Australian National University

Climate Adaptation at the Australian National University

Opportunities for climate action

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Contents

Executive summary

As a Commonwealth entity, the Australian National University (ANU) will be required to submit climate risk disclosures to the Department of Finance financial reporting from 2025 onwards. A necessary part of assessing climate risks is planning pathways for mitigating and adapting to these risks. The practice of adaptation planning for physical and transition risk in response to climate change is an emerging concept for the tertiary sector. This report outlines the minimal engagement in this space so far in Australia and the opportunity for ANU to take a leadership position in assessing climate risks and establishing robust strategies for meeting these potential futures. As a research institution with experts in this space, ANU has a direct link to their expertise while seeking to operationalise the practice of assessing and planning for climate and transition risks. This report provides guidance on implementing adaptation planning at ANU and outlines procedures for assessing physical climate risks and adaptative actions that mitigate them. To do this, the report examines two scenarios in the ANU context: a severe storm on the Acton campus and sea level rise at the Kioloa campus, NSW. This report presents the opportunity for the ANU to reduce financial liabilities and disruptions to research and learning and, hence, build resilience against threats to daily operations and business viability posed by climate change.

Global context

The wide-reaching impacts of climate change necessitate a layered and holistic response to adapt to climate impacts and mitigate their effects. Most public and private entities have adopted mitigation targets, such as carbon neutrality or net zero goals, but this is only half of an effective climate transition response. The Intergovernmental Panel on Climate Change (IPCC) has been unequivocal on the impacts of human-induced climate change, detailing how this has changed global climate systems in the last century. Consequently, institutions now face increasing physical risks to their facilities and assets and transition risks resulting from changing policies, supply chain infrastructure and market demand. For example, physical risks to a university may include an increased risk of extreme heat waves that restrict services, damage campus facilities and pose potential health and safety risks or bushfires that can destroy property and assets. Transition risks may include reputational costs for a weak climate action program or organisational policies and procedures to reduce emissions from travel impacting engagement opportunities if alternatives to travel are not available or accessible.

Climate risk management and adaptation planning are becoming standardised and mandated internationally, guided by internationally accepted reporting standards developed by the Taskforce on Climate-Related Financial Disclosure (TCFD) and the International Sustainability Standards Board (ISSB). Enshrining risk disclosure in legislation signifies its growing importance for planning and adapting to the changing climate, and is a critical signalling exercise to students, staff, investors and the broader community. Tertiary institutions are often recognised as “anchor institutions”, positioned to influence local and international action on climate change through student learning and the impact of research initiatives. In this context, these institutions are well-placed and, arguably, have social license to take the first steps on climate action.[1]

