



## The role of networks and governance frameworks in regional climate adaptation

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Climate Adaptation



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# The role of networks and governance frameworks in regional climate adaptation

- Adaptive capacity & adaptation
- Importance of institutions and governance in climate change adaptation
- Methodological approaches
- Insights from Newcastle context
- Conclusion



# Adaptive capacity and adaptation

## Adaptive capacity

*The ability of a system to adjust to climate change (including climate variability & extremes) to moderate potential damages, to take advantage of opportunities or to cope with the consequences (IPCC, 2007)*

## Adaptation

*'Adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities' (McCarthy et al. 2001)*

# What contributes to Adaptive Capacity?

- supportive social structures & institutional frameworks
- investigation, research, sharing information – context specific
- planning & participation in networks / discussion groups
- access to a range of technological options
- availability & distribution of resources
- allocation of decision making authority and selection criteria
- human capital including education and personal security;
- social capital including the definition of property rights;
- the system's access to risk spreading processes – e.g. insurance
- credibility of decision makers & their ability to manage information
- public perception of climate change and the significance of exposure to its local manifestation.

Source: Preston et al, 2010; Yohe & Tol, 2002; Smit et al, 2001; Brooks et al, 2005

# Barriers to adaptation practices

- **Lack of adaptive capacity**
  - Resource constraints – lack of financial, social, natural capital....
- **Failures in human decision making**
  - inability to reach consensus in collective decisions
  - decision making impeded by information uncertainty
  - difficulty in determining who is responsible for action
- **Climate drivers not mainstreamed in normal business or operating environments**
  - planning and management strategies
  - legal and institutional mechanisms
  - technological approaches
  - financial incentives
  - education and training
  - research and development

Scientific Expert Group on Climate Change (SEG), 2007

# What leads to adaptation practice

- Adaptations are most likely stimulated by climatic variability
- Credibility
- Leadership
- Strategic planning
- Implementation experience
- Principles of fair governance
- Strong institutions
- Financial assistance
- Involvement of those at risk
- Learning and continual improvement
- Flexibility
- Collective action

Support climate adaptation practice

# Importance of institutions and multi-level governance frameworks

- Effective adaptation to climate change needs to occur at multiple scales from global to local to individual
- Dependencies within the social system are expressed by interactions among and between individuals and groups
- Investigation of these interactions allows us to study the acceptance, adoption, diffusion and implementation of adaptation practices
- earth system governance
  - “the interrelated and increasingly **integrated** system of formal and informal rules, rule-making systems, and actor-networks at all levels of human society (from local to global **scale**) that are set up to steer societies towards preventing, mitigating, and adapting to global and local environmental change and, in particular, earth system transformation, within the **normative** context of sustainable development” (Biermann et al 2010, p.279)



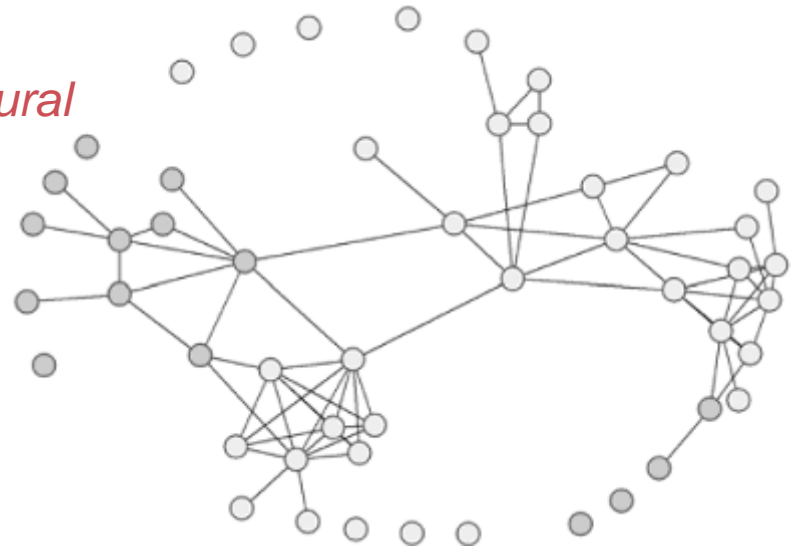
# Policy processes and social interaction

- The failure or success of policy interventions is often critically dependent on a cascade of reactions of individuals and organisations
- The social dimension of these interactions is often not well understood
- Climate adaptation needs to be embedded into policy processes and institutional systems to enable
  - cross-sectoral policy integration ('mainstreaming')
  - decision making under conditions of uncertainty,
  - vertical ('cross-scale') policy coordination
  - consideration of capacity and devolution issues, and
  - policy evaluation and learning.

