



## Statement 3: Applicability and usefulness of tools and methodologies to selected decisions

*Organisations seeking to value the benefits of natural hazard and climate resilience can access a growing array of methods and tools. The Resilience Valuation Initiative has identified several that specifically include a systems approach and seek to value intangible benefits and novel value flows.*

### SUMMARY:

- ▶ Leading guidance, including the AIDR Systemic Disaster Risk Handbook, the revised Infrastructure Australia Assessment Framework and Advisory Paper on A Pathway to Infrastructure Resilience Guidance, suggests that a systemic view of climate risk and resilience is required to manage the evolving future risk and opportunity landscape.
- ▶ Translation of a systemic approach into a quantitative measurement framework, especially one that adequately captures and monetises intangible costs and benefits, is a cutting-edge endeavour.
- ▶ RVI member experiences of applying frameworks and methods have shown that they largely focus on avoided loss of, and damage to, tangible assets but don't account for intangible costs and benefits or novel value generation. Undertaking this work requires significant resources, and organisational structure and support is critical to effectively applying the information gathered through a valuation process.

The Australian Business Roundtable for Disaster Resilience & Safer Communities established the Resilience Valuation Initiative (RVI) coalition. RVI is seeking to advance an accepted process with enabling methodologies for understanding the value generated by a resilience-building asset, network, feature or activity.

# Costs and Benefits of Resilience

In Statement 1, the RVI participants identified that they are seeking an approach that will produce outputs that reflect both tangible and intangible risks, costs and benefits, and that these can be quantified and monetised where possible. In addition, they are looking for quadruple bottom line measures covering environment, social, economic and governance factors.

RVI participants discussed specific examples of the costs and benefits from resilience building assets that would be important to them and their work and would therefore be useful for tools to be able to measure.

The discussion revealed:

- There is a large variety of costs and benefits that users may seek to measure.
- Current efforts have focussed predominantly on business/financial costs and benefits, in particular the (avoided) loss and damage of assets.
- In the practice of measuring possible loss and damage to assets, there are a variety of approaches and assumptions that underpin analysis which make comparison difficult<sup>1</sup>.
- Measuring intangible costs and benefits faces several barriers including that there are no agreed metrics to estimate the value to be assigned, no data available to assign values and further work is required before an agreed conversion from impacts to dollar values is possible.
- Mapping the systems that interconnect with a resilience building asset, feature or activity will reveal which groups should be involved in determining the critical costs, benefits or an intervention, and will likely result in identifying new or different costs and benefits from the intervention.

While currently there is no agreement within sectors nor within applications on standard ways to measure resilience benefits and then assign values to them, growing agreement and alignment seems likely to emerge first around avoided loss and damage to assets. Examples include the Coalition for Climate Resilient Investment Physical Climate Risk Assessment Methodology. It will be important to consider how emerging consensus approaches are compatible with a systemic view of disaster risk.

Resources exist that can support measuring intangible values by gathering existing data sources and approaches to convert impact measurements into monetised impacts (e.g., [the Bushfire & Natural Hazards CRC 'Value Tool for Natural Hazards'](#)). However, substantial gaps in data remain, many of which would require original research and new data collection efforts.

Identifying and advancing an agreed approach will require understanding the preferred (or emerging standard) approaches in different contexts and identifying if, and where alignment is desirable. In addition, it will require an understanding of which measures of resilience are important in different contexts and which are likely to be impactful in informing decision making. The cross-sector nature of RVI makes it an ideal platform to undertake this work.

It is important to note that across sectors and contexts the terminology used in methods and approaches for valuing the costs and benefits of resilience is interpreted and applied differently. This can lead to fundamental differences in the approaches taken and further frustrate efforts for comparable indicators or measures of costs and benefits. While definitional discussions can slow or distract from action, having consensus within an organisation and/or across collaborating entities does help when designing and implementing policy. In addition, shared understanding of where differences in definitions create material differences in approach, can facilitate collaboration and support moves for alignment where required. The RVI Decoder will be a preliminary effort to characterise the different definitions and interpretations. It can provide better understanding across sectors and practices and act as a stepping-stone to agreed definitions.

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<sup>1</sup> AIGCC Riding the wave of physical risks A compendium of tools and service providers for investors in Asia, Alice Martin, July 2021

# Measuring Resilience Costs and Benefits

Several examples of resilience valuation were explored by the RVI working group. The experience of working group member organisations, and results from the case studies in measuring the value generated by resilience building assets, shed light on the suitability of existing tools and resources in various decision-making contexts.

