Natural Hazards and Resilience Planning

Professor Bruce Glavovic, Professor Iain White, Dr Paul Schneider, Dr Richard Smith
Dr Richard Smith
University of Waikato
Resilience and NZ’s ‘Long-Tail’ Risks
Annual Likelihood

National Hazard Risks

Relative Consequences

Geophysical
Meteorological
Biological
Technological

Severe Weather
Large rural flood
Hazardous Spill
Major Transport Accident
Sustained volcanic ash eruption
Major Infrastructure failure
Agricultural Pest/Disease outbreak
Sustained Drought
Moderate Tsunami
Large urban flood
Large urban earthquake
Human Pandemic
Auckland Eruption
Very large tsunami
Very Large Central North Island eruption
Moderate Earthquake
Moderate Infrastructure failure
Large urban flood
Large rural flood

21 October, 2011:
Once a Century
10 %
Once a Decade
10 %
Once a Millennium
0.1 %
0.01 %
What are the Options?

**Avoid** exposure

**Control** impact

**Transfer** or pool

‘**Accept’** residual

- Land use planning
- Design and build
- Insurance (capital for recovery)
- Fix post-event; Emergency response

More explicit community engagement about trade-offs is needed
Management of Disaster Risk – Achieving Resilience

The prior question: What is the objective?

- Save lives?
- Preserve or rebuild buildings and infrastructure?
- Maintain or restore economic activity?
- Maintain community cohesion?
- And, additionally, what price heritage and other values?

Each has different costs and different policy and financial implications.
Who decides? At what cost?

- How likely is the event?
- What kind of investment should we make?
- When do we pay? Now, or in the future?
- How much risk do we tolerate?
- How much risk do we want to manage ahead of time?
- How much risk are we prepared to manage after an event?
Informed choice or unwelcome surprise?
How do we find the right balance?

Community Well-Being

- Assure Life-Safety
- Assure Amenity
- Assure Resilience?

Spending on Risk Reduction

Level of Affordability for
- Community 1
- Community 2
- Community 3
- Community n
Catastrophe Risk Perceptions

BEFORE

- It won’t happen
- it won’t affect me
- it won’t be bad
- there’s nothing I can do...

So why are you worrying me with this?
Catastrophe Risk Perceptions

AFTER

- Psychological scarring
- Over-estimation of repeat disaster
- Risk appetite switches – from high to low
- Risk over-priced

How could this be allowed to happen?!
Thank you
Resilience and the Science-Policy interface

Professor Iain White
University of Waikato, New Zealand
lain.white@waikato.ac.nz
Science-Policy Tensions Context...

1. The increasing science funding focus on ‘Policy transfer’, ‘policy tools’, ‘research impact’, ‘value for money’

2. The need to produce policy that is defendable, easily communicable and based on sound evidence

3. Highlight the tensions in how different arenas engage with resilience

4. Focus is on the system/structures/worldviews of decision making rather than the decisions themselves
From 2012... Thousands of Hamilton residents responded angrily after receiving letters warning their homes are at risk of flooding...An internal council email said the letters were deliberately vague to prevent widespread panic. But the strategy backfired, with residents criticising the way the council released the information. [a resident said] said adding flood risk to a LIM report was unreasonable and would impact on property value and insurance costs. All this is doing is protecting themselves ... it is devaluing our house.” Are you willing to put your hand in your pocket and pay for any losses you have incurred by this debacle...It is one thing to identify the risk, but you must be 100 % correct before you start playing with people's livelihoods.

Tendency to see conflict in terms of robustness of data or communities simply protecting economic interests – but the process is important
The scientific manufacture of UNcertainty...

- **Growing complexity**
  - more data=same uncertainty? better knowledge of interactions but while models have got better, they are no better at predicting (Batty, 2015)
  - Advances in climate models, but uncertainty range unchanged for 30 years (Roe and Baker 2007)
  - Cascading effects, moving targets, Earthquakes, causing landslides, due to sodden ground
  - Paradox of scientific investigation – maps or models presented as robust, then we flag up assumptions, limited lifespan and improve it, which proves it was imperfect and open to challenge...

