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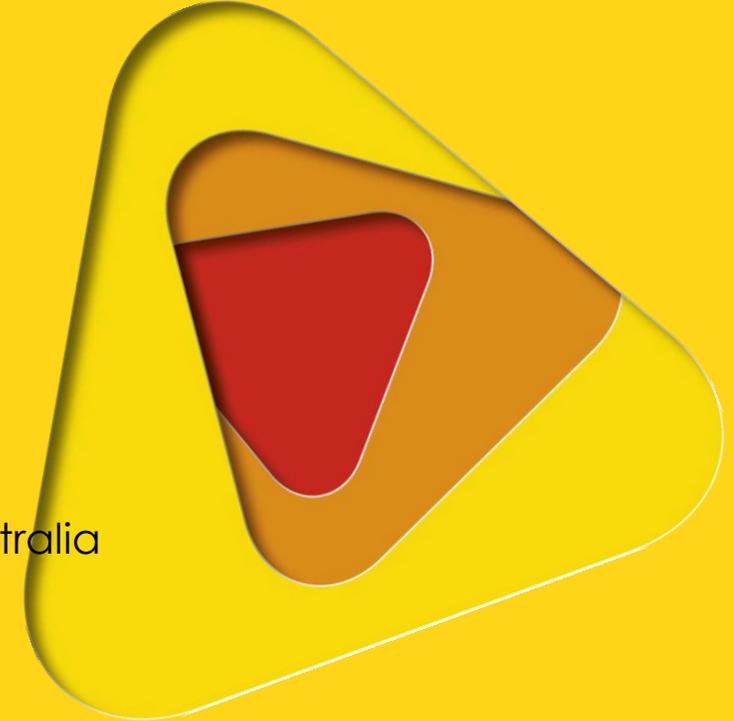
FILLING THE GAPS

How economics can help make important decisions when information is missing

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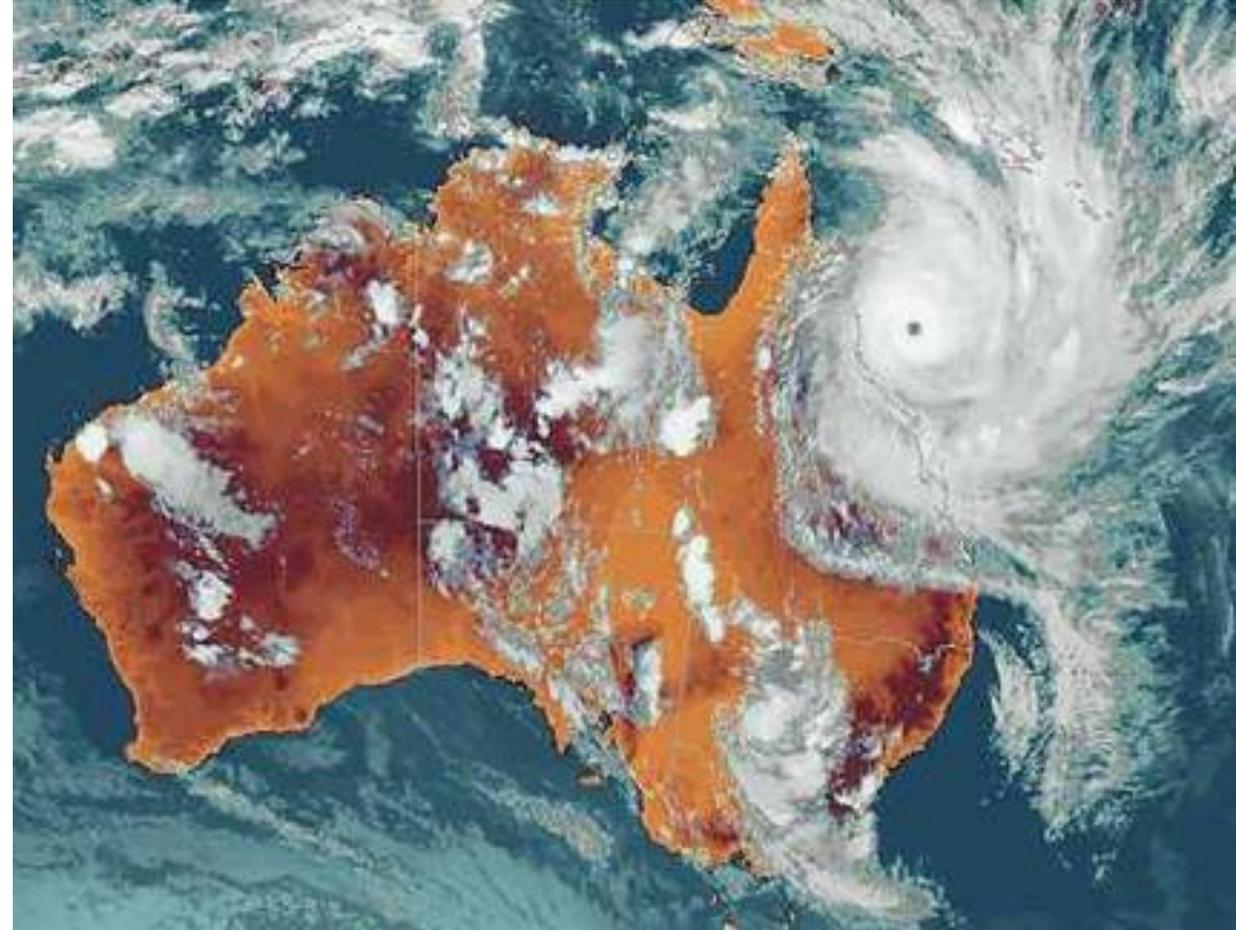
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DECISION MAKING FOR NATURAL HAZARDS

