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Climate change

Consequences of the impacts of climate change in Western Australia

In its 2007 Fourth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) concluded that some level of future climate change is inevitable (as a result of past emissions) and that Australia is particularly vulnerable to consequences of the impacts.¹

Since 1910, observed average temperatures for Western Australia (WA) have increased by 0.8°C.² There has also been an increase in precipitation in north-west WA and a decline in precipitation in south-west WA. Australia as a whole has experienced an increase in the number of heat waves, fewer frosts and a rise in sea level of approximately 70mm.³

In line with recent trends, the Indian Ocean Climate Initiative (IOCI) (see fact sheet 4) climate change projections for the south-west of WA, for **2030** indicate that rainfall will decrease by between two and 20 per cent and temperatures will increase by between 0.5 and 2.1°C. The projections for **2070** indicate that rainfall will decrease by between five to 60 per cent and temperatures will increase by between 1.0 to 6.5°C.

The implications of the projected impacts are wide-ranging.

CHANGES IN RAINFALL AND TEMPERATURE

As a consequence of declining precipitation and higher mean temperatures it is likely that droughts will occur more often and be more severe. The decrease in rainfall has already caused a reduction in the amount of water entering our dams. The average inflow during 2001–2006 was 81.8GL, which is less than 25 per cent of the average inflow during 1911–1974. Under a worst case future climate change scenario, where the world fails to reduce and stabilise greenhouse gas emissions, declining rainfall and rising temperatures could jeopardise Australia's agricultural capacity, resulting in significant reductions in output. Production of grain, fruit, vegetables and dairy produce would be particularly affected. This could impact on our ability to export food and on the continued viability of rural communities based around agriculture.

Declines in precipitation and increasing temperatures will affect infrastructure. Higher temperatures can cause degradation of road and building materials, damage to building foundations and gas and water piping, and increased flooding and the risk of bushfire.

Increasing temperatures can have both direct and indirect impacts on health. Climate change could result in an increase in heat-related deaths particularly in the northern part of the country. Other health-related issues include a possible increase in the prevalence of vector-borne infectious diseases (e.g. dengue fever and Ross River fever) and food-borne infectious diseases (caused by salmonella and campylobacter). Potential secondary health consequences from climate change include malnutrition and obesity because declines in food production and increases in the cost of fuel will increase food prices, and increases in respiratory diseases due to increased air pollution (e.g. from bushfires) and changes in the production of aeroallergens (exacerbating asthma etc).

CHANGES IN STORM INTENSITY

Storm events could become much more severe in the absence of effective global mitigation. This would apply considerable stress to infrastructure in settlements in the form of structural damage (from increased wind speed and rain and hail intensity) and damage from flash-flooding (including to sewerage infrastructure causing health consequences). Low levels of soil moisture prior to storm events can increase the impact and magnitude of flooding. These impacts will have implications for the future planning and development of human settlements and for the maintenance and continued viability of existing settlements in vulnerable areas. Intense rains and winds can damage crops, livestock and buildings and threaten human health.

SEA LEVEL RISE

A level of further sea level rise is now inevitable. The exact scale of that rise is uncertain; it may rise by 0.18–0.79m by 2099. Worst case scenarios indicate the rise could be higher. Increased sea level will exacerbate coastal erosion, coastal inundation and the intensity and frequency of storm surges. These could damage or destroy coastal habitats, developments and infrastructure.

¹ The IPCC is the world's leading body for assessing climate change. See www.ipcc.ch

² Australian Government Bureau of Meteorology website. See www.bom.gov.au

³ IPCC Fourth Assessment Report, 2007.



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CHANGES FOR THE NATURAL ENVIRONMENT

Climate change will alter existing natural habitats and in some instances the changes will be intolerable for certain species. Many species have a limited ability to adapt to climate change. In south-western Australia many endemic species with narrow climatic ranges will be at risk of extinction with relatively small amounts of global warming. Pests and weeds that favour warmer conditions may become a greater threat as they can colonise new habitats rapidly. Like the Great Barrier Reef, Ningaloo Reef in northern WA is highly vulnerable to increases in ocean temperatures.

In addition to a loss of biodiversity, climate change will reduce the effectiveness of various ecosystem services that benefit humans, for example:

- the provision of food and fibre (including wood, textiles), medicinal (including genetic resources) and cosmetic products (including pigments), and fuel;
- carbon sequestration, climate regulation (including cloud formation), air and water purification, protection from natural hazards, disease and pest regulation, soil formation and nutrient cycling, primary production;
- the value of the environment in aesthetic, recreational and cultural terms.

Climate change impacts upon ecosystems and species will have consequences for industries such as natural resource-based tourism, fisheries and viticulture. In WA particularly, tourism in the south west could be adversely affected, as could the fishing industry as a consequence of the changes in ocean temperatures and acidity affecting populations and life-cycles of fish and marine organisms.

CHANGES IN HUMAN BEHAVIOUR

The actions and policies implemented to address climate change impacts will also have consequences. The introduction of a carbon trading scheme will result in price increases for energy, fuel and food. It is likely that as rainfall decreases and population increases, the development of new water supply infrastructure will increase the price of water. Perth is already experiencing one consequence of reduced rainfall: watering (sprinkler) restrictions. Less essential uses for water (such as water for maintaining sports grounds/recreational areas, ornamental water features, etc) may become too expensive. As storm intensity increases and more areas become prone to flood damage, the cost of insurance will increase. Due to sea-level rise the cost of insuring houses in vulnerable coastal areas could also escalate.

Using water more efficiently and developing non-climate dependent water supplies (e.g. desalination, recycling) are ways of adapting our behaviour to accommodate climate change. Changing planning regulations to take into account sea-level rise and the impacts of increased intensity of storms is a way of adapting settlements to the potential impacts of climate change, as is restricting development in vulnerable coastal areas.

Some climate change adaptation measures are extensions of existing practices. Increasing the connectivity between conservation areas enabling species to migrate to different locations as their original habitats change, has general conservation benefits as well as climate change benefits. Regulating to improve the energy efficiency of all new buildings encourages insulation to be installed. This in turn keeps houses cooler and improves the efficiency of air-conditioning, reducing energy costs and reducing the amount of energy used (and the associated greenhouse gas emissions).

The potential impacts of dangerous climate change are significant. However, by anticipating and responding to them, Western Australians can adapt to the impacts of climate change, and so reduce and in some cases possibly avoid the associated climate change costs.