Economics of natural hazards

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Our projects

1. Which strategies for managing natural hazards offer the best value for money?
2. How should emergency budgets be set, recognising the variability of need?
3. How can we value the social and environmental benefits of management?

Progress so far

- **Postdoctoral researchers appointed**
  - Fiona Gibson will be working on the intangible values aspect of the project
  - Veronique Florec will be working on integrated modelling of disaster management strategies
- **Meeting with end users prior to RAF. Found new end users at the RAF**
- **Two workshops set with experts in valuing intangibles to help with inputs into non-financial benefits part of the project**
- **Relevant literature documented**

Previous work

- **Case studies in Mount Lofty ranges, South Australia, and Central Otago, New Zealand**
- **Simulated bushfire risk per year using fire weather index and landscape characteristics**
- **Estimated values lost: property, life, infrastructure, biodiversity, forestry**
- **Applied mitigation actions and estimated cost, risk change, suppression change, expected benefit**
- **Generated benefit: cost ratios to rank mitigation actions**

Major outcomes

- **Potential to improve decision making**
  - Weighing up alternative management options
  - Better targeting of effort and resources
- **Ability to evaluate and justify programs**
- **Identify information gaps**
- **Capacity building with policy makers and land managers**

Natural disaster mitigation: intangible values

- **Mitigation actions and natural disaster events affect many things that people value**
- **Tangible losses (or benefits) have observed economic value – traded in markets**
- **Intangible losses (or benefits) have unobserved economic value - no market exists e.g. biodiversity**
- **Worth estimating economic values for these impacts:**
  - Cost: benefits analysis of mitigation options, for prioritisation
  - Damage assessment
  - Leverage for funding

Types of intangible values

- **Use values**
  - Recreation, amenity, ecological function,
- **Non-use values**
  - Existence value: person is WTP to protect a National park, but never want or expect to ever visit it
  - Option value: person is WTP to protect a National park because they want to preserve the option to visit it
  - Bequest value: person is WTP to protect a National park for future generations
- **Other values**
  - Injury, death, memorabilia, heritage

Estimating intangible values

- **Productivity Commission report suggests using "willingness to pay"**
- **WTP can be estimated with stated and revealed preference techniques**
- **Stated WTP:**
  - Survey based
  - Asks for individuals WTP for a change in the amount of an intangible
  - Asks individuals their WTP to change their behaviour for using an intangible
- **Revealed WTP:**
  - Data based
  - Number of trips to a site
  - Change in property sale amount due to distance and characteristics of a site

Limitations

- **Original studies are expensive and time consuming – impractical to do for every type of intangible value, in every location**
- **"Benefit transfer" is where WTP estimates from one study site (the source of the data) are transferred to another site (the site of policy interest)**
- **Issues with benefits transfer**
  - WTP differs with population demographics, distance to the intangible value
  - How many studies should be used?
  - Are the intangibles between original study and new site comparable?

Our idea

- **To identify available information on the economic value of each type of intangible loss or benefit**

- **To create a tool that:**
  - Identifies the intangibles affected by natural disaster mitigation actions and events
  - Provides an estimate of intangible values

- **Test tool in a case study**

Collaboration with other CRC projects

- **Mapping and understanding bushfire and natural hazard vulnerability and risks at the institutional scale – Victoria University**

- **Decision support system for assessment of policy and planning investment options for optimal natural hazard mitigation – Adelaide University**

Thanks

Please email us if you would like to be involved in our projects

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Types of losses from natural disasters

- **Direct loss – Damage caused by the event**
- **Indirect loss - Losses resulting from the event but not from its direct impact**

In both loss categories, there are two clear sub-categories of loss:

- **Tangible losses - Things that have a monetary (replacement) value (often private goods)**
- **Intangible losses: Things that are not bought and sold in a market (often public goods)**