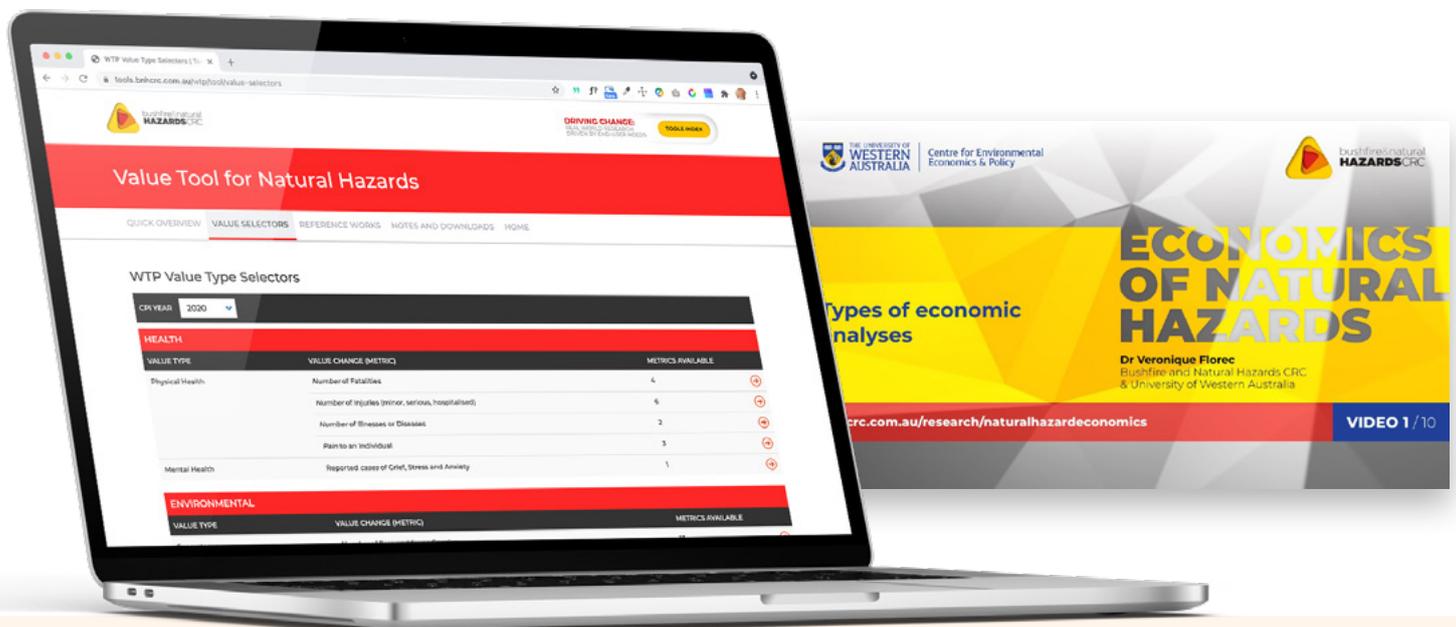


BUILDING ECONOMICS CAPACITY WITHIN EMERGENCY MANAGEMENT: TOOLS AND TRAINING FOR MANAGERS AND PRACTITIONERS



ABOUT THIS PROJECT

The *Economics of natural hazards* project provided information on the economic, social and environmental impacts of natural hazards, to help managers and practitioners make decisions about the allocation of resources for the mitigation of natural hazard impacts. Using the resources developed by this project, managers and practitioners are better equipped to estimate and evaluate the benefits of mitigation options, specifically when considering intangible (non-market) values.

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SUMMARY

Although there is significant interest in economics within the emergency management sector, there is a general lack of capacity when applying economics to natural hazard management. This research produced

and delivered resources to natural hazard managers and practitioners that helped improve their use of economic data and analyses - including improving their ability to choose the appropriate economic tools for the questions they want answers for, and their capacity to use, interpret and apply the results of economic analyses to their roles as natural hazard managers. The resources include the Value Tool for Natural Hazards, the Economic Assessment Screening Tool, an explainer video series and an online training course. All three are available to anyone who would like to improve their understanding of how to use economics in natural hazard management and can be accessed through the Economics, Mitigation and Value theme of the CRC's Driving Change website: www.bnhcrc.com.au/driving-change/economics-mitigation-value.