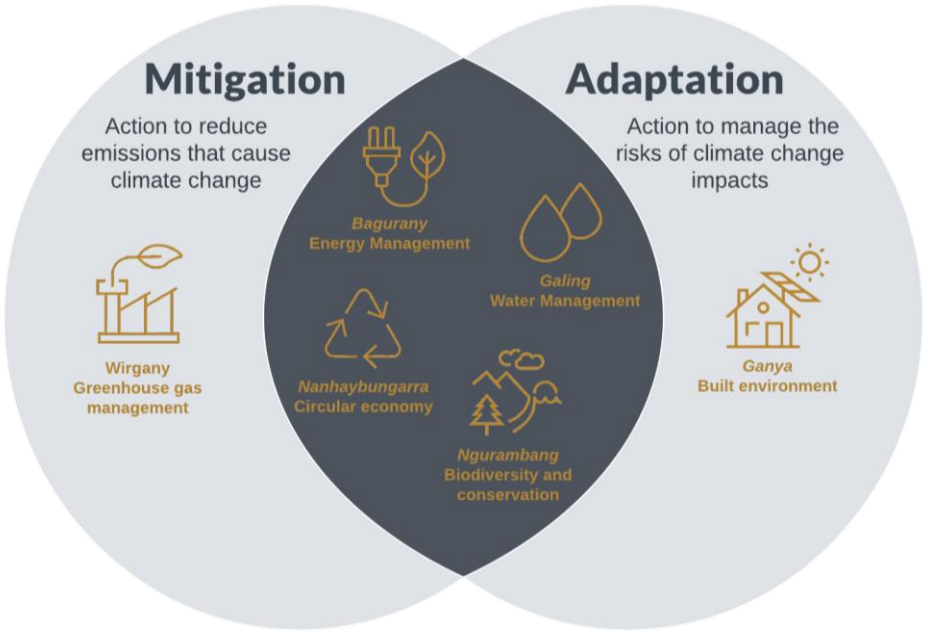

Figure 1: Venn diagram of current ANU sustainability initiatives

Up until now, the primary focus of narratives for climate action has been on mitigation strategies. These justifications for transitioning must be broadened to include climate adaptation planning, given the symbiosis of emissions reduction and building resilience to climate-related risks, as depicted in Figure 1.[2] For example, transitioning buildings from gas-reliant heating to electric heat pumps powered by renewable energy (action) will reduce greenhouse gas emissions (mitigation) and build energy resilience by diversifying energy sources (adaptation). Comprehensive management of climate risks exposes opportunities for security and resilience against transition and physical risks, leading to greater resource efficiency, potential cost savings and securing robust supply chains. For ANU, this can support minimal disruptions to its core business of research and teaching well into the future.

Global tertiary sector climate adaptation

Adaptation planning in the international tertiary sector is variable, reflecting discrepancies in investment in the adaptation side of a comprehensive climate response. In the UK, the sector takes a collaborative approach to reducing exposure and sensitivity to climate harms and increasing adaptive capacity.[3] Since 2022, large UK companies have been legally required to report climate-related risks and opportunities.[4] A marker for success in these organisations is those with proactive governance strategies for supporting climate adaptation programs.

Examples from UK institutions include the University of Glasgow, which published a comprehensive Climate Adaptation Plan in 2018, stepping through short-, medium- and long-term objectives for four different spheres of adaptation planning, namely governance, built environment, community and natural environment.[5] More specifically, after extreme flash flooding in 2012, Newcastle

University implemented a new flood model, including extensive drainage systems under existing buildings, and collaborated with other universities to improve surface water management.[6] The University of St Andrews undertook an in-house climate impact assessment, focusing on how changes in climate could affect the critical functions of the coastal university vulnerable to rising sea levels and extreme storms.[7]

In the southern hemisphere, the Tertiary Education Sector Climate Futures Group in Aotearoa New Zealand, recently published a collaborative report on the impact of climate change to inform tertiary institutions' individual climate adaptation plans. Scenarios consider a future with low and high physical impacts, depending on whether there is a planned or unplanned societal response. By modelling alternate scenarios, the report provides a spectrum of impacts and opportunities resulting from the level of action taken. It champions the potential positive social, environmental and economic impacts of proactive tertiary sector adaptation and the opportunity to avoid declining financial health and student numbers and the loss of vital infrastructure and widening inequity in access to education. [8] It emphasises the urgency of proactive adaptation planning to safeguard the stability and resilience of the tertiary sector. Largely inspired by Aotearoa, Australasian Campuses Towards Sustainability (ACTS) have begun discussions around workshops to construct future climate outcome scenarios to be used by the Australian tertiary sector for adaptation planning.[9]

Australian tertiary sector climate adaptation

The Department of Finance has introduced mandatory climate disclosure for Commonwealth entities, following the lead of serious climate adaptation planning from state governments, such as the NSW Climate Risk Ready Guide.[10] The private sector also has to step up its climate reporting with the Treasury's Climate-Related Financial Disclosure coming into effect in July 2024 for large entities.[11] However, adaptation planning across Australian institutions is currently limited, as seen in Table 1 below. Many universities have substantial research programs focused on climate adaptation. However, the recommendations made by experts are yet to be operationalised by the sector. Consequently, there is scope for ANU to champion and coordinate strong and purposeful climate adaptation planning and implementation in the tertiary sector.

Table 1: Summary of climate adaptation actions in the Australian tertiary sector

Tertiary Institution	Climate Risk Management and Adaptation Research and Actions
Australian National University	ANU Institute for Climate and Energy Disaster Solutions • Provides short courses and modules tailored to policy makers that address climate risk and adaptation scenarios • Hosts climate mitigation and adaptation research and outreach programs
La Trobe University	Climate Change Adaptation Lab researching climate change impacts and the work of adaptation[12] • Hosted workshops to generate future climate risk scenarios as part of a comprehensive climate risk assessment [13]
Royal Melbourne Institute of Technology	Quantitative and qualitative climate risk assessments since 2012[14] • Hosted workshops to generate future climate risk scenarios, incorporating staff, student, academic, corporate and administrative stakeholders
University of Melbourne	Implemented climate adaptation plans for Parkville and Fishermans Bend campuses[15] • No progress reports published
University of New South Wales	Aiming to take an undefined climate risk assessment[16]
University of Queensland	Established a climate risk assessment framework[17]
University of Sydney	Hired four staff across its sustainability and finance function areas to focus on climate risk assessments and management to voluntarily align the organisation with forthcoming climate disclosures
University of Tasmania	Climate Futures Research Group, which quantifies climate risks and formulates adaptive solutions[18]
University of Technology Sydney	Climate Adaptation research team, which works with stakeholders to develop and execute adaptation plans[19]

