17. Disaster Recovery: The particular governance challenges generated by large-scale natural disasters

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I will share some of my reflections on disaster recovery by drawing on lessons learnt from recent international experience. I will focus attention on post-Hurricane Katrina recovery experiences. Since 2005, I have spent a lot of time in Louisiana, for periods of anywhere from two to six weeks at a time on an annual basis, in order to track the recovery process and learn from their experience. I have also conducted fieldwork in Indonesia and the Maldives after the 2004 Indian Ocean tsunami; and have been studying the recovery experience after the 2011 Tohoku earthquake and tsunami in Japan. My goal is to learn from these large-scale disasters to understand the nature of risk better, how to build more effective institutions for risk reduction and post-disaster recovery and, ultimately, how to build more resilient and sustainable communities.

I will introduce the notion of a political ecology of recovery and frame this concept in the context of the 'wicked problem' of post-disaster recovery that presents society with 'wicked choices'. Drawing on examples from disaster experiences around the world, and in particular the post-Katrina and Canterbury earthquake recovery experiences, I will argue that recovery presents a distinctive governance challenge that goes far beyond 'fixing levees' (in the context of the New Orleans levee failure) or bridging fault lines (in the Canterbury context).

The topics I will cover include reflections on disaster narratives and what they teach; the complex challenges of leadership and governance in the face of disaster risk; the political ecology of recovery; responding to and recovering from disasters in ways that build resilience to future shocks; and finally a word or two about future-proofing society.

Hurricane Katrina

You will have seen the graphic televised images of the impacts of Hurricane Katrina on the people of New Orleans and their plight in the face of the dismal response and protracted recovery process. I am sure you are all aware of the many challenges faced by people in this region. Hurricane Katrina was not a 'natural disaster'. It was a natural hazard event that became a human-induced

catastrophe because of failings in the design and maintenance of the levee system that was compounded by the response failure in the aftermath of the flooding of New Orleans. This multifaceted failure continued into recovery.

The immediate drivers of the disaster have historical roots that go back more than 200 years of well-intentioned efforts to 'wrest the city from nature' (Colten 2006). The Mississippi River was channelled, levees were constructed, navigation channels cut through the wetlands and resources exploited as if they were infinite. The construction of the levee system opened up the possibility for suburban development in former swampland. The wetland ecosystems that sustain livelihoods in the region and act as a natural defence against coastal storms have been degraded and transformed over time. To compound matters, more and more people live in harm's way as people move into suburban developments that depend on the levees to keep out floodwaters. Over time, these choices have resulted in more and more people being exposed to natural hazard events like hurricanes. To make matters worse, New Orleans and the Mississippi Delta have a disproportionate share of people living in poverty. As a consequence, the region and New Orleans are fractured by layers of social vulnerability that were exposed by Hurricane Katrina.

Attention is usually focused on the story of the storm or the post-storm response narrative. Freudenberg et al. (2009) persuasively argue that a critical narrative predates the landing of Katrina: choices were made to locate people in places exposed to storms and flooding. They argue that a 'growth machine' of self-interested property developers, business tycoons and public officials secured public funding to undertake projects that profited a few in the short term but have caused extensive environmental degradation and spiralling disaster risk as people moved into low-lying suburbs on former swamplands.

Burby (2006) describes the paradoxical consequences of endeavours to reduce moderate risk—for example, through levees that safeguard people from low-level frequent events such as river flooding—but that generate a false sense of security, encourage intensified development behind the levees and result in catastrophic consequences if an event exceeds design standards. This is often referred to as the 'safe development paradox'.

Early settlers stayed on relatively high ground but with the expansion of suburbs into low-lying areas behind levees, the flood risk increased exponentially. New Orleans was flooded in the aftermath of Hurricane Betsy in 1965, and, despite improvements to the levee system, it failed again in 2005 when Katrina struck. Now repaired and improved, it provides category three protection; but this is insufficient to protect the city from a breach by a category four or five storm. Tragically, New Orleans will flood again when a category four or five storm strikes the area—we just do not know when it will happen. The people of New Orleans and the wider gulf region thus face waves of adversity from coastal

storms and hurricanes.