BACKGROUND

Research has shown that, despite substantial interest in economics within the emergency management sector, there is still a general lack

of capacity in the sector to fully understand and carry out economic analyses. Natural hazard managers often have limited familiarity with economic evaluation methods and limited knowledge on how to use the information derived from economic analyses. In addition, while hazard management agencies collect large amounts of information on their mitigation activities, costs and effectiveness, as well as natural hazard impacts, this information is generally not collected in a form that can be readily used in economic models. Agencies do not usually collect their data with strategic economic analyses in mind and, because of this, there can be inconsistencies and information gaps that make economic analyses difficult to conduct. Increasing the economic capacity within the sector helps address these challenges. The goal of this research was to build capacity in and understanding of the core economics concepts and models that are relevant to natural hazard management, so that natural hazard managers could become enthusiastic and effective utilisers of economic analysis.

Left: THE ECONOMIC ANALYSIS SCREENING TOOL
Below: THE VALUE TOOL FOR NATURAL HAZARDS.

VALUE TYPE	VALUE CHANGE (METRIC)	METRICS AVAILABLE
HEALTH		
Physical Health	Number of Fatalities	4
	Number of Injuries (minor, serious, hospitalised)	6
	Number of Illnesses or Diseases	2
	Pain to an Individual	3
Mental Health	Reported cases of Grief, Stress and Anxiety	1
ENVIRONMENTAL		
Ecosystems	Number of flora and fauna Species	13
	Number of identified endangered Species	5
	Status of identified endangered Species	8
	Change in status of ecosystem function	2
	Coverage of Native vegetation	13
	Status of threatened Ecosystems	1
	Carbon storage in vegetation and soils	1
Water Quality	Coverage of Riparian Vegetation	1
	Waterway Condition	1
SOCIAL		
Recreation	Recreation activity within the area	9
Amenity	Scenic amenity in the area	3
Safety	Perceived safety of dwelling location or construction	3
Cultural Heritage	Indigenous heritage significance	1

BUSHFIRE AND NATURAL HAZARDS CRC RESEARCH AND RESOURCES

Researchers have produced four resources that increase economic capacity within the emergency management sector, accessible to anyone interested through the Economics, Mitigation and Value theme of the CRC's Driving Change website: www.bnhcrc.com.au/driving-change/economics-mitigation-value.

1) Value Tool for Natural Hazards

The Value Tool for Natural Hazards is a searchable online database of the best-available intangible economic values associated with the impacts of natural hazards, such as health, environmental and social values. The values are designed to be incorporated into other economic analysis tools, such as the Economic Analysis Screening Tool (see below) and should be used in accordance with the guidelines provided. It incorporates annual Consumer Price Index increases to the values, allowing users to use values corrected to the relevant date.

The Value Tool is now being used by natural hazard managers across the emergency management sector, many of whom learned to use it through the training course mentioned below - including managers from the Department of Planning, Lands and Heritage (Western Australia), the Department for Environment and Water (South Australia), the Department of Fire and Emergency Services (Western Australia), and Geoscience Australia. This increased awareness and acceptance of intangible values and their importance has led to a clearer understanding of the trade-offs between tangible and intangible impacts, helping hazard managers make more informed and comprehensive decisions about different mitigation options.