- Multiple hazards, multiple locations, multiple management options
- Limited resources
- Need to prioritise investments: best value for money



DECISION MAKING FOR NATURAL HAZARDS



- Compare costs and benefits of alternative options
- Often information is missing (often relating to benefits)
- Decisions can't always wait for new information
- What don't we know?

OR KNOW LITTLE ABOUT...

- Which hazard will hit next
- Where and when
- How big the damage will be
- How much will it cost to fix
- Which prevention measures will be effective
- How people will respond



How do we allocate resources efficiently when data is missing?

ECONOMICS WHEN DATA IS MISSING

- Economists can still model decision outcomes when data is missing or there is high uncertainty
- Economic tools can support decision making in such cases
- Simple and approximate comparisons of costs and benefits can show if an option is worth considering
- Conceptualising the process provides valuable information
- Uncertain information is better than no information

TOOLS TO FILL THE GAPS: #1 BENEFIT TRANSFER

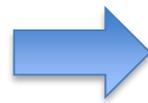


- Intangible values can be important
 - Often these are the 'benefits'
 - Often excluded from quantitative phases of decision making
 - value is implicitly zero

- Non-market valuation
 - Measures how much people are willing to pay for changes in social and environmental outcomes
 - Monetary-equivalent \$ values for benefit-cost analyses

BENEFIT TRANSFER – AN ALTERNATIVE

- Non-market valuation is too costly and time consuming to use for every decision → missing information
- Instead, take \$ values estimated from existing valuation studies and apply them to similar policy contexts



THE VALUE TOOL FOR NATURAL HAZARDS

Value Tool for Natural Hazards DATABASE_V1.xlsm - Excel

Value Tool for Natural Hazards: Database
Version 1, May 2018.
Fiona L. Gibson, Abbie A. Rogers, Jacob I. Hawkins, David J. Pannell

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Cover Page | Value type | Health values | Environmental values | Social values | CPI adjustment ...

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**VALUE TOOL FOR NATURAL
HAZARDS: GUIDELINES**

**Abbie A. Rogers, Fiona L. Gibson, Peter C. Boxall, Michael P. Burton,
Jacob I. Hawkins, Robert J. Johnston, Marit E. Kragt, John Rolfe and
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Health values **Environmental values** **Social values**

TOOLS TO FILL THE GAPS: #2 SENSITIVITY ANALYSIS

- Widely used + important tool
- How different information impacts results
- Wide range of uses



ECONOMICS WHEN DATA IS MISSING



Can provide information on:

- Confidence on the results
- Information needed + priority
- Changes to optimal decision
- Adaptive management

