



What is adaptation?

Purpose

This fact sheet introduces the concept of adaptation in the context of climate change and explains some related ideas.

Introduction

The Intergovernmental Panel on Climate Change (IPCC) tells us that due to past emissions of greenhouse gases, future climate change is inevitable and that Australia is very vulnerable to its impacts¹. Western Australia (WA) is already experiencing some climate change impacts.

There are two categories of responses to climate change: mitigation and adaptation. Initially climate change policy focused primarily on mitigating greenhouse gas emissions (reducing emissions or enhancing their storage sinks) and therefore reducing the rate and the magnitude of climate change. It is now apparent that we also need to adapt our way of life, to make us less vulnerable to the impacts of climate change on our society, environment and economy.

Adaptation is defined by the IPCC as follows: “the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects”. In simpler terms, adaptation refers to any activity that reduces the adverse effects of climate change and/or enables us to take advantage of opportunities that climate change may present.

We have now reached a stage where neither mitigation nor adaptation alone can prevent climate change impacts and we need to do both to significantly reduce the risks we face.



Figure 1: Tropical Cyclone Fay over north-west WA. Climate change may result in increasing severity of tropical cyclones. Photo: NASA 2004.

The cost of climate change and investment in adaptation

There will be costs associated with the impacts of climate change. Investing in well-planned adaptation measures will in many situations help avoid or at least minimise these costs.

The impacts of climate change will vary from region to region and as such the consequences and costs will be circumstance-specific. Therefore, while mitigation responses can be efficiently determined through international and

national processes, many adaptation strategies are best developed at a regional level. This will ensure consideration of regional conditions and circumstances and harness the potential of regional communities. The scale of impacts projected requires us to act now to identify risks, develop strategies to reduce these, and adapt to observed and projected changes. Adaptation case studies have shown that in many cases delaying action will result in increased long-term costs and reduced adaptation options.

Risk management

Risk management approaches—such as those set out in the Australian Government’s publication ‘*Climate Change Impacts and Risk Management, A Guide for Business and Government*’²—provide a useful framework for identifying climate change risks, engaging interested parties and collaboratively determining strategies and measures to reduce risk and adapt to climate change impacts. Identifying and prioritising the risks is a useful precursor to incorporating climate change considerations into risk management, decision-making and strategic planning activities.



Figure 2: Perth Hills fire. Increased fire frequency and intensity is a possible impact of climate change in WA. Photo: Department of Environment and Conservation 2012.

Vulnerability assessment

Vulnerability assessment is an extension of a risk management approach. An important step in determining how best to adapt is to identify how vulnerable our systems (natural and human) are to climate change impacts.

Vulnerability refers to the degree to which a system is susceptible to, and unable to cope with, the adverse impacts of climate change. As with risk, vulnerability is a function of both the *exposure* to changes a system may experience, and its *sensitivity* to those changes. It is also a function of *adaptive capacity* in relation to those risks.

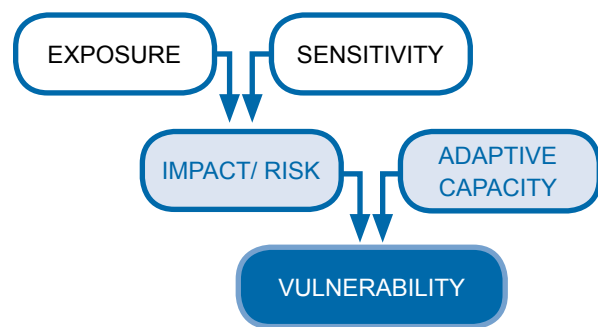


Figure 3: Relationship between vulnerability and its components (Allen Consulting 2005).

For example, to assess the vulnerability of an agricultural system to climate change and determine appropriate adaptation strategies we must ask:

- How the climate is likely to change in the agricultural region (the system’s exposure to climate change)—how will rainfall and temperature change? Are droughts more likely?
- How sensitive the system is to change (its sensitivity)—how tolerant are the agricultural revenue generators, including the crop, to the predicted climate change impacts?
- What is the potential to adjust the system to the changes predicted (its adaptive capacity)—is there potential to plant crops that will be able to

withstand the projected changes? Will diversifying the system (establishing a range of revenue generators) improve its resilience to climate change?

The systems that are most vulnerable to the impacts of climate change are those that are highly exposed to the impacts, are sensitive to the risks and have little or no capacity to adapt.

Adaptation measures

Following the assessment of risk and vulnerability, decision-makers then identify the potential options for reducing the risks, i.e. adapting to changes. This requires the evaluation of individual measures and in some cases broader adaptation pathways. Such evaluation involves examining the values of relevant assets and services, the costs and benefits of the individual measures and their consequences, as well as consideration against social and environmental criteria.

Adaptation measures are generally developed to reduce vulnerability to climate change impacts by:

- reducing exposure to climate change; for example, establishing communities away from high risk flood prone areas;
- reducing sensitivity to climate change; for example, designing infrastructure such as bridges, roads and buildings that can withstand climate changes such as increased temperatures and storm surges; and
- increasing the adaptive capacity of systems; for example, putting into place emergency management systems to deal with flood or bushfire conditions.

Adaptation measures also aim to increase the resilience of systems to climate change impacts. Resilient systems are those that can absorb

disturbances such as climate change impacts, reduce disruption and retain their basic function and structure. Identification of measures to improved system resilience can be assisted by taking a holistic view, considering the interconnected nature of systems within society, the environment and the economy and recognising that an impact on one system can lead to flow-on effects to other systems.

Taking an adaptive management approach, where ongoing monitoring and regular evaluations are used to adjust risk assessments and adaptation measures, can assist in managing for changing circumstances and any uncertainties that cannot be avoided.

It helps ensure the measures taken continue to best suit the evolving evidence and any changes in values, and minimise the risks of maladaptation.

In 2012 the State Government set out its approach to climate change adaptation with the publication of its climate change strategy, *Adapting to our Changing Climate*³. This strategy establishes a high-level strategic framework to support WA state agencies to adapt to the effects of climate change. It identifies appropriate responses for Western Australia and outlines key policies the government will adopt to tackle the issue.

Stakeholders, both private and public, will have a role in managing their respective climate risks and adapting to these. Cooperation between all levels of society, including government, industry, the scientific community, technical and professional experts as well as the general public will also be essential for assisting communities and the economy to become well adapted to climate change. Such cooperation will also

help to ensure that decision-making is better informed, that adaptation skills and lessons learned are shared, that duplication of time, effort and resources is avoided, and that adaptation is tailored to local conditions.

Conclusion

Climate change presents risks to our communities, environment and economy. These risks can be better managed and the associated costs minimised with investment in good adaptation practice.

Our challenge is to adapt to the impacts of climate change sustainably, basing our decisions on the best available science, risk analysis, and an understanding of our vulnerabilities. This will need to consider the complex flow-on effects that climate change, and the policies we develop, may have on our human and natural systems.

¹ [IPCC \(2014\) Climate Change 2014](#)

² [Australian Government Department of Environment–Climate change impact and risk management – A guide for business and government](#)

³ [Western Australia's Adaptation Strategy. Adapting to our Changing Climate](#)

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Legal advice

The information provided by DER in relation to this matter does not constitute legal advice. Due to the range of legal issues potentially involved in this matter, DER recommends that independent legal advice is obtained if required.

More information

For advice on climate change adaptation, or related matters, please contact DER's Climate Change functional area on (08) 6467 5000.

This document is available in alternative formats and other languages on request.

Publications

[Adapting to our Changing Climate](#)

Legislation

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