2) Economic Analysis Screening Tool

The Economic Analysis Screening Tool - previously known as the Quick Economic Analysis Tool - performs economic analyses and evaluates the tangible and intangible costs and benefits of mitigation options for any natural hazard. It is a companion tool to the Value Tool, enabling managers and practitioners to evaluate and prioritise the treatment options that are likely to provide the best value for money. With the Economic Analysis Screening Tool, managers and practitioners can:

- conduct economic analyses in weeks rather than months or years

- understand the data requirements for benefit-cost analyses and how it all fits together
- identify the options that are most worth developing business cases for
- identify and prioritise the type and quantity of information that is needed to improve decisions and the confidence in those decisions
- understand the calculations and assumptions behind a benefit-cost analysis
- clarify the counterfactual (business as usual or another baseline)
- determine the importance of intangible values for different decisions.

The Economic Analysis Screening Tool was used to conduct a case study of bushfire management through prescribed burning in south west Western Australia. The results of this case study were compared with the results of a recent in-depth economic analysis of prescribed burning in the same area. Researchers found that, despite a few differences, the results from the Economic Analysis Screening Tool were comparable to those from the in-depth analysis and provided enough information to understand the value for money that each prescribed burning strategy generates. The findings from this case study were published in a peer-reviewed article in the *Australian Journal of Emergency Management* (see Further Reading, page 4). The Economic Analysis Screening Tool and its guidelines are available for download from [Economics, Mitigation and Value theme](http://www.bnhcrc.com.au/economics-mitigation-value) of the CRC's Driving Change website.

3) Explainer video series on the economics of natural hazards

Researchers created an explainer video series that guides natural hazard managers and practitioners through easy-to-understand explanations of the key economics concepts relevant to natural hazard management. The series teaches managers the different economic analyses available and the data requirements for each. Using drawings and simple examples, researchers explain how to use economic analyses to assess the value for money of different mitigation options, what information is needed to conduct an economic analysis, and how to interpret the results.

Researchers received very positive feedback from managers on the explainer series. Viewers have particularly enjoyed the graphics that are used for the explanations (as opposed to presentation slides).

Those who have watched all 10 videos in the series have reported improvements in their ability to frame decision-making problems appropriately and choose the right economic tools to define and compare mitigation options. The full series is available via the CRC's website: www.bnhcrc.com.au/hazchan-playlists/economics-natural-hazards-video-course.

4) Economics of natural hazards online training course

Researchers developed and delivered an online training course in 2021 on how to use economics in natural hazards management, using the Economic Analysis Screening Tool as the primary training tool. Participants were guided through different exercises about data requirements; how to calculate, interpret and use net present values; benefit-cost ratios and the internal rate of return; and how to perform, read and use a sensitivity analysis. Researchers modified the Economic Analysis Screening Tool slightly so it could be used as a training tool to explain, step-by-step, how to conduct a benefit-cost analysis and interpret the results. The course received excellent feedback.

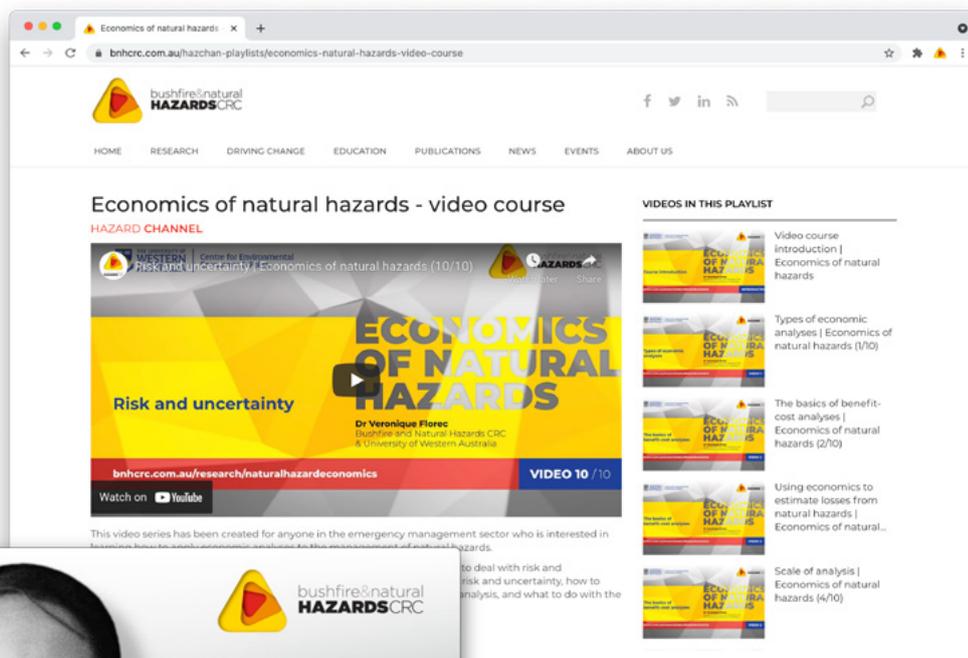
Researchers recorded and edited all sessions of the course. A video compilation of the course highlights will be made available on the CRC's Hazard Channel. This video will ensure that people who were unable to attend the course are still able to benefit from the training. The recorded video and supplementary material will be available [here](#).