EXAMPLE

INFRASTRUCTURE BETTERMENT

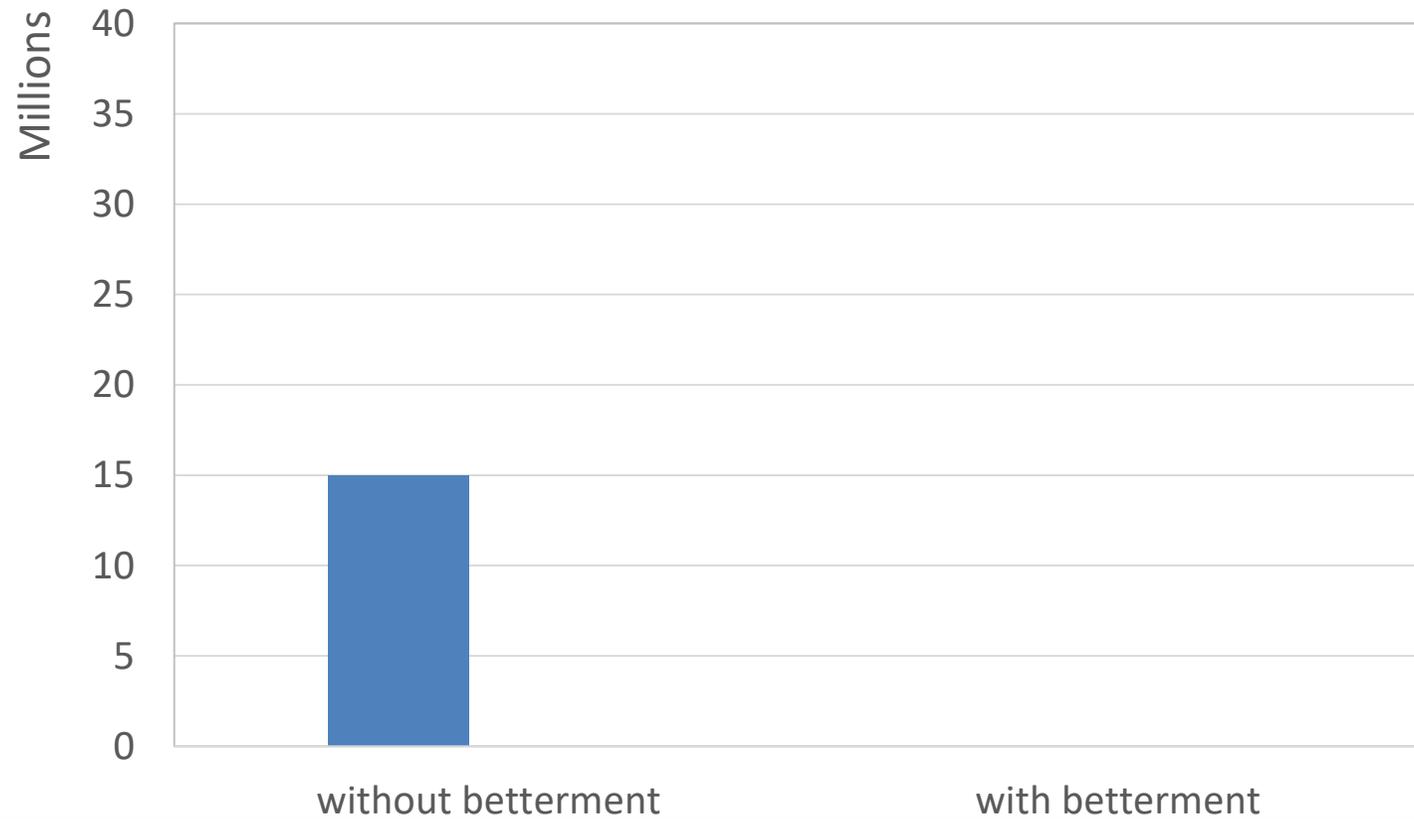
- Rebuild an asset to better standards
- Still rarely undertaken in Australia
- Example: coastal highway