Source: Dovers et al, 2010

# Why study networks?

- Networks represent the macro-social contexts of behaviour.
- The structural properties of relationships are socially constructed and affect the *perceptions, beliefs, decisions or actions* of individuals, groups and systems
- Network analysis aims to measure and represent these structural relations accurately
- Network analysis helps to explain *why structures emerge* and the *behavioural consequences of these structures*
- Network structures change as relationships between entities change



Adapted from Knoke & Yang 2008

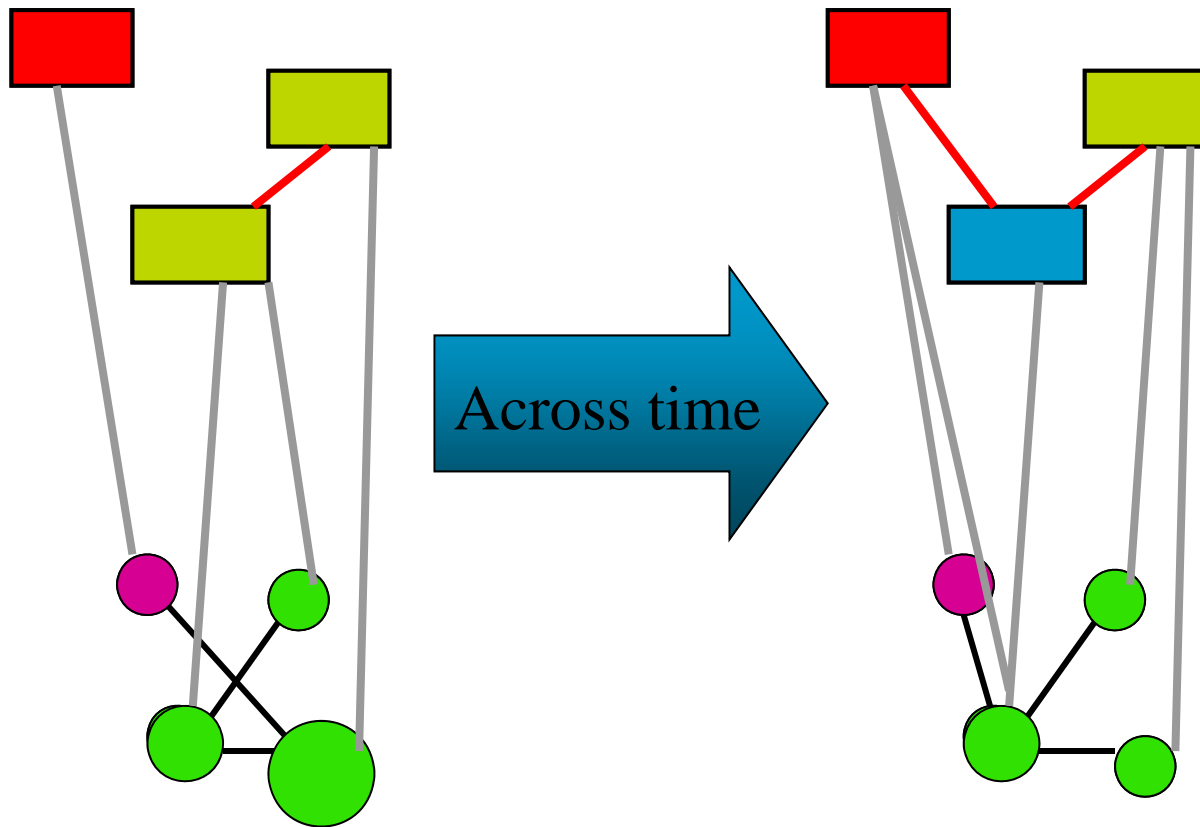
# Study design - SNA

**Organisations & policy forums**  
attributes, behaviours, policies, Institutions & Organisational links

Meso connections

**Individuals in organisations** – attributes, behaviours, cognitions

Network connections



Ability to include  
geospatial aspects

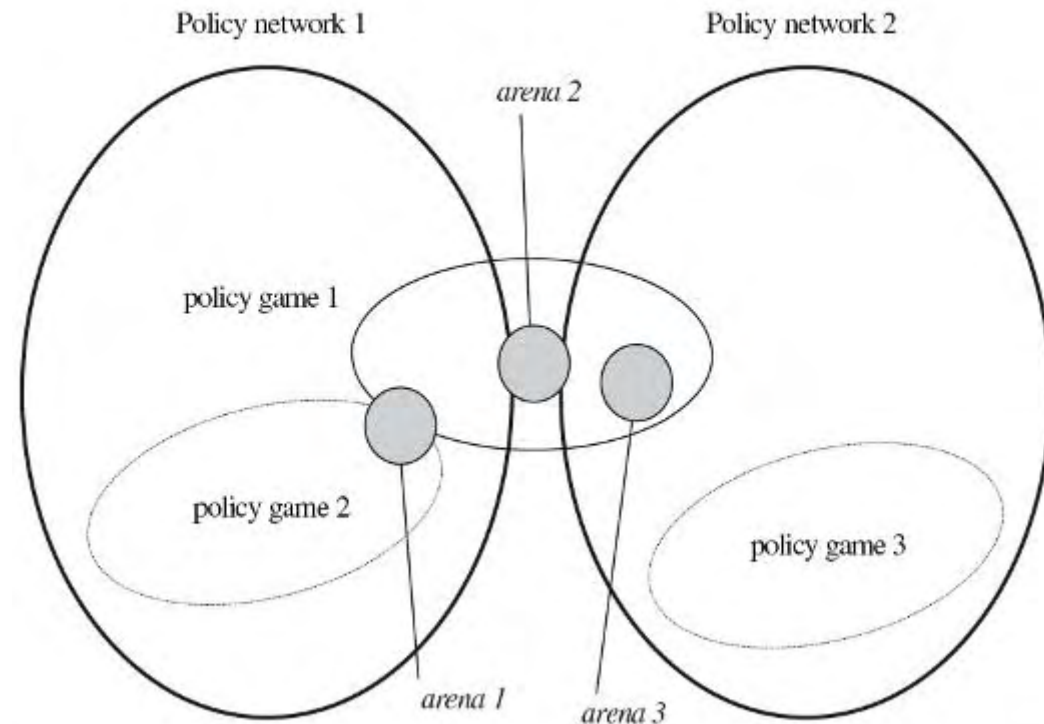
# Why study organisations and policy forums (games)

Interactions among actors are guided (in part) by rules about how decisions are made

## Organisational adaptive capacity

- Encourage the involvement of a variety of perspectives
- Enable learning and continual improvement
- Motivate actors to adjust behaviour
- Mobilize leadership qualities
- Mobilise resources
- Support principles of fair governance

Gupta et al, 2010



Source: Koppenjan & Klijn 2004 *Managing Uncertainties in Networks: a Network Approach to Problem Solving and Decision Making* p. 88

# Some research hypotheses

## ***Link between adaptive capacity – adaptation practice***

- Organisations active in developing mainstreamed climate change strategies demonstrate better adaptive capacity and clear pathways to adaptive practice

## ***Interaction between adaptation / adaptive behaviour and network structure***

- Pairs of organisations with a strong dyadic connection will have similar approaches to the development and implementation of climate adaptation strategy.
- Organisations that are active in developing climate change strategies will be well connected (leadership – high centrality)
- Organisations that collaborate in developing policy on climate change are more likely to collaborate on other issues of mutual strategic importance
- Organisations that engage in multiple policy forums are more likely to collaborate when implementing adaptive practices

## ***Impact of interventions***

- Participation in forums designed to increase awareness of climate adaptation practices and range of responses encourages greater subsequent interaction between participant organisations