There are other waves of adversity that face the people of this region. The 2010 BP oil-spill disaster devastated the wetland ecosystems of the Mississippi Delta and has had profound negative impacts on coastal livelihoods in the region. To exacerbate matters, the region is a global hotspot for climate change impacts, particularly sea-level rise, and consequently the waves of adversity will be magnified and intensified in years to come.

Choices made in recovery have profound implications for exposure to these coming waves of adversity. Future disasters are inevitable if pre-event exposure and vulnerabilities are entrenched in post-disaster recovery choices.

Mitch Landrieu, who was lieutenant-governor of Louisiana in 2005, made a statement in 2008 that captures the essence of the recovery challenge:

> The challenge is to keep and secure those things that are good: our food, our music, our architecture, our people, our faith and our families, our love of life and our love of country. And at the same time, [to] discard that part of our culture that strangles us: crime, bad schools and the inability to move beyond race.

In 2010, Landrieu became mayor of New Orleans, a place with an amazing array of 'good things': the birthplace of jazz, incredible cuisine, amazing architecture—a city that resonates with ritual and culture. It is, however, also a place that has a longstanding slew of social, economic and political challenges—including deep poverty, social inequity and racism. As Landrieu points out, the recovery challenge boils down to discarding that part of our culture that strangles us. Confronting the root causes and drivers of social vulnerability lies at the heart of reducing disaster risk and enabling recovery—a theme I will build upon. Hurricane Katrina and disasters in general expose the skeleton, the 'bones', of society: the good and the bad. Working out how to secure that which is good and discard that which strangles is a critical but complex undertaking.

Many lessons have been learnt from Katrina. You might remember the televised images of people looting, and the reports of rape, pillage, plunder and mayhem; but it has subsequently been shown that many of these media reports were based largely on rumour and unverified sources that resulted in misinformation.

Yet we do not hear enough about the stories of Katrina's heroes: the people who brought their boats into the city to rescue people, who broke cordons to get through to the needy, the incredible role played by the US Coastguard, and many more stories of heroism and altruism. It is the same in every disaster. The first responders are local people, and beyond that response there are those who dedicate themselves to the recovery process, working tirelessly through very, very difficult circumstances, often with their own homes and families disrupted. It is important not to lose sight of these stories of selfless commitment and dedication.

A series of studies and reviews reveals the systemic failure of the post-Katrina response, some of which persisted into recovery. There are many lessons that have been learnt. One review described the post-Katrina response as a systemic failure of initiative (US House of Representatives 2006). Another contribution in this book speaks of the need for imagination in disaster situations. You could say the same thing about post-Katrina New Orleans. Analysts and reviews describe a failure in leadership at every level of society—from the White House down to the lowest level of government, and in key domains of civil society and the private sector. Of course, it is not as simple as that because there are examples of success and effective leadership despite the fraught circumstances. So it is important to acknowledge that Katrina is not a simple, 'everyone did a bad job' story. It is a much more complex, nuanced narrative.

Particular attention needs to be focused on the pre-Katrina story to understand how to avoid recovery choices that put people back in harm's way and, fundamentally, how to confront the poverty and marginalisation that were endemic in New Orleans and the region; together these constructed the human catastrophe that was precipitated by Katrina.

Another recovery insight is the 'speed versus deliberation' dilemma: the conundrum of trying to progress a speedy recovery by making quick decisions so that a level of 'normalcy' can be restored and meeting the countervailing need to create opportunities for meaningful dialogue and deliberation to ensure that wise public choices are made that will be enduring and robust (Olshansky 2006). Resolving this dilemma has been very challenging in post-Katrina New Orleans. One of the tragic consequences of failing to resolve it has been the decision to allow rebuilding in places that are low-lying and exposed to future flooding. In short, the pre-event exposure and social vulnerabilities that characterised the pre-Katrina narrative have been entrenched by recovery choices so that a future disaster is a dismal inevitability. Post-Katrina demographics and socioeconomic conditions have changed. Many long-term New Orleans residents have left the city permanently. In some areas there is no tangible evidence of Katrina while nearly a decade later other areas are little changed from the immediate aftermath of the hurricane and flooding. Despite massive recovery efforts, social vulnerability in the city and wider region persists. Exposure is entrenched and disaster risk is escalating in the face of climate change. There are always winners and losers in disasters and in the recovery process. A key Katrina lesson is the imperative to address the needs of marginalised and socially vulnerable groups.