- **ALWAYS uncertainty + economic interests = scope to challenge...**
The policy challenge of manufacturing certainty

• Policy and politics needs to manufacture certainty
  – Need to compare choice and value for money, defend in public, avoid liability and environment court - quantifying risk financially can defend institutions, deflect blame, provides political justification, avoids liabilities (Kreiger 2013; Kuklicke & Demerrit, 2016)

• Scientific methods provide trust in expert systems (Giddens 1990) but they also transform
  – Ewald (1991, 207): ‘to calculate a risk is to master time, to discipline the future’ –
  – Quantify risk or look for ‘laws’ (O’Neill 2001) to help code uncertainty - 1 in a 100 event
  – We set artificial boundaries – ie CBA, or bound the future for X years (Lane et al 2014). Few longer term as uncertainties resist quantification (White and Haughton 2017)
The policy challenge of manufacturing certainty

• Also government drive to reduce complexity
  – Certainty, clarity, permissive activities, and ‘tick box’ speed is key
  – Less interpretative more easy rules for government, investors and institutions

• KEY – recognise the science-policy interface will produce certain hazardscapes
  – Choice and use of methods support policy choice & privilege outcomes (Bell 1994).
  – Protect risk TO institutions. ‘Risk colonization’ (Rothstein et al 2006: 12) decision makers set agenda for science to underpin institutional practice, such as certainty, rather than norms of science, which may be caveated.
Key Science-policy tensions

• Scientists manufacture **uncertainty**, policy manufactures **certainty**
  – but ‘false precision’ (White 2013), ‘stationarity is dead’ (Milly et al 2008)? Or aspects missing (ie social impacts)
  – Distil complex science into single lines – zoning, property rights, enforceability, avoid legal challenge.

• Scientists reveal **complexity**, government reduce it
  – PCE (2015): more time needed for complex issues to be debated. Creates poor space to discuss science

• Scientists want **adaptability**, govt and investors want **certainty**
  – Investment, protection of use rights, infrastructure
  – To make current investment more certain we transfer risk to future
  – Politics is about trade offs, but uncertain, long-term issues struggle to influence. Eg electoral safety (Boston 2016)
Closing the science-policy gap

• A large science-policy gap can help create vulnerable hazardscapes, where risks may be embedded, transferred, and hard to reverse.

• Cannot treat resilience science as a technical issue – it is about politics and the way institutions make decisions.

• **Science, Maps and Models** are not neutral:
  – Inherent *Uncertainty, Inconsistency + redistributive* effects = potential **conflict**
  – Controversies not necessarily about questionable science, or development rights, but also due to poor community discourse (process not outcomes)
  – Highlights importance of creating the **space for politics** to happen before the **economics** happens – eg ‘what if?’ tools, compensation or tipping points

• Need to acknowledge and **embrace the political nature of science**, and use it not just as a defensive decision support tool, but also a **discourse support tool** – it can provide a way to open up space for difficult conversations about policy choices
  • Tendency to be conservative and wait until robust data, but treating science as uncertain and ‘in motion’ can help in discussing risks and policy options
  • Cross party/public buy in, policy investment, non linear science, event triggers
The Institutional Setting for Resilience Planning: Fit for Purpose?

Paul Schneider PhD, MREP, BSc (Hons)
Postdoctoral Research Fellow
Resource and Environmental Planning Programme
Massey University
What defines resilience?

1. High diversity
2. Effective governance and institutions
3. Ability to work with uncertainty and change
4. Community involvement and inclusion of local knowledge
5. Preparedness and planning for disturbances
6. High social and economic equity
7. Robust social values and structures
8. Acknowledgement of non-equilibrium dynamics
9. Continued learning
10. Adoption of a cross-scalar perspective
Statutory Planning Tools

Key Legislation: RMA, LGOIMA, BA, CDEMA, LGA

Central Government Level: Nat. CDEM Strategy and Nat. CDEM Plan, NPS: NZCPS (all levels)


Local Level: LIMs, PIMs, Annual Plans & LTPs, District Plans, Resource Consents, State of the Env. Monitoring & reporting

Non Statutory Planning Tools  Guidance and Hazard Mitigation Publications
Contestations and tensions in planning

- Public vs private
- Short-term vs long-term
- Economy vs environment
- Stability vs flexibility
- Culture vs nature
- Uncertainty vs certainty
- Complexity vs simplicity
- “no performance measurement” (LGNZ, 2014)
“While the powers and tools might well exist in the RMA and BA etc. it is not clear that they are being used to reduce risk”*. Governance and institutions are fundamental.