EXAMPLE

INFRASTRUCTURE BETTERMENT

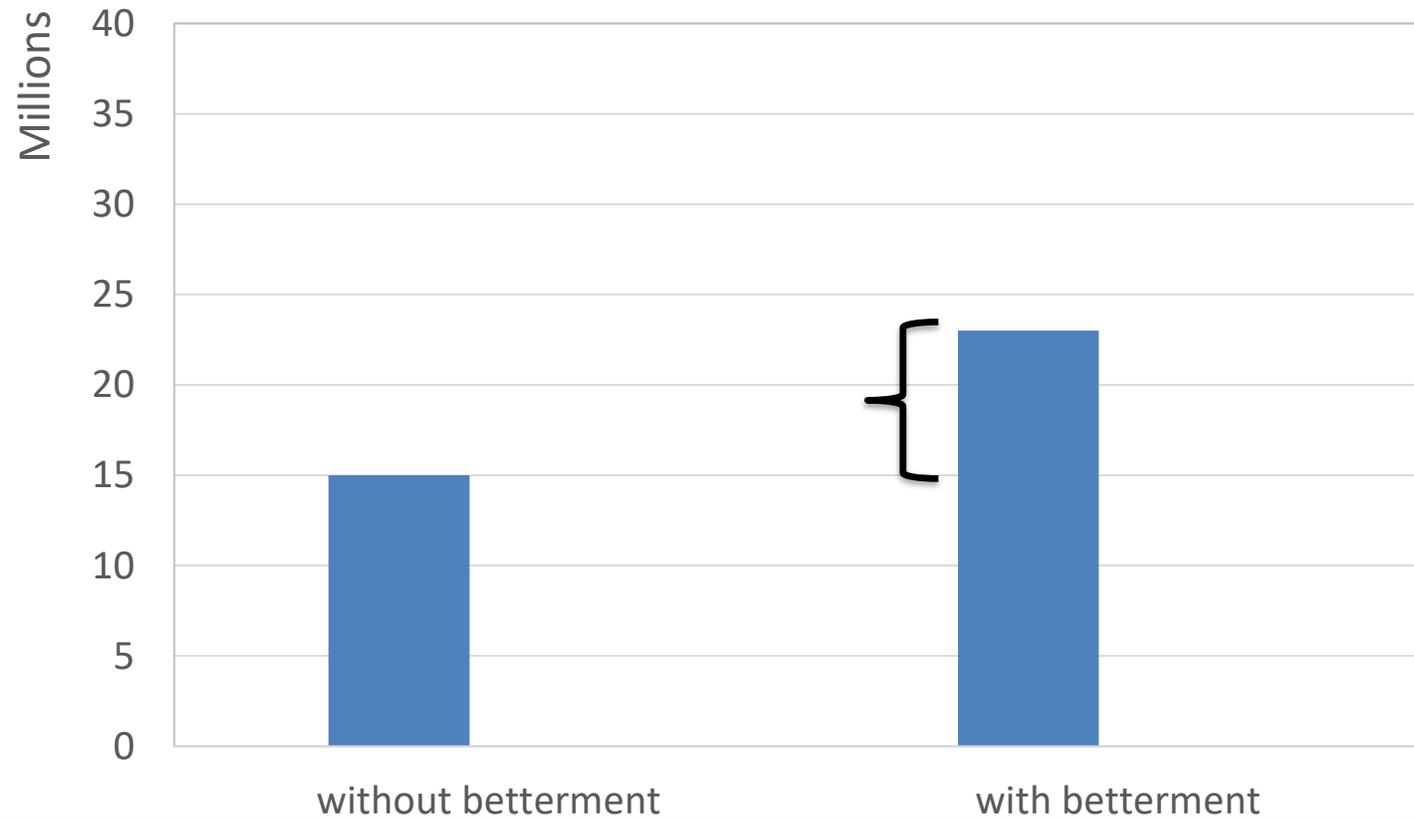
Costs of repair and reinstatement (current) 



EXAMPLE

INFRASTRUCTURE BETTERMENT

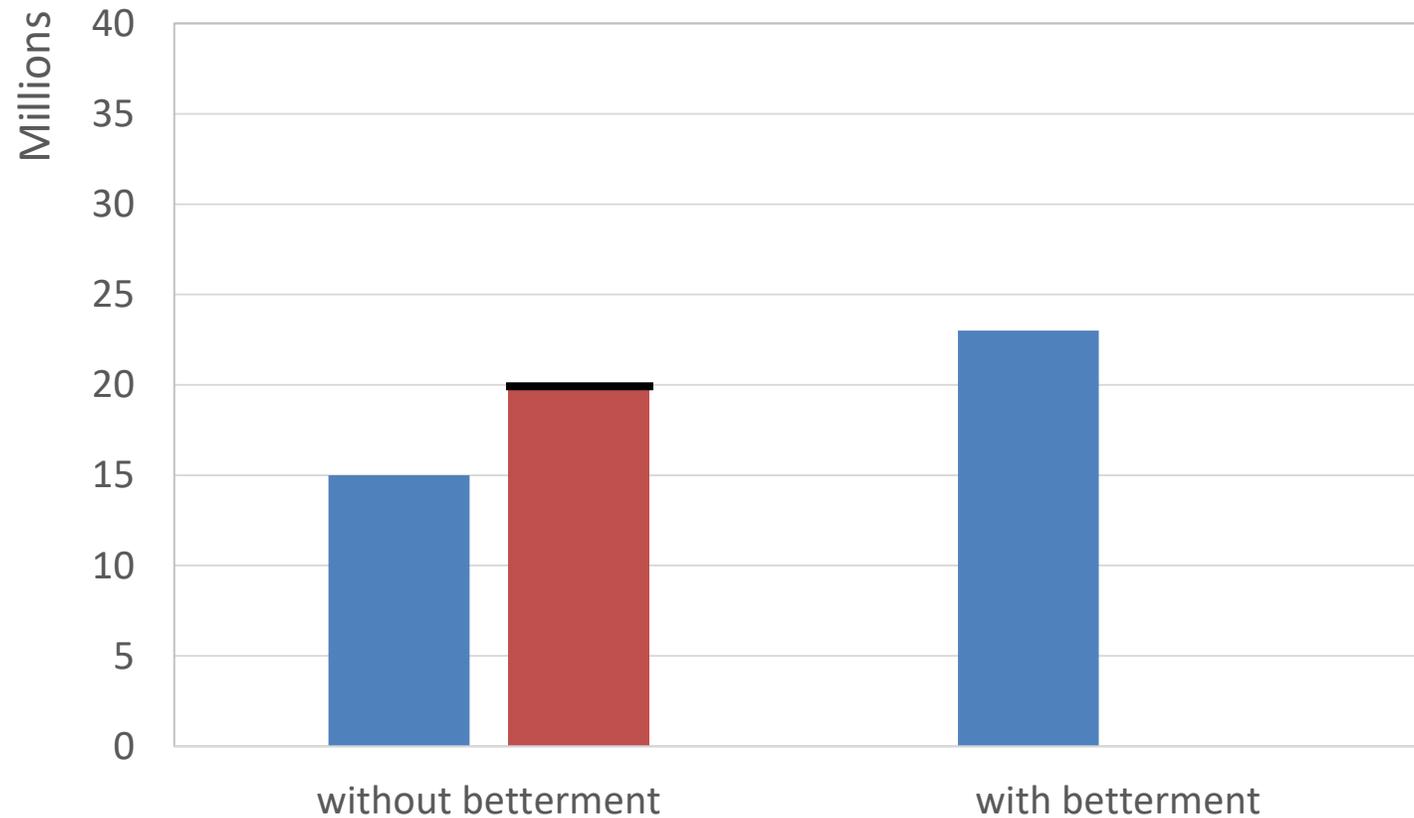
Costs of repair and reinstatement (current) 