Another lesson is the need to anticipate and plan for waves of adversity that are likely to occur over time and subject the people of this region to multiple shocks. For those living in the bayous of Louisiana, there is no levee protection and they are dependent on the wetlands for their livelihood. But their way of life and, indeed, their lives are exposed to waves of adversity as they have had to weather a succession of events in recent years, including Hurricane Katrina, the

BP oil spill, the Global Financial Crisis, several other hurricanes and the prospect of flooding by the Mississippi River. To make matters worse, these waves of adversity will intensify in the future in this era of climate change. These waves of adversity are not unlike the series of earthquakes and aftershocks that have devastated the people of Greater Christchurch and the wider Canterbury region.

So, the challenge is: how do we fix the levees—not just the physical ones, but the levees of society—to build more resilient and sustainable communities? This is a 'wicked problem' that presents society with a set of 'wicked choices'.

The Canterbury Earthquake

I will now make some observations about Canterbury, based on a series of interviews I have conducted with key informants involved in the recovery process since late 2010. Here, like Katrina, you could argue that there are villains and there are heroes. There were people who stole, though I do not think we saw anything like the level of villainy in Canterbury as was seen in New Orleans. But we have seen many, many heroes in Canterbury, as we did in New Orleans and the wider gulf coast.

The story of leadership and initiative is quite different in Canterbury than the Katrina story. By all accounts the response worked very well in Canterbury and that is a real credit to those in positions of responsibility for the response. I understand from my key informant interviews that many dimensions of the recovery are going well. There is also room for improvement. So, does practice make perfect? I have heard some interesting commentaries. For example, a scholar from the University of Canterbury has argued that the university may not have responded as well in the major February event as it could have because it relied on practices learned in the September 2010 response that may not have been appropriate for the February 2011 circumstances. So that is ironic.

There are many stories emerging about our understanding of seismic risk and choices made to build on ground prone to liquefaction. We have learned about the notion of a 'class quake', as people describe how some lower socioeconomic neighbourhoods in Greater Christchurch were more exposed and vulnerable to seismic impacts and have borne the brunt of suburban damage. The dilemma of 'speed versus deliberation' in decision-making is an obvious reality in Canterbury.

A key challenge in the Canterbury recovery, as in major disasters elsewhere, is how to avoid entrenching pre-event exposure and vulnerabilities that inexorably lead to future disasters. The Government has made some bold decisions about not allowing rebuilding to take place in localities prone to a high risk of liquefaction. Not allowing rebuilding in 'red-zoned' areas is very

different from the decision to allow people to rebuild anywhere—regardless of flood risk—in New Orleans. These 'red-zone' decisions were controversial and contentious. And there are winners and losers in Canterbury as a result of these decisions, but it took bold leadership and a focus on societal resilience, equity and sustainability to avoid putting people back in harm's way.

Inevitably, there are winners and losers in disasters and part of the recovery challenge is to support and enable those worst affected, and to avoid deepening the misery and hardship that many face. This has been especially challenging in Canterbury because the earthquake series has caused shock after shock after shock, quite literally. The people of the region have faced waves of adversity as they seek to recover and they need to build layers of resilience.

The recovery challenge in Canterbury thus boils down to bridging fault lines— not just geomorphological fault lines, but also societal fault lines. For example, bridges need to be built between civic, business and political leaderships. Bridging societal fault lines is, however, a wicked problem and presents wicked choices that must be made—and made well.

Lessons Learnt

So, what have we learnt from disaster narratives? Simply put, social vulnerability must be confronted—as was graphically exposed in Katrina. You cannot stop a hurricane or an earthquake, but we can do something about reducing social vulnerability—and this is pivotal for reducing disaster risk and enabling recovery.

