Preparing for sea level rise: the economics of adapting

"Sea level rise is the biggest risk to the Australian economy from climate change – bigger even than bushfires, heat stress and the damage to agriculture."
Professor Tom Kompas, reported in The Age (23/1/21)

What will damage from sea level rise and storm surge cost Victorian communities in the coming decades? How much should we invest to mitigate that damage? These are critical questions for government, land managers, traditional owners, business, and the wider community.

Last year, the Victorian Marine and Coastal Council (VMaCC), Lifesaving Victoria and DELWP initiated a project to assist with answering these questions. The project partners commissioned the University of Melbourne to model the economic impacts to help planning for adaptation to sea level rise and associated climate change effects in the coastal environment. The planned release of the project report is late 2021, and the project outcomes will enable the future provision of evidence-based economic recommendations to the Victorian government and community.

Why is the project needed?

August 2021 saw the IPCC release their most recent report with the latest understanding of global warming, and the climate projections for the future. It all suggests we need to be better prepared for what is coming, and that adaptation is essential.

> *B.5: Many changes due to past and future greenhouse gas emissions are irreversible for centuries to millennia, especially changes in the ocean, ice sheets and global sea level.*
> *B.5.3.: It is virtually certain that global mean sea level will continue to rise over the 21st century.*
> *B.5.4: In the longer term, sea level is committed to rise for centuries to millennia due to continuing deep ocean warming and ice sheet melt, and will remain elevated for thousands of years (high confidence).*
> Sixth Assessment Report for the IPCC, https://bit.ly/3k0TJmK

Victoria's infrastructure strategy 2021 – 2051 (Infrastructure Victoria) flags that there are mounting risks to critical coastal infrastructure and assets, and a need to plan for coastal resilience.

The project complements work being done by the Victorian Government to respond to climate change impacts, including the Marine and Coastal Strategy; a draft of which is available at Draft Marine and Coastal Strategy | Engage Victoria.

Victoria's Climate Change Strategy (released in May 2021) is a roadmap to net-zero emissions and a climate resilient Victoria by 2050. It sets out the Victorian Government's priorities to address current climate change impacts, reduce barriers to adaptation, and lay the foundations for transformational adaptation. The Victorian Government is working on Adaptation Actions Plans for seven essential systems to ensure Victoria's climate resilience: these span the built environment, education and training, health and human services, natural environment, primary production, transport, and water cycle system. In addition, the Victorian Government has supported local communities to develop their own Regional Climate Change Adaptation Strategies for release in late 2021.

What is the project doing?

Professor Tom Kompas (University of Melbourne) leads the project and research team, which includes Dr Karl Mallon (Climate Risk Pty Ltd). Both are acknowledged Australian leaders in the development of large-dimensional computational modelling used for determining the impacts from climate change and the costs of mitigation and adaptation. Their expertise is used widely by Commonwealth and State Governments and the finance and insurance sectors.

The project team is looking at the costs of damage anticipated from sea level rise and storm surge on coastal communities, on wetlands and land use classes within 5 km of the coast, and on assets such as homes, commercial buildings, power and water utilities, and roads. These costs are likely to be many billions of dollars. Using selected case studies, the team is also assessing the costs of investment in adaptation to minimise damages.

The team is using three models to estimate the range of potential economic costs:

- The Climate Risk spatial model (Karl Mallon, Climate Risk Pty Ltd) which assesses residential, infrastructure and government asset layers.
- The spatial-economic model (Kompas/University of Melbourne) aggregates 88 land use data categories into ten land use categories across 133 sub-regions: residential, commercial, industrial, quarries, agriculture, infrastructure, education and public facilities, parks, museums and outdoor areas and reserves and conservation areas.
- The macro model (Kompas/ University of Melbourne) uses data to determine the impacts on the Victorian and national economies in terms of losses in State income and GDP from climate change, which augment the damages from sea-level rise and storm surge.

VMaCC plans to start briefing government and industry later in 2021 ahead of a public release of the full report.

Image credits: Anthony Boxshall