

## INCREASING THE RESILIENCE OF VICTORIA'S REGIONS AND COMMUNITIES

*Discussion Starter by Dr Penny Whetton*

### Background/Context

The State of Victoria is a major social and economic engine for Australia, accounting for approximately one-quarter of Australia's population and economic activity. The State is projected to add approximately 1 million residents over the next 25 years (including significant overseas migration), the majority of which will settle within the metropolitan Melbourne area or other regional cities. Such anticipated growth is likely to drive a diverse array of social, cultural, economic and environmental changes in Victoria in the decades ahead. Some rural regions are projected to change markedly over this time, while others will continue to rely more on historical combinations of industry and land-use. Such changes will evolve within the context of significant climate change, which will interact with other social and economic drivers to increase the risk of adverse outcomes, and potentially create some opportunities.

Victoria's climate has warmed over the past century by around 1°C, in line with Australian and global trends. The climate is projected to warm by a further 0.8°C by 2030 (with a range of 0.6 to 1.2°C), with uncertainties mainly due to differences between results of the climate models rather than the different emission scenarios. Beyond 2030, projected climate changes are more strongly affected by emissions. Warming by 2070 is projected to reach 1.4°C (range of 0.9 to 2.0°C) given a low emissions scenario or 2.7°C (range of 1.8 to 3.8°C) under a high emissions scenario. More extreme projections cannot be ruled out.

Victoria's climate is also expected to dry as the decades progress. Climate models project a decrease in annual rainfall of 4% by 2030 (with a range of -9 to +1%) compared to the past century. By 2070, this decrease grows to 6% under a low emission scenario (range -14 to +2%), or 11% (range -25 to +3%) under a high emission scenario. If the dry conditions that have prevailed over the past decade in Victoria are due to the enhanced greenhouse effect, this rainfall decrease is more severe than the predictions from climate models. It is more probable that we have experienced a naturally-driven dry period made more severe by climate change, but we don't know for sure. It may be prudent to consider the rainfall of the last decade as the "new normal" with further decreases being possible.

In addition to these changes, Victoria is likely to have increasing evaporation rates, increased days of high fire danger, much less snowfall, more frequent drought and greater risk of coastal erosion and inundation. IPCC projects a sea level rise of 18 to 79 cm by 2095, relative to 1990. A recent study developed a relationship between observed global average temperature and sea level rise, then applied this relationship to the IPCC global warming projections to estimate future sea level rise. This study estimates a rise of 49 to 89 cm by 2095, relative to 1990. For 2030 and 2070, the study found a sea level rise of 13 to 20 cm and 32 to 56 cm, respectively. There is a risk that the rise will be higher than this if melting of ice sheets (which is poorly understood) begins to contribute significantly.

### Implications for Victoria

Such changes in climate have implications for Victoria in many sectors and regions as set out in a recent assessment of the vulnerability of the State to climate change. Victoria's resilience to climate change is likely to be most tested in the areas of biodiversity (many species at risk with limited scope for adaptation), water resources (declining resource, increased demand, but moderate scope for adaptation) and primary production (significantly affected by higher temperatures, increased drought,

reduced water available for irrigation, but moderate to high adaptive capacity). In the longer term, the impacts of rising sea level (increased storm inundation and coastal flooding) will test the resilience of our coastal development.

## Possible ways forward

Victoria can help reduce the risk of larger changes in climate occurring as the century progresses, by contributing to global greenhouse gas emission reduction efforts. However, even if the world is successful in this endeavour, some climate change is inevitable over the coming decades. Most of the projected change to 2030 cannot be avoided. Victoria will need to adapt to the impacts of climate change in an environment where there is uncertainty about how large and rapid the impacts will be, and where society is also changing. Planning needs to consider how to adapt to the changes in climate over the next few decades that are difficult to avoid, as well as managing the longer-term risks posed by potentially much larger changes in climate. The latter concern is particularly relevant for infrastructure with long planning horizons such as major developments in low-lying coastal areas, although priority concerns will vary regionally around the State. Adaptation will require the involvement of all levels of government, industry and the community.

## Some critical questions

- (1) **What are the current trends in Victoria's demographics, economy and environment that are likely to increase or reduce vulnerability to climate change and how might these shift in the future?**
  - (a) *How important is climate change relative to other regional, national and global changes to the security of its natural resources and the prosperity of its enterprises and communities?*
  - (b) *Are there areas or sectors in Victoria that are likely to suffer from the cumulative strain of climate change as well as other structural adjustments?*
  - (c) *Are there critical thresholds or tipping points ahead for Victoria arising from climate change? What are they?*
- (2) **How can Victoria maximise its leadership potential in contributing to national efforts in greenhouse gas mitigation and climate adaptation (e.g., COAG Adaptation Framework)?**
  - (a) *How can responsibilities for mitigation and adaptation be shared among different levels of government as well as the public and private sectors?*
- (3) **How does the State manage the major risks posed to its biodiversity, which stems from loss of preferred climatic habitat, limited scope for adaptation, and the potential invasion of new species?**
  - (a) *How can land use and development be managed to maintain or enhance resilience of ecological communities?*
- (4) **What are the implications for urban and irrigation water supplies, and what is the appropriate response if the dry conditions that have prevailed over the past decade persist into the future and become more severe?**
  - (a) *What is the appropriate balance of investment in supply and demand-side management?*
  - (b) *How do we arrive at an efficient yet equitable partitioning of Victoria's water resources?*

- (5) **How do we empower the State's primary industries to adapt to climate change?**
- (a) *Which industries require adjustment and which require transformation?*
  - (b) *How will changes and impacts at national to global scales affect Victoria?*
- (6) **How do we plan coastal development in Victoria given that the risk of erosion and storm surge inundation will increase in the decades to come, and future sea-level rise may be significantly higher than currently projected?**
- (a) *How do we maintain coastal amenity and economic vitality while minimising risk?*
  - (b) *Who should bear the risk for development in at-risk areas?*

**By Dr Penny Whetton, April 2008**

**(in collaboration with colleagues at CSIRO including Ben Preston, Roger Jones and Kevin Hennessy)**

*This discussion starter has been prepared by Dr Penny Whetton to stimulate ideas and debate at the Victorian Climate Change Summit. It is not a statement or policy paper by the Victorian Government.*