Recovery is complex precisely because it involves much more than the physical dimension; it is overlaid with social, economic and political dimensions. There is no simple end point and it is certainly not a return to 'normal', or to what existed previously (International Conference on Urban Disaster Reduction 2005). Recovery begins when the community repairs or develops social, political and economic processes, institutions and relationships that enable it to function in the new post-disaster context (Alesch et al. 2009). That is the challenge. The hard part of recovery is rebuilding the human and societal architecture that underpins every community. The physical and economic infrastructure is important and is difficult to repair after a disaster; but it is much easier to repair physical and economic infrastructure than it is to repair the social and cultural infrastructure.

One way to frame the recovery challenge is to recognise that there are 'domains of uncertainty' that need to be 'shrunk' (see Figure 17.1). After a disaster uncertainty intensifies and expands. Reducing this proliferation of uncertainty is a key challenge for the recovery process. Domains of uncertainty include,

first, uncertainty about seismic risk. The September 2010 earthquake took place on an unknown fault. The region has experienced a series of earthquakes and aftershocks since then, moving east towards the coast and offshore. A lot of work has been undertaken to better understand and reduce uncertainty about seismic risk in the region. It is not possible to finalise insurance decisions, for example, as long as there are aftershocks and uncertainty about when they will diminish. Consequently, as long as there is uncertainty about seismic risk it is very hard for people to make critical livelihood decisions—such as whether or not to repair their homes and businesses, or whether or not to relocate. Uncertainty about seismic risk thus compounds a second domain of uncertainty: livelihood uncertainty. A third domain of uncertainty is uncertainty about recovery governance. Shrinking this domain of uncertainty is critical for instilling confidence and building trust to progress recovery.
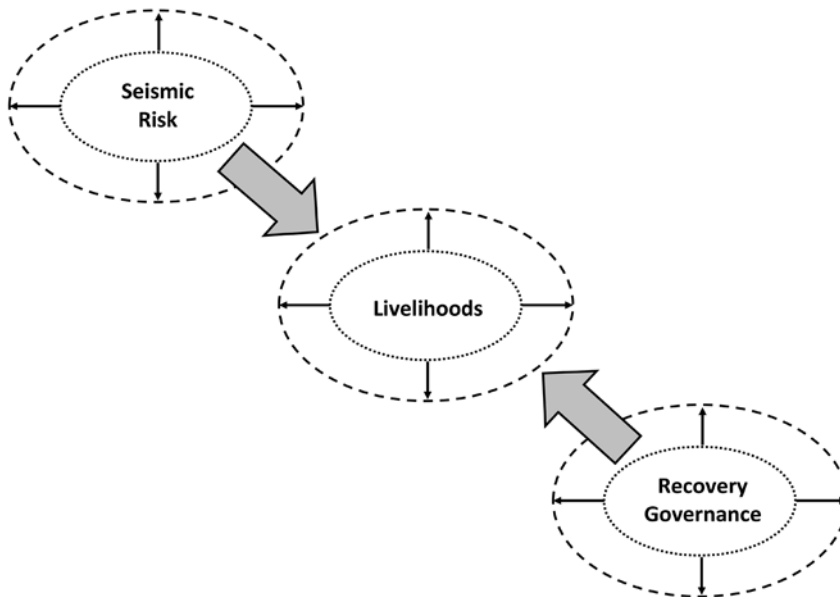

Figure 17.1 Domains of Recovery Uncertainty

Source: Author's summary.

The Government came in early to try to provide clarity about how to govern the recovery, enacting legislation to set up the Canterbury Earthquake Recovery Authority (CERA) to lead the recovery process in partnership with local government in the region. Despite these measures, however, and notwithstanding the good intentions and hard work of many politicians and government officials, there has been widespread and persistent uncertainty about the recovery governance process. Many of those I have interviewed lacked basic knowledge about the recovery governance process and expressed frustration about the perceived confusion and lack of clarity about who is responsible for different aspects of the recovery. A particular concern has been uncertainty

about how citizens and business can contribute meaningfully to the recovery effort. Many have found it difficult to connect with CERA and local government recovery efforts. Many have felt excluded and marginalised from the process—notwithstanding the many efforts by CERA and local government to consult the public. Many would like to see more opportunities to contribute and collaborate in what they consider to be 'their recovery'. Any complex, large-scale disaster confronts this third domain of recovery governance uncertainty. The sooner recovery roles and responsibilities are clarified, and opportunities created for authentic public participation in the recovery process, the faster this domain can be 'shrunk', but as long as it persists it 'squeezes' the domain of livelihood uncertainty and people continue to feel they are in limbo. In sum, the recovery challenge is to reduce each domain of uncertainty.