ANU climate risk management

ANU has taken significant steps in mitigation action on climate change through its Below Zero Program, with ambitions to achieve below zero emissions by 2040. As suggested in this report, climate adaptation planning is required to create a holistic institutional response to climate change. With climate risk disclosure mandated as of the 2025 financial report, ANU is in a prime position to mitigate these risks through adaptation planning and implementation that prioritises the resilience of University operations, financial assets and physical facilities.

Existing ANU risk management plans were examined for responses to the changing frequency and intensity of climate risks, and only one mentioned increasing risks (see Table 2 below). Additionally, flood and storm assessments have yet to be conducted, a significantly costly climate-related

disaster risk. Comprehensive climate risk assessments and adaptation plans, explained in the proceeding section, will ensure that ANU is prepared for these risks as their severity, frequency and characteristics change.

Table 2: Summary of ANU climate-related risk management plans as of May 2024

Document Name	Campus	Date	Climate risk driver	Climate-related risk management
NARU Cyclone Plan 2018 2019	NARU	2018 - 2019	Cyclone	No mention
NARU BMP FINAL	NARU	2019 - 2024	Cyclone	No mention
QMS-FS-PRF-41-204_Rev A_Cyclone Plan_20190607	NARU	2019	Cyclone	No mention
QMS-FS-WIN-41-202_Rev A_Emergency Plan_20190620	NARU	2019	Cyclone	No mention
DRAFT SSO BEMEP 20 Nov 2023	SSO	September 2023	Bushfire	No mention
A3 SIDING SPRINGS OBSERVATORY Bushfire	SSO	November 2023	Bushfire	No mention
SSO_Emergency_Plan_-_August_2023.docx	SSO	August 2023	-	No mention
SSO_Site_Emergency_Response_Procedures_August_2023_ii.docx	SSO	August 2023	Bushfire, Earthquakes	No mention
A3 MOUNT STROMLO CAMPUS Bushfire Management Plan Iss	MSO	October 2023	Bushfire	No mention
Fire Management Zone locations V01	MSO	October 2023	Bushfire	No mention
ANU Kioloa Campus Bushfire Risk Assessment & BAL Determination Report Iss 01	Kioloa	December 2022	Bushfire	No mention
Draft 2 Kioloa Coastal Campus BEMEP	Kioloa	December 2022	Bushfire	No mention
Final ANU Acton Campus Bushfire Risk Assessment Report Iss 01 [27]	Acton	December 2023	Bushfire	No mention
Australian National University Campuses Bushfire Management Plan V2	All	2019 - 2024	Bushfire	Acknowledges trends of increasing number of days with extreme fire behaviour that increases risk of bushfire damage

Vision for ANU adaptation planning

As discussed in this report, developing and implementing an adaptation plan is vital in securing financial, infrastructural and reputational assets currently threatened by physical and transition climate risks. Table 3 outlines the procedure in the NSW Climate Risk Ready Guide for organisations to develop a climate risk assessment and adaptation strategy. [20] It serves as a potential guideline for ANU to frame its own procedure moving forward.

Mandatory climate reporting has expedited the first step in Table 3 of establishing the context. Identifying, analysing and evaluating the risks in Step 2 is being encouraged through discussion forums to develop climate risk scenarios by[21] various Australian universities, including the University of Tasmania, the University of Queensland and Western Sydney University, are discussing how to instigate workshops to develop a similar report for the Australian tertiary sector. This collaborative approach is an essential tool to stimulate climate risk assessments sector-wide and will aid in developing specific risk assessments for ANU campuses and operational frameworks. ANU involvement and support can ensure there is adequate resourcing to support this collaboration.