EXAMPLE

INFRASTRUCTURE BETTERMENT

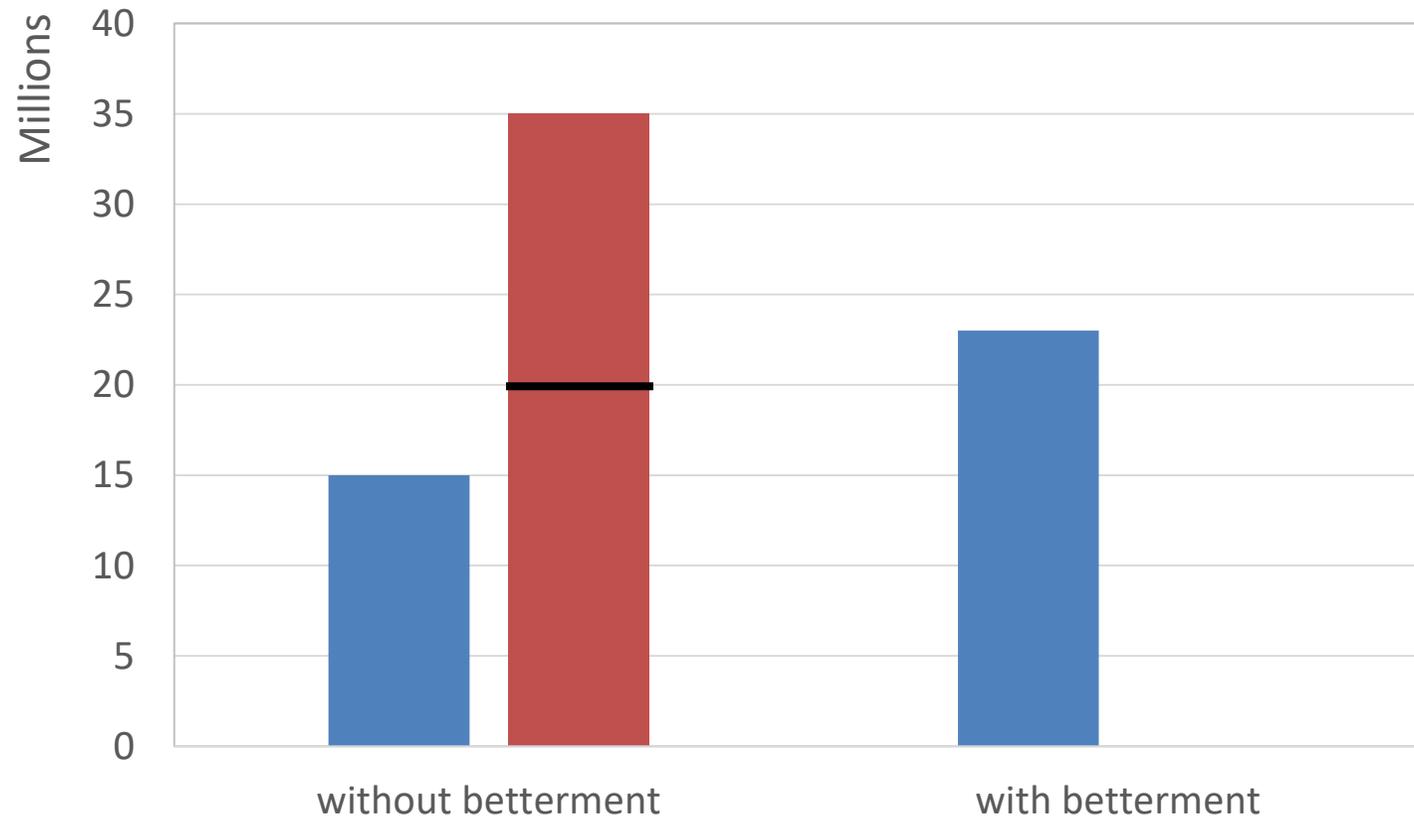
Costs of repair and reinstatement (current) ■ Future costs + damages ■