We live in a time of escalating disaster risk, with an exponential increase in the number of people living in places prone to natural hazard events. Disaster is unavoidable in the context of exposure to natural hazards and historical patterns of vulnerability (Oliver-Smith and Hoffman 2002). Key international organisations are focusing increasing attention on reducing disaster risk: prevention is better than post-event cure and it pays dividends in the long term (UN-World Bank 2010). Disaster risk, resilience and sustainability are fundamentally interconnected and there is a compelling need to make sense of the relationship between these concepts. Among other things, there are complex interrelationships between sudden shock events, like a hurricane, and slow onset disasters, like climate change. Resilience and sustainability are about building the capacity of present and future generations to, among other things, cope with large-scale natural hazard events, and anticipate and adapt to a future characterised by change, uncertainty and surprise. Post-disaster recovery opens up opportunities to chart pathways to a more resilient and sustainable future.

I submit that recovery is community (re)development in a pressure-cooker situation. The stakes are higher and the circumstances are much more pressurised than in typical pre-event situations. Extremely important and complex social choices have to be made. Fundamentally, recovery is democracy in action under dire circumstances. It is about empowering local people—and some of the comments New Zealand Prime Minister, John Key, made are pertinent: how should central government engage and work with local government and local communities? An empowering recovery process is compelling but complex; it is a wicked problem that compels us to rethink how we make social choices in pressure-cooker situations.

I would like to provide a rudimentary contrast between 'simple', 'complicated' and 'complex' contexts or situations. One could argue that baking a cake is a simple undertaking. Sending a person to the Moon is more complicated. Raising a child is a complex task. So, what institutional arrangements and leadership

qualities enable us to deal with these very different circumstances? In short, the implications for the kind of leadership and organisational characteristics required under these different circumstances are very, very different. That is not to say that disaster situations are always simple, complicated or complex. At different points in time circumstances vary from simple to complex.

In the response phase, there are probably half a dozen priorities: save lives, rescue people, secure buildings, and so forth. It is a relatively high-danger situation in which the response is made in a complicated set of circumstances that requires leaders to marshal resources, stabilise the situation and buy time. The archetypal 'alpha male' personality is the ideal leadership model. In fact, many females perform this role better than many men, so this is not a gendered comment. The traditional notion of an alpha male—a commander in control of his troops supported by a command-and-control organisational culture—works really well in these circumstances.

Transitioning into recovery is a very different reality. Recovery is a much more complex task; it involves building safe, resilient and sustainable communities. It is about empowerment. It is about making social choices in the face of deep uncertainty and ambiguity, so the appropriate leadership style is that of a nurturing female, where empowering, collaborative and adaptive ways of working are dominant.

The concept of risk lies at the heart of recovery choices and resilience and sustainability more generally. But prevailing risk discourse needs to be deepened and extended. Risk is typically defined as the probability and consequences of a hazard event (after Knight 1921)—or measurable uncertainty. But not all risk problems can be reduced to measurable uncertainty. There are situations that are dominated by ambiguity, which is when people disagree about how to frame options, context and so on, resulting in contending legitimate viewpoints about a particular social choice. Ambiguity cannot be resolved by a probability and consequence analysis. Some risk problems might be characterised as being dominated by unmeasurable uncertainty when the nature of the problem is effectively unknown and credible probabilities cannot be assigned. Other risk problems are best described in terms of 'ignorance'—where we lack knowledge, education or awareness of the problem. Andy Stirling (2010) from the United Kingdom distinguishes knowledge about possibilities from knowledge about probabilities, and categorises risk, uncertainty, ambiguity and ignorance into four domains (see Figure 17.2).
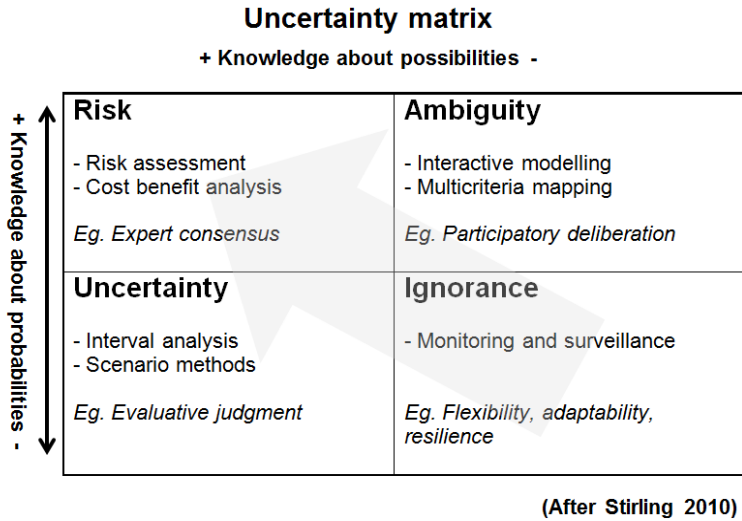
Uncertainty matrix