*LGNZ, 2014
Institutions and the way they are governed
How to build resilience

- Social vulnerability reduction
- Sustainable hazard mitigation
- Promotion of disaster risk reduction

- No more people and critical infrastructure in risky areas
- Promotion of healthy ecosystems
- Resilient buildings and infrastructure
- Awareness and preparedness
“It always seems impossible until it’s done”
Nelson Mandela
BEYOND BUSINESS AS USUAL: PLANNING IN THE FACE OF CHANGE, COMPLEXITY, UNCERTAINTY & CONTESTATION

Bruce Glavovic
EQC Chair in Resilience and Natural Hazards Planning
Resource & Environmental Planning Programme
Palmerston North
b.glavovic@massey.ac.nz
Beyond Business as Usual

- **Productivity Commission’s Better Urban Planning says:**
  - “current system is slow to adapt & biased towards …status quo”
- A future planning system
  - Distinguish built & natural environments
  - New mechanisms & models to overcome growth challenges
  - More responsive infrastructure provision
  - Better planning & plans through spatial planning & independent hearing panels
  - Improvements in consultation, recognition & protection of Maori interests, and planning capability & culture
  - Improve system stewardship
- Recognizes need to plan for changing climate but what about natural hazard risk & building resilience?
- **Better planning = resilience planning**
“We live in challenging times with a heightened sense of uncertainty and constant reminders of the unpredictability of what might be lurking around the corner; be it catastrophic climate events, terrorist attacks, credit crunch, youth riots, or mass redundancies. For planners in the UK, this wider sense of unease is exacerbated by a decade of constant change and perennial attacks on the value of their professional contributions to society. Among the prescribed remedies for dealing with such a state of flux, the one that is rapidly gaining currency is “resilience”. It appears that resilience is replacing sustainability in everyday discourses” … (Davoudi, 2012: 299).
Resilience

Change

Intensity of responses

Flexibility

Absorptive coping capacity
(persistence)

Adaptive capacity
(incremental adjustment)

Transformative capacity
(transformational responses)

Stability

Mild
Moderate
Severe

Intensity of shock/stressor impact
**Vulnerability**

**Context:**
- social, political, economic, institutional processes & changes.

**Outcome:**
- Sensitivity, exposure, impacts, hazards.

**Resilience**

**Adaptive capacity**
- Diversity
- Institutions
- Resources
- Productivity

**Coping capacity**
- Transformative:
  - learning, change.
- Adaptive:
  - flexibility,
  - adaptability,
  - reorganisation.
- Absorptive:
  - regeneration,
  - recovery, stability.

**Transform**

**Adjust**

**Cope**

**Adaptation**
Resilience imperative in NZ

- 2004 - Manawatu floods
- 2010-2011 Greater Christchurch earthquakes
- 2013-2017 Kapiti Coast coastal erosion & SLR
- 2015 - Wanganui floods
- 2016 Hawkes Bay water campylobacter
- 2016 - Kaikoura / Wellington earthquakes
- Auckland housing, transport …
4 systemic challenges

1. **Change** (shock, surprise, turbulence …)
   “Flexibility is the key to stability” (John Wooden)

2. **Complexity**
## 4 Systemic Challenges

### 3. Uncertainty

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### 4. Contestation
• **Risk** = measurable uncertainty (Knight 1921)

• **Uncertainty**: Nature of things is unknown & credible probabilities cannot be assigned

• **Ambiguity**: When experts disagree over framing of options, contexts, outcomes, benefits or harms. Cannot be reduced to risk analysis, & demands plural & conditional treatment.

• **Ignorance**: Lack of knowledge, education or awareness.

(After Stirling, 2010)
Towards resilience planning

“Resilience thinking constitutes an alternative approach. “Planning for resilience” can find a home in planning theory as an analysis of the external dynamics that accelerate urban economic, social and spatial vulnerability and as an approach that helps to link social and economic processes with ecological processes, calling for a reconsideration of the “substance” of planning so as to enhance capacity to deal with slow and sudden changes of different forms. This can occur within a process that focuses on “building a self-organisation capacity” alongside a change in the value system that can overcome the unequal power relations” (Eraydin, 2012: 19).
Beyond business as usual

• “a tension will exist between maintaining the resilience of a desired current configuration in the face of known (and some unknown) shocks, and simultaneously building a capacity for transformability, should it be needed” (Walker et al. 2004).

• The status quo is the antithesis of transformability. Society resists changes to the status quo.

• Hence the need for ‘better planning’, i.e., resilience planning:
  • Move beyond narrow framing of risk as a probability-consequence calculus
  • Navigate change, complexity, uncertainty & contestation
  • To reduce disaster risk & build resilient & sustainable communities

• What are the barriers and enablers to institutionalizing resilience planning in NZ?
Capability building for Resilience Planning

- What are the most pressing capability building needs?
- CPD Workshops in 2017
  - Risk & resilience imperatives in NZ
  - International context & agreements (DRR, SDGs, CC, etc.)
  - The concepts of risk & resilience planning
  - The NZ institutional setting: Barriers & enablers for resilience planning
  - Tools for disaster risk reduction & resilience planning
  - Case studies in resilience planning
- Survey of Planners
Resilience Planning in NZ: Barriers & enablers

- Barriers
- Enablers