EXAMPLE

INFRASTRUCTURE BETTERMENT

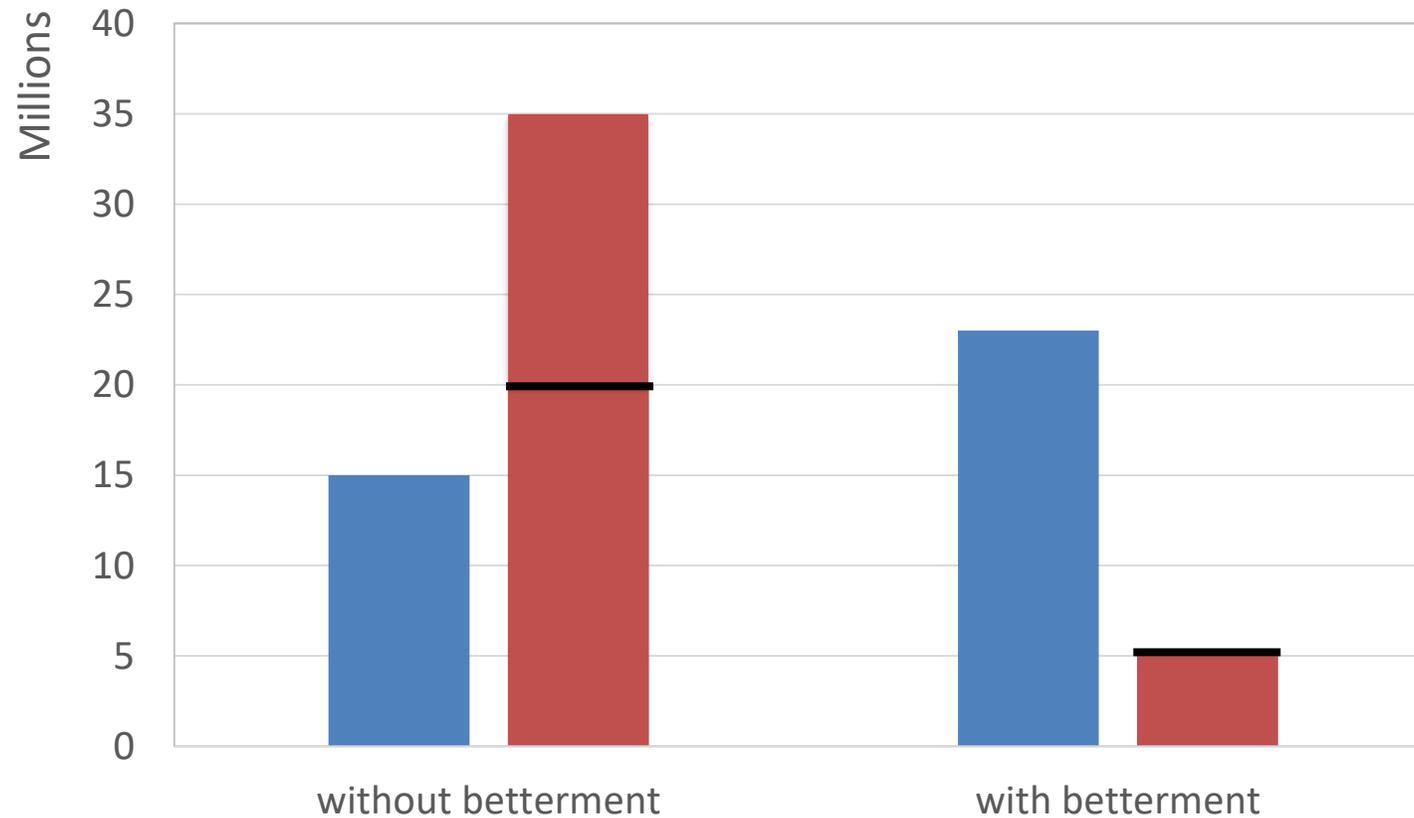
Costs of repair and reinstatement (current) ■ Future costs + damages ■