HOW IS THE RESEARCH BEING USED?

These four resources are helping build economics capacity within the emergency management sector. The online training course alone trained four groups of natural hazard managers and practitioners, totalling nearly 50 people, all of whom now have a much better understanding of the data requirements for economic analyses, as well as how to estimate the benefits of mitigation options, interpret the results of a benefit-cost analysis, conduct a one-at-a-time sensitivity analysis, and apply the information obtained. Upon completion of the course, participants reported that they felt empowered and better equipped to conduct economic analyses, seeing possibilities for better mitigation of natural hazards using the knowledge they gained.

Ultimately, using the freely available resources has significant potential to create a shift in thinking within emergency

management agencies, empowering more organisations to become effective users of economic data and analyses. With more people using the training, discussions about how to allocate resources to mitigation and how to evaluate the cost and benefits of the tangible and intangible values of different mitigation options will not be limited to a few – instead, many more people in the emergency management sector will be able to contribute to those discussions. The resources may also create a change in the way data is collected, to ensure that future data collected are useful for conducting economic analyses and justifying the benefits of management decisions.



▲ **Above:** THE EXPLAINER VIDEO SERIES ON THE ECONOMICS ON NATURAL HAZARDS.

◀ **Left:** DR VERONIQUE FLOREC PRESENTING THE ECONOMICS OF NATURAL HAZARDS ONLINE TRAINING COURSE.

END-USER STATEMENT

“This project has done an excellent job of creating and maintaining an excellent relationship with its end-users, while also focusing on producing high quality research. The course of the project has adapted and changed to meet the needs of end-users, and ensured that quality research was undertaken along with ensuring that the outputs were relevant and accessible.

I commend the project team, and the community of end-users, in working well together and producing a suite of accessible products and knowledge on the economics of natural hazards. This continues to be an important area of research, and over time, with increased predicted impacts from natural hazards, will continue to play important role in planning mitigation strategies.”

Ed Pikusa, Principal Risk and Audit Coordinator, Department for Environment and Water, South Australia

The Bushfire and Natural Hazards CRC is a national research centre funded by the Australian Government Cooperative Research Centre Program. It was formed in 2013 for an eight-year program to undertake end-user focused research for Australia and New Zealand.

Hazard Notes are prepared from available research at the time of publication to encourage discussion and debate. The contents of *Hazard Notes* do not necessarily represent the views, policies, practises or positions of any of the individual agencies or organisations who are stakeholders of the Bushfire and Natural Hazards CRC.

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FURTHER READING

Flore V & Rogers A (2020) Economic analysis of natural hazard mitigation using the Quick Economic Analysis Tool, *Australian Journal of Emergency Management*, 35 (4), pp.48-55, accessible from <https://knowledge.aidr.org.au/resources/ajem-october-2020-economic-analysis-of-natural-hazard-mitigation-using-the-quick-economic-analysis-tool/>.

Flore V, Rogers A & Pannell D (2021) Economics of natural hazards, final report, Bushfire and Natural Hazards CRC, accessible at www.bnhcrc.com.au/publications/biblio/bnh-8120.