+ Knowledge about possibilities -

Risk	Ambiguity
- Risk assessment - Cost benefit analysis *Eg. Expert consensus*	- Interactive modelling - Multicriteria mapping *Eg. Participatory deliberation*
Uncertainty	**Ignorance**
- Interval analysis - Scenario methods *Eg. Evaluative judgment*	- Monitoring and surveillance *Eg. Flexibility, adaptability, resilience*

+ Knowledge about probabilities - (vertical axis)

(After Stirling 2010)

Figure 17.2 Risk, Uncertainty, Ambiguity and Ignorance

Source: Author's summary, after Stirling, 2010.

Importantly, different approaches and ways of working are needed to deal with each different risk problem. There is a tendency to try to reduce all risk problems to 'measurable uncertainty' and to rely on traditional assessment and treatment options for dealing with problems that cannot be resolved using these approaches. But ignorance, ambiguity and unmeasurable uncertainty cannot be resolved using probability–consequence calculations. Fortunately, there is an array of available approaches that can and should be used to deal with different classes of risk problem. It is imperative to match the assessment and treatment approaches to the particular risk problem under consideration.

Recovery is thus much more than rebuilding physical infrastructure and analysing all risks as if they can be reduced to measurable uncertainty. Yet such framing tends to dominate prevailing recovery governance thinking and practice.

Recovery governance needs to be reframed to suit the more demanding tasks of recovery. Governance is more than government. Governance is about making social choices and raises the question: how should key actors in government work together with key actors in the private sector and civil society to resolve societal problems? There is an important role for key actors in science and the media in recovery governance; and, together with other governance actors, they draw upon and develop vital institutions and relationships to navigate through the wicked problem of recovery. What constitutes appropriate modalities of recovery governance will vary from place to place. The challenge is to construct an architecture of recovery governance that engages and empowers those in recovery; this is a monumental but crucial challenge for all in pressure-cooker situations.

Figure 17.3 Actors and Institutions of Governance

Source: Author's summary.

Recovery governance needs to be an empowering and collaborative process that provides a solid foundation for addressing the pivotal questions of what kind of post-disaster community is desirable; how do we live with risk, uncertainty, ambiguity and ignorance; and who should make the critical recovery decisions? In short, I submit that there is a compelling need for deliberation, a non-coercive communicative process that encourages reflection, not only on the technical details, but also on the values, preferences and interests that underpin recovery. Recovery governance thus needs to be reframed as a deliberative process. This is not merely a philosophical reframing of recovery governance; it has important practical implications for how key actors and stakeholders in recovery negotiate their shared future.

My reflections on large-scale disasters and the recovery narratives of Katrina and Canterbury in particular have prompted me to explore political ecology as an arena of scholarship that is relevant to the challenge of recovery governance. For those who do not have a background in ecology, the term comes from the Greek '*oikos*' (house) and '*logos*' (study of), and means the study of the house or household ('household' being extended to include entire estates by medieval times). Ecology is the scientific study of the relationships between living organisms and their natural environment. Political ecology introduces the political dimension into the study of social-ecological systems, and it recognises that issues of global change, resilience and sustainability are essentially political issues. Political ecology is the study of the politics of environmental change that shape socioeconomic power relationships in society, which may be driven by natural and/or human-induced phenomena and development interventions. It is therefore constructive to think about a *political* ecology of recovery, which recognises the politics of recovery, the connection between people and places and the socioeconomic power relationships that are fundamental to understanding

recovery as a process to empower local communities in the aftermath of disasters. A political ecology of recovery is the study of the politics of recovery that shape post-disaster socioeconomic power relationships impacted by natural hazard events and recovery interventions.