## ***Policy processes***

- Policy processes addressing climate change that are inclusive and planned through interactions with other organisations and people are more easily implemented than 'stand alone' policies

## ***Longitudinal***

- Interaction between players in the form of communication over time leads to increased cooperation and self governance

# Regional Case Studies – Hunter Central Rivers

- Major river and coastal estuary
  - high quality agricultural land
  - aquifers & surface water resources - potable water sources
  - significant environmental assets (nationally & internationally)
- Newcastle
  - second largest urban centre in NSW (pop. 2006 > 500,000)
  - 160 kilometres north of Sydney, area 4291<sup>2</sup> km
- Diverse industry
  - largest coal exporter in the world
  - wineries
  - tourism
  - horse studs
  - education (Newcastle Uni)
- Significant investment in infrastructure

# Newcastle LGA - vulnerability



# The Newcastle LGA Flood Problem

## One issue, one LGA

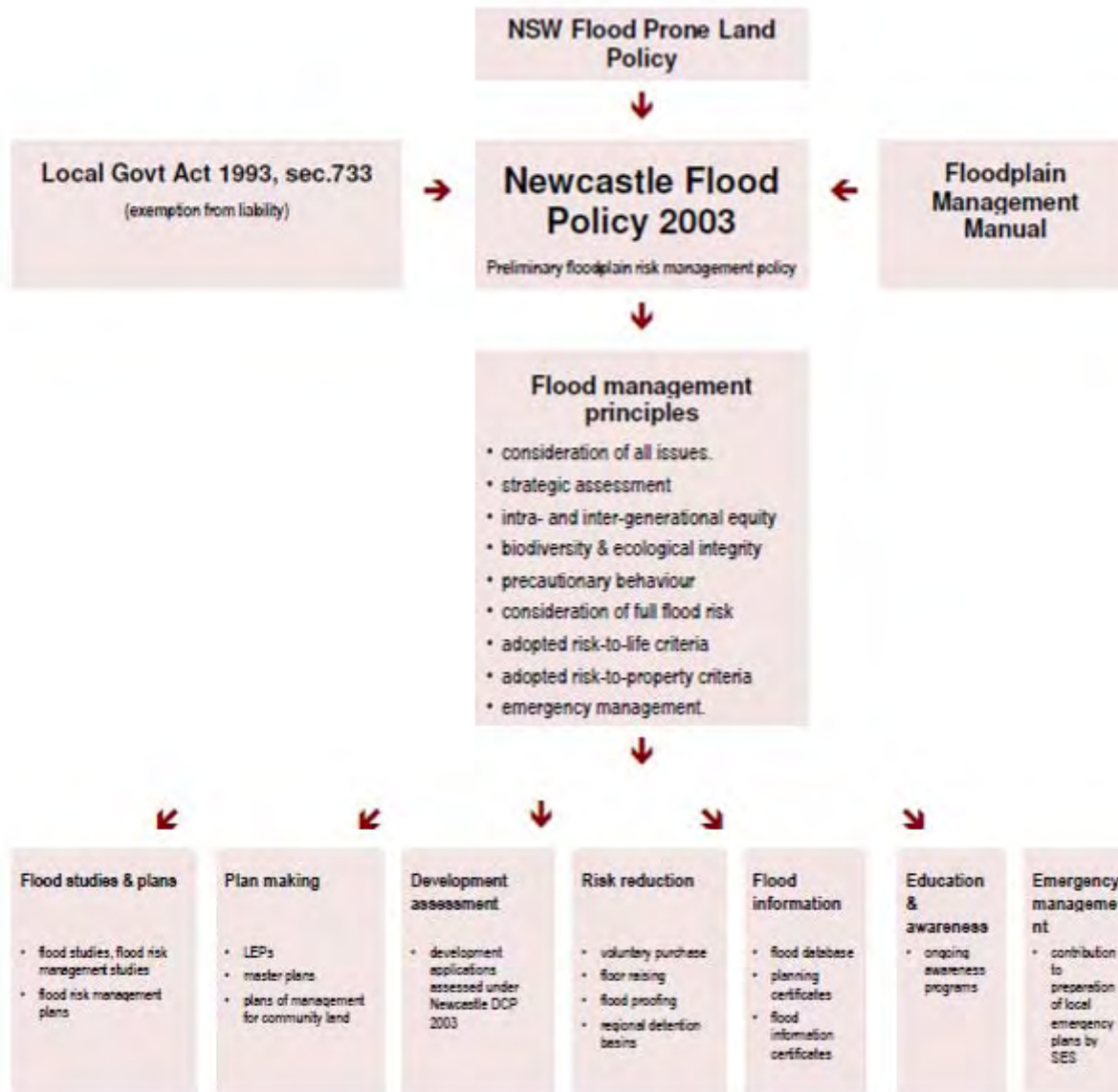
- 70% of Newcastle is floodplain
- About 20,000 (1 in 3) properties are at risk of flooding
- Flooding occurs through three mechanisms
  - Ocean inundation (storm surges, high tides, SLR)
  - River Flooding (backwash from the Hunter River)
  - Flash flooding
- Climate Change may make it worse
- Greatest risk to life is in suburbs affected by flash floods
- No quick fixes
- Cost of retreat in excess of \$2 billion
- Cost of risk management plan \$200m