## CBA – AustralianSuper

**DECISION TYPE** – investment of a pool of funds in infrastructure / assets (private sector investment linked to strategy).

AustralianSuper uses a combination of top-down and bottom-up assessments to understand the physical climate change risks to their assets and across their portfolio of investments.

The top-down approach is aimed at informing the Board, Chief Investment Officer, Investment Committee, internal investment teams and members, and offers a portfolio-wide assessment of exposure to climate change risks. It allows for disclosure under the TCFDs and informs ongoing management of the portfolio of investment.

AustralianSuper worked with Four Twenty Seven to assess physical climate risk for heat stress, water stress, floods, rising sea levels and cyclones for unlisted assets and heat stress for the listed portfolio.

This analysis provided information to help understand the areas of high potential exposure across the portfolio but has limitations in its ability to take account of the surrounding context of those assets and mitigation actions undertaken at the asset level. AustralianSuper is exploring further analysis with other tools to understand the potential revenue impacts from climate change risk to listed equities across geographies.

The bottom-up assessment is based on an in-house framework undertaken as part of the due diligence process when deciding whether to invest in an asset and during regular monitoring as part of the ownership plans. The bottom-up assessment includes a risk identification and analyses of mitigants, adaptation plans and asset level governance and strategies in place.

Through the combination of these processes, resilience issues are covered, however there is an ongoing refinement process to integrate both these considerations to ascertain more quantitative impacts.

## CBA - QRA

**DECISION TYPE** – re-building assets following a natural disaster (allocating funds from within an existing pool).

The Queensland Reconstruction Authority's (QRA's) Queensland Betterment Fund has allowed for local governments and state agencies to rebuild essential public assets to a more resilient standard to help them withstand the impacts of future natural disasters. Since the first betterment fund was established, most completed projects have been subsequently impacted by natural disasters, with 85 per cent sustaining no damage or only minor or superficial damage.

Queensland's experience with betterment shows that an upfront investment in rebuilding impacted assets to be more resilient, saves money for all levels of government in future disasters. QRA undertook analysis to examine avoided costs generated, identifying that of the betterment projects that have been re-impacted, an investment of \$110 million has generated more than \$250 million in avoided reconstruction costs.

QRA is interested to expand upon the analysis that it has undertaken so far as, despite the positive results in terms of avoided reconstruction costs, it is still likely the value generated by these investments is underestimated. For example, improvements to a water supply intake for the town of Gayndah not only avoided damage to the intake in three subsequent events (an avoided cost estimated at \$5,408,720), it also meant that the town had a clean drinking water supply following several flood events. The value of clean drinking water for that town might be estimated by applying the SAVi tool.

## SAVi - Stormwater Infrastructure Solutions in Johannesburg, South Africa

**DECISION TYPE** – design of a new infrastructure asset (projects, programs or assets seeking funding).

Johannesburg City Council used the '[SAVi assessment](#),' integrated with climate data developed by the Copernicus Climate Change Service (C3S) to help choose a potential stormwater infrastructure solution to improve flood management in the area.

The SAVi assessment involved mapping the system dynamics then using project finance modelling to:

- Calculate capital and operational expenditures.
- Value co-benefits, avoided costs, and societal costs. This includes job creation, discretionary spending, (reduced) flood damage costs, and air quality improvements (reduced health costs).
- Simulate climate change scenarios (varying projections of climate variables) and the impact on the performance of the three stormwater infrastructure alternatives, such as impact on operational expenditures and magnitude of co-benefits, avoided costs, and societal costs.
- Analyse the performance (IRR, NPV) of three alternatives under the different climate change scenarios.

Over the life cycle of the infrastructure, the hybrid solution and the full re-naturalisation of the stream were found to be the most cost-effective investments.

## CSIRO – Enabling Resilience Investment

**DECISION TYPE** – selecting responses to address physical climate risks and realise value (projects, programs or assets seeking funding / finance).