This framing of recovery governance has important implications for understanding the nature and role of science in post-disaster situations. The physical sciences have a vital role to play, and among other things to help reduce uncertainties such as the nature of seismic risk. The social sciences also have a tremendously important role to play, a role recognised by key players in the Canterbury recovery. The kind of science that is most relevant for answering urgent questions in a post-disaster situation is not, however, 'normal' or traditional science, which is appropriate when decision stakes are relatively low and a high degree of certainty prevails. In domains where there are high levels of system uncertainty and decision stakes are high, a different kind of science needs to be engaged. Funtowitz and Ravetz (1991) introduced the concept of 'post-normal science', which is an appropriate modality of science in circumstances in which facts are uncertain, values are in dispute, stakes are high and decisions are urgent. Post-normal science is especially relevant for a post-disaster situation (see Figure 17.4).
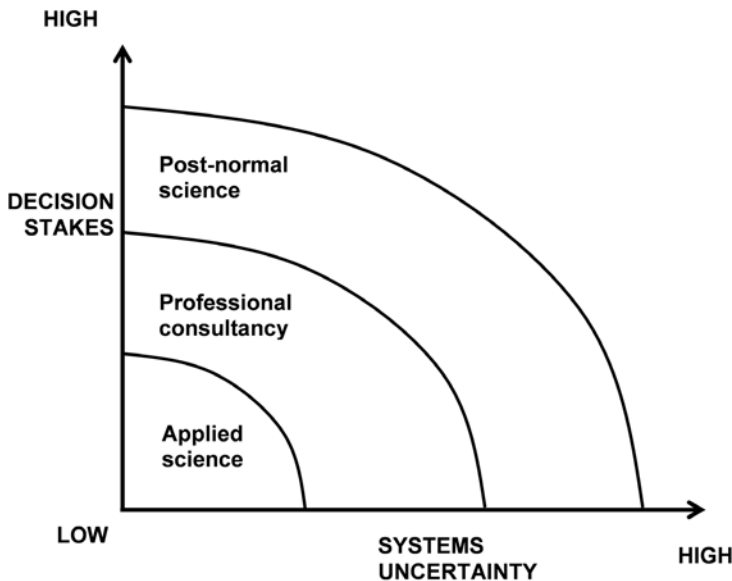

Figure 17.4 Post-Normal Science

Source: After Funtowicz, S. O. and Ravetz, J. R. 1991. 'A New Scientific Methodology for Global Environmental Issues', in R. Costanza (ed.) *Ecological Economics: The Science and Management of Sustainability* (New York: Columbia University Press).

In post-disaster circumstances—fraught with uncertainty and high decision stakes—an extended peer community needs to be engaged in post-normal

science, including those affected by the disaster and willing to participate in a process of shared learning and understanding. Such participants can contribute to the process of scientific learning and also bring local, tacit knowledge to the table. An extended peer community is vital, not only for good process but also for good outcomes in a post-disaster situation.

One of the challenges of undertaking post-normal science in recovery is 'speaking truth to power'. Key informant interviews in post-Katrina New Orleans revealed that a number of scientists found themselves marginalised from key decision-makers and access to research grants ostensibly because they were critical of some of the recovery choices made. They were not necessarily critical of the individuals making those decisions but their research exposed flawed decisions. Many difficult choices have to be made in the course of the recovery and some of those choices stand up as being good decisions in the fullness of time; others, perhaps, will not stand up so well. So, in presenting their findings, some scientists and academics found themselves ostracised, and their ability to provide constructively critical input to the recovery process was marginalised—arguably to the detriment of recovery. This experience brings to the fore the need to develop a new social contract for science (Lubchenco 1998) in which the role of science is not simply to produce 'reliable knowledge' but for science and society to co-produce the knowledge required to navigate the uncertainty and the high decision stakes of the post-disaster setting.

