Chapter 15:

The mitigation – adaptation link

We can already see the physical impacts of climate change in Aotearoa today, and these changes are expected to continue. On a global scale, acting earlier to tackle climate change will reduce total emissions and help to reduce the severity of impacts that we experience of climate change. The difference in impacts between a global temperature rise of 1.5˚C and 2˚C is large and serious. Therefore, it is important that Aotearoa is aware of the impact that contributing to global action to reduce emissions could have on our country's ability to adapt.

This chapter looks at the mitigation and adaptation link.

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This chapter looks at the mitigation and adaptation link.

15.1 Introduction

The physical impacts of climate change are being observed in Aotearoa today; with increasing temperatures, changes in the frequency and severity of droughts, more extreme rainfall patterns and increasing fire risk, rising seas and shrinking glaciers.[1] With ongoing climate change, these changes are expected to continue and in some cases accelerate.

Far more than the current generation, future generations would bear the brunt of these impacts of climate change – both from the physical impacts that are locked in from historic emissions and from any current and future emissions.

Globally, acting earlier to address climate change reduces cumulative emissions and avoids more severe physical impacts of climate change. The Intergovernmental Panel on Climate Change's special report on 1.5°C concludes that climate risks would be significantly lower if warming is limited to 1.5°C rather than 2°C. In a 2°C world, sea levels are projected to rise more, there would be more species loss. Almost all of the world's coral reefs would be destroyed. Globally, hundreds of millions more people would be exposed to climate-related risks, including risks to health, water supply, food security and economic growth.[2]

Earlier global action enhances the ability for society and natural systems to adapt to these physical impacts, reduces the impact on indigenous culture and reduces the number of people exposed to climate-related risks, including risks to health, water supply, food security and economic growth.[3]

Impacts such as rising sea levels and flooding pose a number of risks to households, businesses and communities. For example, increased flooding from storm surge and higher sea levels poses a risk to low-lying homes, the banks that provide mortgages and those who insure them. An assessment of our country's exposure to rising sea levels suggests that there are 140,244 buildings within 1.2 metres of the spring high tide mark, with a replacement value of $43.78 billion in 2016 dollars.[4]

Sea level rise is also a risk to ancestral land, coastal marae, papakainga, wāhi tapu and urupa and could displace the haukāinga who uphold tikanga.

Warmer temperatures, drought and the introduction of new pests and diseases could, for example, impact rural livelihoods and the wider food and fibre industry. They could also impact indigenous

[1] (Ministry for the Environment & Statistics NZ, 2020)
[2] (IPCC, 2018)
[3] (IPCC, 2018)
[4] (Paulik et al., 2019, p. 12)

biodiversity, and disrupt mahinga kai, rongoā and other practices that enable members of whānau, hapū and iwi to apply and retain their tikanga and mātauranga.[5]

Analysis by Aotearoa scientists suggests that droughts alone cost Aotearoa $800 million between 2007 and 2017.[6]

While there are estimates of the damages from more severe climate change, there is a growing body of research showing that these estimates significantly underestimate the true cost.[7] This is because it is challenging to quantify many of the most serious consequences of climate change as they lie outside of human experience. The most serious consequences include destabilisation of the Greenland and Antarctic ice sheets, disruption to ocean and atmospheric circulation, biodiversity loss and the collapse of ecosystems. These risks provide a compelling reason for the globe to work together to reduce emissions.

While Aotearoa acting alone to reduce emissions would not reduce these impacts, by playing its part as a responsible global citizen, Aotearoa would contribute to the global action necessary to reduce the severity of these impacts.

15.2 Considering adaptation in mitigation decisions

Some of the actions Aotearoa takes to reduce emissions can impact on the ability to adapt to these physical impacts.

On the energy side, Aotearoa would become increasingly reliant on renewable energy that can also be affected as the climate changes. Wind, solar and hydro electricity generation depend on the weather. Shifts in rainfall, wind, temperature and the occurrence of storms could affect the availability of these energy resources. This would have broader impacts on the security of electricity supply.

Seasonal rainfall and dry years already have a significant impact on our country's electricity generation, prices and use of coal and gas. A recent modelling assessment projects that climate change would have a beneficial impact on inflows into hydro lakes due to increases in winter precipitation in major hydropower basins and a shift in the dry season towards summer.[8] Modelling also suggests that wind generation would not be significantly impacted as windspeeds are projected to only change moderately.[9]

Electricity infrastructure would be impacted by warmer temperatures and extreme weather events. Transmission and distribution networks are vulnerable to increased risks of flooding, landslides and other natural hazards. This is because the carrying capacity of electric power cables decrease as temperatures rise. This may further impact the capacity of electricity systems, as increased demand for electricity puts pressure on the transmission and distribution network, thereby reducing their capacity.[10]

[5] (Ministry for the Environment & Statistics NZ, 2020)
[6] (Frame et al., 2020)
[7] (DeFries et al., 2019)
[8] (Collins et al., 2020)
[9] (Meridian Energy, 2019)
[10] (Yalew et al., 2020)

Electricity infrastructure could also be impacted if storms were to become more frequent and more severe. Power outages due to storms would be particularly problematic for charging electric vehicles. This infrastructure would need to be more resilient, particularly as our dependence on electricity increases with use of electricity for electric vehicles and process heat. Warmer temperatures would also mean demand for electricity would also increase in summer due to increased air conditioning.

Our forests may also become more exposed to fire, wind damage and pest incursion as a result of climate change. Global climate modelling suggests that the risk of fire would increase in many parts of Aotearoa due to increased temperature and wind speed and reduced rainfall and humidity.[11] This could have impacts on the supply of biomass for biomass industry and the ability to reduce emissions from higher temperature process heat.

Animals would require more shade and shelter as rising temperatures increase the risk of heat stress.[12] Trees on farms whether native or exotic can help to provide this shade. Native forests can also be used in green firebreaks to protect from the increased risk of fires due to climate change.[13]

On the other hand, some land use changes may reduce emissions but require more water that may be less available due to climate change. Exotic afforestation can also decrease water yield by 30-50%.[14] This could be a particular issue in areas that experience water shortages or where there is demand for irrigation, such as the eastern foothills of the Southern Alps and the tussock grasslands in the South Island.[15]

Nitrate leaching from pastures could also increase and become more variable with climate change.[16] Practices that optimise fertiliser application to different types of soils as a mitigation measure could prepare for adapting to future climate variabilities.

[11] (Pearce et al., 2011)
[12] (Ausseil et al., 2019)
[13] (Curran et al., 2018)
[14] (Dymond et al., 2012)
[15] (Dymond et al., 2012)
[16] (Ausseil et al., 2019)

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