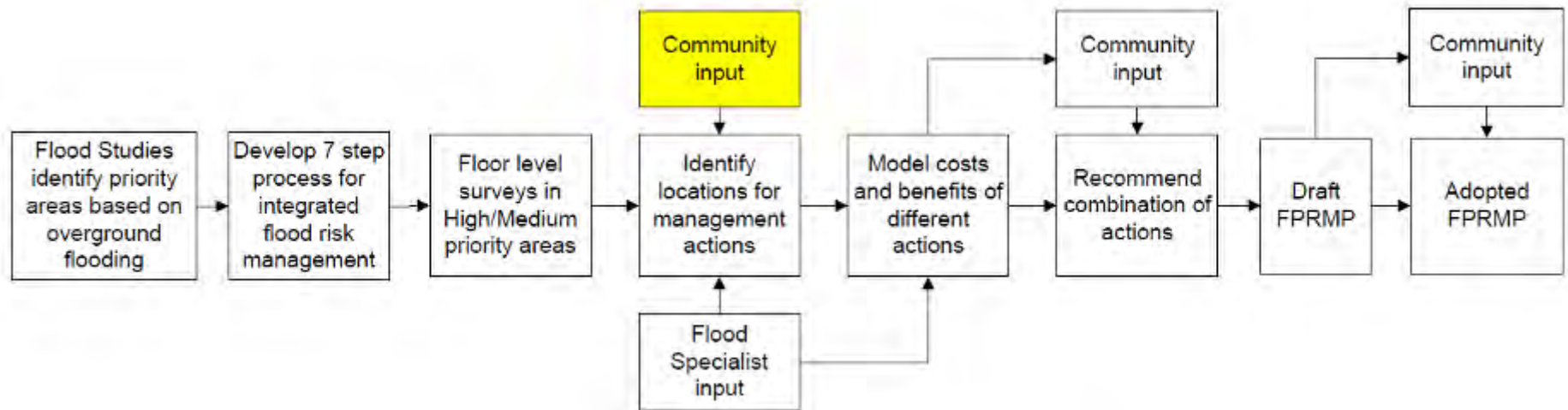
# Newcastle – 2007 floods



# Policy Forums - Flood plain risk management



# Strategic Planning – Floodplain Risk Management



Source: Molino Stewart

# Governance Structure: Inter-agency collaboration & coordination



# Governance in action

## Partnership of Floodplain management

*Community involvement is essential to the effective management of flood risks across Newcastle. It cannot be stressed too strongly that community involvement in all phases of the floodplain risk management process is crucial to the **development, acceptance and implementation** of effective risk management planning*

# Conclusion

- *There is a need for adaptation practices to become systemic if we are to address the implications of climate change.*
- *A well-adapting society will demonstrate evidence of socio-technical transition as a result of simultaneous changes in technology, user practices, regulation, industrial networks, infrastructure, symbolic meanings, and culture*
- *Institutions and multi-level governance frameworks are a critical component of these changes*

Acknowledgement: Geels, 2002; Tompkins et al 2010



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