So, to begin to bring this to a close, I want to highlight some of the conundrums and challenges revealed by the disaster narratives I have recounted and the spectrum of wicked choices that needs to be faced.

First, we tend to focus on the 'readiness' and 'response' phases of the hazard cycle, but we need to extend these efforts out into the 'reduction' and 'recovery' stages (to use the four rs of the New Zealand hazard cycle). Second, we need to go beyond the physical and economic dimensions of recovery to engage the social, cultural and political dimensions. Third, as important as the technical details are, attention needs to be focused on the ethical or moral dimensions of recovery. The last dimensions are fundamental for resolving the 'speed versus deliberation dilemma'—the fourth set of wicked choices. There are no simple or easy answers; post-disaster recovery poses a wicked problem and presents society with many wicked choices. Fifth, the question arises of whether recovery governance should be top-down or bottom-up. Should government establish a centralised agency to take charge of the recovery process? If so, how can those at the local level be empowered to recover? Invariably there are no easy answers and there is no panacea. Sixth, another conundrum is the issue of 'insiders' versus 'outsiders'; according to some there is antipathy to outsiders driving recovery in Canterbury. In post-Katrina New Orleans, there was strident objection to academics who came in from elsewhere to do research but were experienced by

local people as syphoning off information from disaster victims, were never seen again and thus did not contribute to the recovery process. But outsiders can and do make invaluable contributions to recovery efforts. Seventh, another issue that arises in post-disaster situations has been described by some as the 'opening up' and 'closing down' of bureaucracies. The post-disaster pressure-cooker situation means that recovery agencies have to manage the tension between focusing all their energy on getting on with the manifold urgent tasks at hand versus setting aside time and effort to learn from past experience and reflect critically on what they are doing and how well it is working and, where appropriate, making adjustments to improve future practice. Eighth, the conundrum of rights versus responsibilities arises: whose recovery is it and can government 'do' recovery on behalf of disaster-struck communities? How does one reconcile local, regional and national interests in large-scale disasters? What are the responsibilities of current generations for the safety, resilience and sustainability of future generations? The conundrum of rights versus responsibilities thus has both geographical and temporal implications. Ninth, to what extent does the recovery entrench 'business as usual' practices or move towards transformative change? Should recovery efforts address the structural or embedded systemic problems that lead to marginalisation and social vulnerability? Can a post-disaster window of opportunity be opened to build back better, safer and more sustainably or will it stimulate exploitative practices that are ultimately antithetical to recovery? Will the choices made be ones that are expedient or will they leave a legacy that future generations will appreciate? Tenth, and finally, the imperative to expedite and operationalise an efficient and cost-effective recovery must be reconciled with the imperative to adopt reflexive practices that stimulate learning-by-doing and build resilience and sustainability.

In order to future-proof society, we need to recognise that society will continue to face waves of adversity, and the challenge is to build resilience in the face of the financial and social realities that Prime Minister Key describes in his contribution to this book. Risk, uncertainty, ambiguity and surprise are the 'new normal'. They will not go away, but will accelerate, intensify, deepen and proliferate in an era of global change. We live in a world that is complex and contested; and we face protracted, wicked problems that generate wicked choices. Deliberation is fundamental to understanding risk, resilience, sustainability and the political ecology of recovery. Recovery governance needs to be reframed as a deliberative governance process that is reflexive, collaborative and empowering. This is a challenging endeavour for individuals in the organisations that are charged with recovery because there is so much pressure on them to meet such compelling immediate needs. But the need to reframe and engage in new modalities of recovery is clear from post-disaster narratives around the world.

Finally, we face a series of complex, contested realities in post-disaster situations. Dealing with them requires deliberation and collaboration. Community wellbeing lies at the heart of recovery. We need a deeper understanding of what constitutes community and, recognising the heterogeneous and contested nature of community, we need courage to engage in new modalities of disaster risk reduction and recovery governance. We need political leaders, and leaders in business and civil society and science, to show courage by engaging in deliberative and reflexive practices in partnership with local communities to enable their recovery.

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