CSIRO, Value Advisory Partners and the University of Adelaide have been collaborating with stakeholders in Port Adelaide Enfield since December 2020 to develop potential opportunities in delivering initiatives and investment cases (in this instance coastal protection infrastructure) which would create value and reduce climate and disaster risk in the Inner and Outer Harbour areas of Port Adelaide. The case study focused on building an investment case for Port Adelaide Enfield, by:

- Identifying and quantifying the value potential - new value created in the form of accessibility and connectivity, commercial opportunities, new and enhanced amenity and new development as well as new additional employment
- Assessing the value at risk in terms of asset restoration, and economic and social disruption
- Evaluating expanded community benefits and beneficiaries
- Monetising the value created and developing funding strategies for government and private sector contributions
- Facilitating collaborative and coordinated partnerships.

This project has demonstrated a viable investment case that creates value for multiple beneficiaries through interventions that mitigate climate and disaster risks and create opportunities for building resilience and creating social, economic, and environmental value that benefits local and regional communities.

# Insights and opportunities

Translating a systems approach into measurement is cutting edge and is not standard in many tools and methods currently available<sup>2</sup>. In addition, adopting a systems view is ambitious for some organisations. It is a big leap from current practice where resilience or exposure to climate hazards have not routinely been considered.

Approaches that seek to take a systems approach and produce quantitative measures tend to be more complex and require significant resources to apply and some degree of expertise to interpret. As a result, a systemic view remains challenging to operationalise into decision making via existing tools and methodologies.

RVI participants identified the need for a process that can support taking a systems approach, but which is sensitive to the capability build that needs to accompany a systems view. This is not a trivial task.

There is a tension between the desire for a simple, scalable approach and the needs of users for a systemic approach that yields quantitative, monetised measures that includes intangible risks, costs and benefits and covers quadruple bottom line measures - environment, social, economic and governance.

Further, there are ethical, organisational, behavioural, cultural, and institutional issues associated with the monetisation of intangibles. Organisations should carefully consider the need to monetise values and explore whether quantification may be more appropriate for their needs. Even within this space there is a lot to be done to agree consistent and comparable approaches.

Alongside the development of tools and methodologies that better incorporate a systemic view, there will need to be a shift in organisational culture that can accommodate a more systemic approach to resilience. Valuing resilience is not a one-off process, it must be valued throughout project design, implementation, maintenance, monitoring and review. Working group members noted that sometimes the importance of resilience diminishes as budgets and timelines squeeze the project. This can result in teams reverting to more standard processes and tools. Therefore, there needs to be an organisational environment conducive to the application of a systemic approach.

There is also a need for improved collaboration among all parts of the system – private sector, government, community and research. Private sector entities that wish to take a systems approach, would benefit from community-led, place-based resilience assessments and plans being in place. Existing, shared assessment and plans would mean that there is less need to undertake unique consultations for all decisions, as an understanding of the community values will be in place. In addition, these plans can provide context and future visions that can inform resilience decision-making and investments by private sector and government actors.

## Recommendations for a way forward

The RVI provides a valuable conduit to test and apply emerging and agreed approaches to advance their uptake and improve their practicality and acceptance. RVI members will test, validate and understand the practical application of emerging approaches, especially those that take a systemic view of risk, and seek to value intangible costs and benefits and novel value generation.

Finding the balance between the ambition of a systemic view with comprehensive quantitative, and monetised valuation of all costs and benefits, and the reality of practical application within existing operating environments, will require testing, flexibility, iteration, and changes to operating environments.

RVI provides a space to seek alignment among the definitions, framings and methods emerging in different sectors, to ensure that the outcomes they are seeking are aligned and drive resilience across the systems they affect.

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<sup>2</sup> AIGCC Riding the wave of physical risks A compendium of tools and service providers for investors in Asia, Alice Martin, July 2021

# About the Resilience Valuation Initiative

## PARTICIPATING ORGANISATIONS

AECOM	Department of Prime Minister & Cabinet	Munich Re
Arup	Energy Networks Australia	National Recovery & Resilience Agency
Australian Business Roundtable for Disaster Resilience & Safer Communities	EY	Natural Hazards Research Australia
Australian Institute for Disaster Resilience	Frasers Property Group	Queensland Reconstruction Authority
Australian Property Institute	Green Building Council of Australia	Resilient Projects
Australian Red Cross	IAG	Woolworths
Australian Super	Infrastructure Australia	WWF-Australia
Climate-KIC	Infrastructure NSW	
CSIRO	Minderoo Foundation	

The Resilience Valuation Initiative welcomes organisations to participate in our work program.

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### FIND OUT MORE:

<http://resiliencevaluation.com.au/>

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