Investing time and resources in treating the climate risks in Step 3 will provide meaningful forward steps to build resilience and mitigate the harms identified in Step 2. It will also be compelling information for investors and prospective students to include in mandatory climate risk disclosures. The NSW Climate Risk Ready Guide provides categories of adaptation actions, which can help inform types of actions depending on the nature and intensity of climate risk they are mitigating. They serve to illustrate how flexible climate adaptation can be, by including:

- **Low-risk responses:** these will often deliver economic benefits and should be implemented as a priority
- **Accommodation responses:** these accommodate the risk by including provisions to reduce the consequence of impacts
- **Retreat responses:** these include relocating assets and people to safe areas
- **Defence responses:** these are existing and new structures against climate hazards using largely structural measures
- **Co-existing or adaptive responses:** these include innovative measures such as future planning

These actions can be assessed on a cost-benefit analysis for prioritisation and identified for short-, medium- and long-term planning timelines. Developing a comprehensive strategy with climate change adaptation milestones, separate from the existing ANU mitigation strategies will ensure transparency and accountability for these adaptive actions. The strategy can also include management thresholds and triggers, which identify limits of unacceptable changes to key indicators to divert resources to more pressing risks. Examples of indicators include supply chain disturbances, which could disrupt research and teaching objectives, or levels of rainfall that increase occurrences of flash flooding.

Potential themes for the strategy could include:[22]

- Governance and organisational knowledge
    - Reporting, communicating and reviewing adaptation plans
- Built environment
    - Risks to physical infrastructure

- University community
    - Risks to health, business and productivity
- University operations
    - Risks to supply chains and existing technology
    - Shifts in market demand
- Natural environment
    - Risks to species, habitats and land use (particularly for satellite sites)

Table 3: Summary of procedure for implementing a climate adaptation plan

Action	Output
Step 1: Establish the Context **Establish an authorising environment and resources for climate change risk assessment and management**	
Understand your organisation's climate risk management maturity	An assessment against the AICD reporting readiness recommendations and NSW Government's Climate Risk Ready Assessment
Establish the reason for a climate change risk assessment and secure approvals	Briefing paper to secure executive sponsorship
Identify stakeholders and establish an assessment team	List of stakeholders and assessment team members
Determine the scope of the climate risk assessment	An agreed climate risk assessment scope
Step 2: Identify, analyse and evaluate the risks **Establish a plausible climate future and document priority climate change risks**	
Understand past and recent climate hazards and trends	A list of climate variables relevant to your context
Consult relevant climate projections	An understanding of projected climate change impacts
Identify risks and opportunities	A list of climate change risk statements
Analyse and evaluate risks	Priority climate risks with agreed risk ratings
Step 3: Treat the risks **Develop an adaptation plan to treat priority climate change risks and increase climate risk maturity**	
Identify and prioritise adaptation actions	A resourced adaptation plan including actions to improve climate change risk maturity
Develop and implement an adaptation plan	
Step 4: Monitor and review **Monitor implementation of adaptation plans, climate change impacts and embed reviews in existing procedures and systems**	
Develop a monitoring and evaluation plan	A plan to track adaptation implementation, and monitor climate risks

In the following sections, two case studies have been provided to illustrate what adaptation planning and actions for physical risks may look like.

Case Study 1: Severe storms at the Acton campus

Defined by the Bureau of Meteorology as events producing large hailstones, severe wind or heavy rainfall leading to flash flooding,[23] severe storms pose serious risk to the Acton campus. On 20 January 2020, a hailstorm struck Canberra, damaging over 80% of the Acton campus and disrupting university operations into 2024. Together with the February 2018 floods, remediation insurance payments have exceeded $291 million.[24]

Figure 2: the view from Chifley library during the 2018 floods

Figure 3: hail damage to Univeristy House in 2020

It is accepted that human-induced climate change is amplifying the frequency and intensity of severe storms.[25] Climate models indicate that the Earth's atmosphere will hold 7% more moisture per one degree of warming, thereby fuelling the formation of storms.[26] Overall, this data anticipates the January 2020 hailstorm event occurring more frequently and with more intensity.

Proactive adaptation measures can mitigate the impacts of this acute (event-driven) physical risk. Addressing the risk of flash flooding could encompass increasing the size of the bridge across Sullivan's Creek and other culverts, directing water flow and drainage, and allowing it to withstand deluges from heavy rainfalls. Additionally, increasing the density of native grasses around the creek will help to regulate overland flow and reduce runoff when rainfall exceeds the creek's capacity. This is especially important with the construction of Yukeembruk Village and the Emergency Services Station on Clunies Ross Street facilitating faster runoff flows from Black Mountain into the Acton campus. Routine management and upkeep of existing infrastructure such as cleaning gutters and working through drainage areas can also have a large impact in preparing for severe storms and flash flooding.