EXAMPLE

INFRASTRUCTURE BETTERMENT

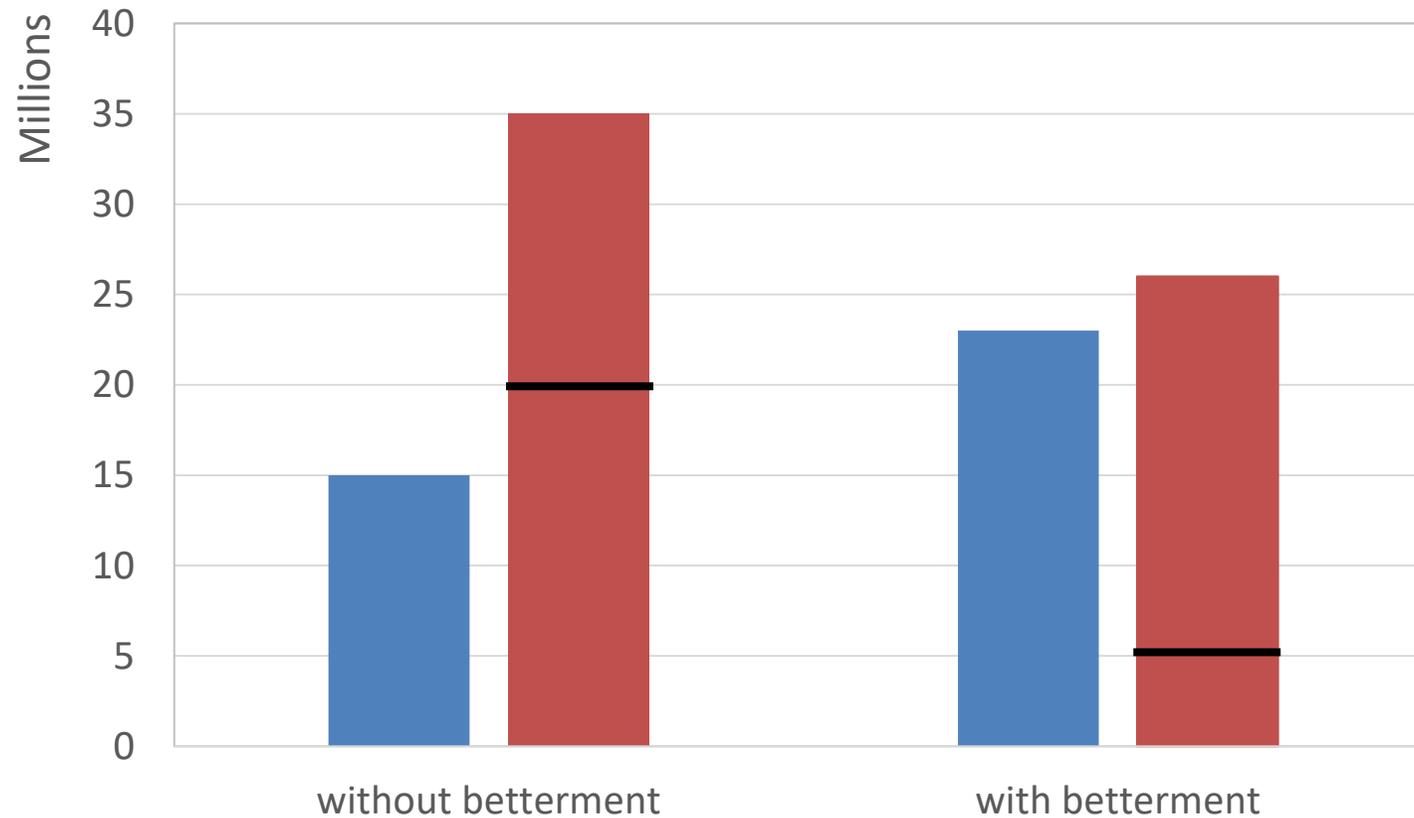
Costs of repair and reinstatement (current) ■ Future costs + damages ■



EXAMPLE

INFRASTRUCTURE BETTERMENT

Costs of repair and reinstatement (current) ■ Future costs + damages ■



EXAMPLE

INFRASTRUCTURE BETTERMENT

Uncertainty:

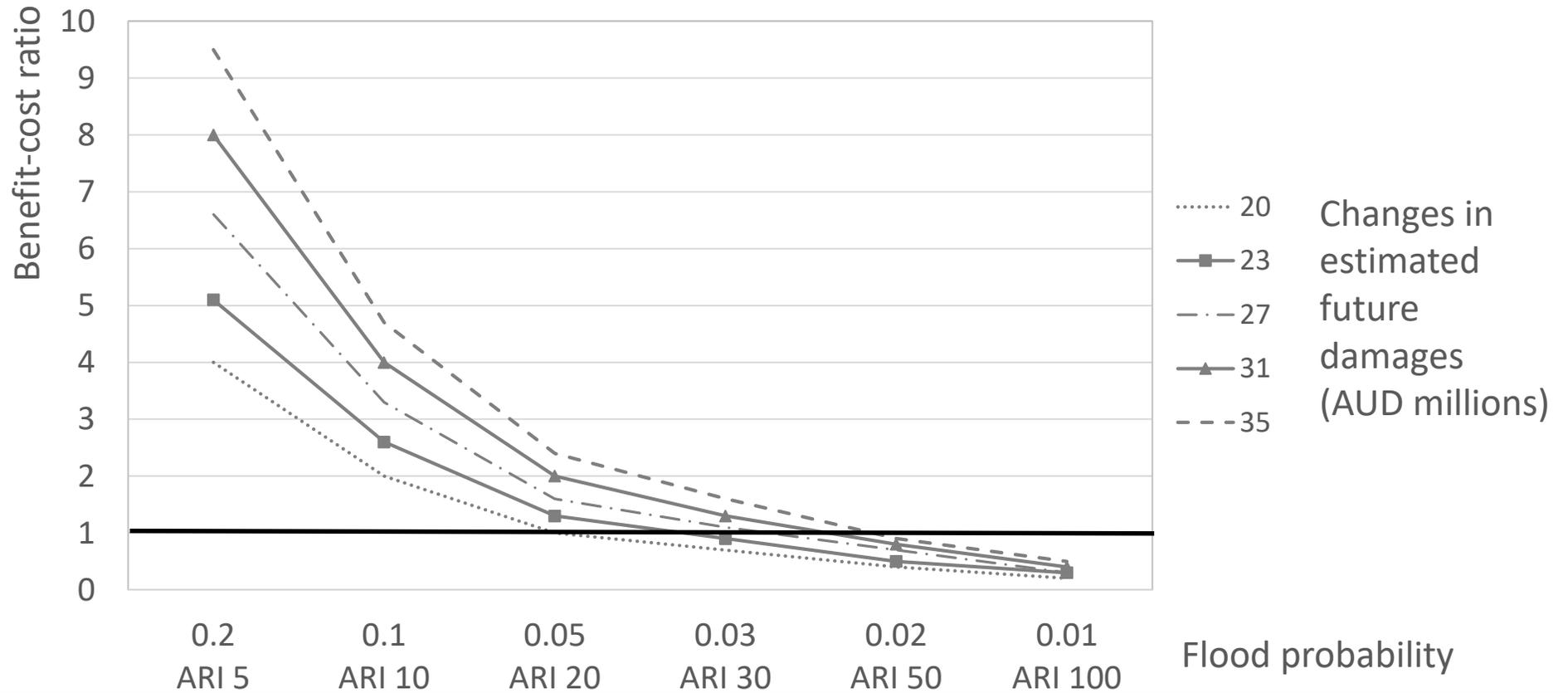
- Future costs + damages
- Probability of flood
- How does the benefit-cost ratio change with different information



EXAMPLE

INFRASTRUCTURE BETTERMENT

Estimates of future damages



INSIGHTS

- Value of betterment reduced if less floods occur
- But in this case: betterment is a good option even for low prob.
- Worth investigating further the effects of betterment
- Worth investigating further potential damages



TOOLS TO FILL THE GAPS: #3 QUICK ECONOMIC ANALYSIS TOOL



- Comprehensive economic assessments
 - Require time
 - A lot of information
- Quick and rough overview of value for money
- Easy to conduct sensitivity analysis
- Help improve decisions with new information

TOOLS TO FILL THE GAPS: #3 QUICK ECONOMIC ANALYSIS TOOL

- Help in decision making
- Use existing information
- Prioritise investments
- Options to develop a business case



TOOLS TO FILL THE GAPS: #3 QUICK ECONOMIC ANALYSIS TOOL



- What is needed to improve decisions and confidence
- Most important information
- Prioritise data collection
- Clear counterfactual
- Develop economics thinking

TOOLS TO FILL THE GAPS: #3 QUICK ECONOMIC ANALYSIS TOOL



- 2 case studies
 - One spot still available

THANK YOU!!

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BNHCRC project: **Economics of Natural Hazards**