk Management in a Changing World – Pathways to a Resilient Society Conference Papers Compendium*, 373-376.

KING, A., MIDDLETON, D., BROWN, C., JOHNSTON, D., and JOHAL, S. (2014) Insurance: Its Role in Recovery from the 2010–2011 Canterbury Earthquake Sequence. Earthquake Spectra: February 2014, Vol. 30, No. 1, pp. 475-491.

LONG, N. (2001) 'Development Sociology: Actor Perspectives'. London: Routledge

LONG, N. (2002) 'An Actor-oriented Approach to Development Intervention'. Background paper prepared for APO Meeting. Tokyo 22-26

MATYAS, D. amd PELLING, M. (2014) 'Positioning Resilience for 2015: An Elaboration of Resistance, Incremental Adjustment and Transformation in the DRM Policy Landscape' Disasters (in press)

MITRA, A., GANGOPADHYAY, A., DUBE, A., SCHMIDT, A. C., and BANERJEE, K. (2009). Observed changes in water mass properties in the Indian Sundarbans (northwestern Bay of Bengal) during 1980–2007. Current Science, 97(10), 1445-1452.

MOSSE, D. (2004) 'Is Good Policy Unimplementable? Reflections on the Ethnography of Aid Policy and Practice'. Development and Change 35(4): 639–671

MOUSAVI, M. E., IRISH, J. L., FREY, A. E., OLIVERA, F., and EDGE, B. L. (2011). Global warming and hurricanes: the potential impact of hurricane intensification and sea level rise on coastal flooding. Climatic Change, 104(3-4), 575-597.

MTA. (2014). Restoring South Ferry Station. http://web.mta.info/nyct/service/RestoringSouthFerryStation_11_19.htm.

MTA. (2013). Governor Cuomo Announces Additional Federal Sandy Recovery Funds. http://web.mta.info/nyct/service/cuomo_130524.html.

MTA. (2012). MTA: Tropical Storm Irene cost agency $65 million. ABC Eyewitness News. http://abclocal.go.com/wabc/story?section=resources/traffic&id=8789084.

MUKHOPADHYAY, A. (2009). On the Wrong Side of the Fence: Embankment, People and Social Justice in the Sundarbans. *Social Justice and Enlightenment: West Bengal*.

National Oceanic and Atmospheric Administration (NOAA). (2012). Sea Level Rise and Coastal Flooding Impacts. http://www.csc.noaa.gov/slr/viewer/.

BLOOOMBERG (2008) Mayor Bloomberg launches task force to adapt critical infrastructure to environmental effects of climate change. NYC Office of the Mayor.

NANDY, S., and BANYOPADHYAY, S. (2011). Trend of sea level change in the Hugli estuary, India. *Indian J. Mar. Sci*, *40*(6), 802-812.

NIELSON. M. (2010) Mimesis of the State Social Analysis, Volume 54, Issue 3, 153–173

OSTROM, E. (1990) 'Governing the Commons: The Evolution of Institutions for Collective Action (Political Economy of Institutions and Decisions)', Cambridge University Press.

PATON, D., JOHNSTON, D., MAMULA-SEADON, L. and KENNEY, C. (2014). Recovery and Development: Perspectives from New Zealand and Australia, in *Disaster & Development: Examining Global Issues and Cases* (pp. 255-273). N. Kapucu, & K. T. Liou, (Eds.), New York, NY: Springer.

PETHICK, J. and ORFORD, J. D. (2013) Rapid rise in effective sea-level in southwest Bangladesh: Its causes and contemporary rates. Global and Planetary Change, 111, 237-245.

PELLING, M. (2011) 'Adaptation to Climate Change: From Resilience to Transformation'. London: Routledge

PELLING, M. AND DILL, K. (2010) Disaster politics: tipping points for change in the adaptation of sociopolitical regimes, Progress in Human Geography, 34 (1), 21-37.

PELLING, M and MATYAS, D. (2011) 'From resilience to transformation: the adaptive cycle in two Mexican urban centres', Ecology and Society, 16 (2) [online] URL: http://www.ecologyandsociety.org/vol16/iss2/art11/

PELLING, M., O'BRIEN K. and MATYAS, D. (2014) 'Adaptation and Transformation'. Climatic Change, submitted.

PREETHI, B., REVADEKAR, J. V., and MUNOT, A. A. (2011). Extremes in summer monsoon precipitation over India during 2001–2009 using CPC high-resolution data. International Journal of Remote Sensing, 32(3), 717-735.

RAHMAN, A. F., DRAGONI, D., and EL-MASRI, B. (2011). Response of the Sundarbans coastline to sea level rise and decreased sediment flow: A remote sensing assessment. Remote Sensing of Environment, 115(12), 3121-3128.

ROYAL COMMISSION ON SOCIAL POLICY. (1987). The Princples of the Treaty of Waitangi. In *The Royal Commission on Social policy: Te Kōmihana A Te Karauna Mo Ngā Āhuatanga-A-Iwi. Discussion Booklet No. 1* (pp.4-5 and pp.14-23). Wellington: Royal Commission on Social Policy.

ROYAL COMMISSION ON SOCIAL POLICY. (1988). *The April Report. New Zealand Today. Vol 1*. Wellington: Royal Commission on Social Policy.

SOLECKI, W. (2014) Urban transit systems and conditions of enhanced climate variability. Forthcoming

STATISTICS NEW ZEALAND. (2012a). *Census of Population and Dwellings: Table Builder*. Retrieved December 19, 2012, from http://www.stats.govt.nz/tools_and_services/tools/TableBuilder/2006-census-pop-dwellings-tables/culture-and-identity/ethnic-group.aspx

STATISTICS NEW ZEALAND. (2012b). *Interactive Map Boundary*. Retrieved December 19, 2012, from http://apps.nowwhere.com.au/StatsNZ/Maps/default.aspx

TAFTI M.T and TOMLINSON R. (2013) The role of post-disaster public policy responses in housing recovery of tenants. Habitat International, 40, 218–224

TE RŪNANGA O NGĀI TAHU. (2012). *Aoraki Matatū* Annual Report. Te Rūnanga o Ngāi Tahu, Christchurch, New Zealand.

TELFORD, J. ARNOLD, M. and HARTH, A. (2004) 'Learning Lessons from Disaster Recovery: The Case of Honduras. World Bank. Disaster risk management working paper series no. 8. Accessed at: http-//www.preventionweb.net/files/1595_honduraswps

UN DESA (2011). World Population Prospects: The 2010 Revision and World Urbanization Prospects: The 2011 Revisio. Access at: http://esa.un.org/unpd/wup/unup/p2k0data.asp on 26/05/2014

UNEP. (2006) 'Climate change and variability in the Sahel region' accessed at http://www.unep.org/Themes/Freshwater/Documents/pdf/ClimateChangeSahelCombine.pdf

UNISDR: (2013) 'Global Assessment Report'. 2013

UNISDR: (2014) 'Proposed elements for consideration in the Post-2015 Framework for Disaster Risk Reduction'

WILSON, G: (2012) Community Resilience and Environmental Transitions. Earthscan.

WISNER B, BLAIKIE P, CANNON T, and DAVIES I (2004) 'At Risk: Natural hazards, Peoples' Vulnerability and Disaster', Routledge, London.

WORLD BANK (2012). Population Growth (annual %). Access at: http://data.worldbank.org/indicator/SP.POP.GROW on 25/05/2014 on 25/05/2014