Furthermore, establishing robust contingency plans for early warning systems of severe storms that are self-generated and well maintained can help avoid damage to personal vehicles and campus infrastructure. Future development design criteria must also account for the risk of damaging hailstorms, as an added layer to the Building Requirements Manual.

Implementing these measures will fortify the Acton campus against increasing frequency and intensity of severe storms. Adaptation actions will ensure the continuity of ANU education and research activities, safeguard university assets, and support procedures to reduce unplanned capital expenditure as well as lower insurance premiums.

Case Study 2: Sea level rise at the Kioloa Coastal campus

Currently, rising sea levels do not impact ANU facilities and assets at the Kioloa Coastal campus. However, projected long-term shifts in climate patterns indicate that chronic physical risk is imminent to this site. The average rate of sea level rise has been increasing from 1901, from 1.3mm per year between 1901 and 1971 to 3.7mm per year between 2006 and 2008.[27] The visual representation of this in Figures 4 and 5 is based on the IPCC Sixth Assessment Report projections.[28]

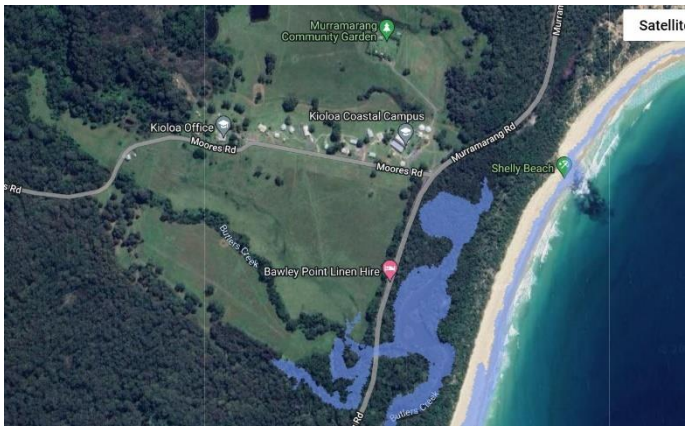

Figure 4: Sea level rise of 0.84 metres by 2100 (medium confidence)

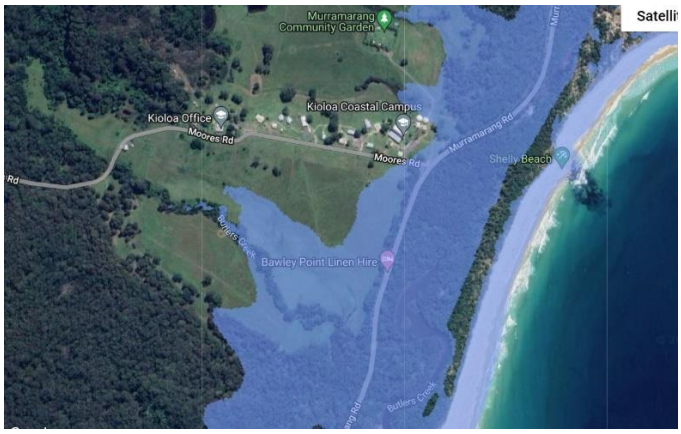

Figure 5: Sea level rise of 2 metres by 2100 (lower confidence)

Figures 4 and 5 demonstrate how access into the campus will likely become obstructed by water flows. Implementing continuous monitoring of sea level rise and severe weather impacts along the coast can help to anticipate disruptions and flooding, thereby enabling timely execution of emergency evacuation plans. These plans must also account for multiple methods of transporting people out of the campus. Existing campus infrastructure could be updated to increase height of buildings, and safeguard lower levels against flooding.

More broadly, a strategic revision to the general use of the Kioloa campus could open many avenues for more research into climate adaptation measures. Its small size enables it to be used as a trial for various adaptation measures planned for implementation in the Acton campus, such as water drainage and culvert infrastructure.

Future directions

This report was designed as an overview to adaptation planning in the tertiary sector, as a guide to frame ANU decision-making when assessing future climate adaptation work. As such, information on climate risks is relatively generalised, and any adaptive measures are designed to be indicative and suggestive. The aim of this report is to stimulate resource allocation to a comprehensive climate risk assessment, partly in conjunction with the ACTS working group on modelling future climate scenarios, and an adaptation plan to mitigate the risks identified in the assessment. These endeavours should involve consultation with external stakeholders, the Facilities and Services Division and existing researchers at the ANU, to deliver specific transition and physical risks and mitigative actions to take.

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