



Mr John Carter
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Department of the Senate□
Parliament House□
Canberra ACT

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Dear Mr Carter

Senate Inquiry into the Effects of Climate Change on Training and Employment Needs

Attached herewith is the submission of the National Climate Change Adaptation Research Facility to this Inquiry.

Please do not hesitate to contact me should you have any questions of clarification or follow up.

Your sincerely

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Senate Inquiry into the Effects of Climate Change on Training and Employment Needs

Submission by the

National Climate Change Adaptation Research Facility

1. About NCCARF

Projected climate impacts such as higher temperatures, sea level rise, and more severe and frequent droughts and storms will affect our natural systems, human settlements, and the economy. In addition to prosecuting mitigation strategies to reverse or slow down the current rates of greenhouse gas emissions, it is critical that Australia also start to prepare for the social, economic and environmental effects of unavoidable climate change. To do this, decision-makers need access to information relating to climate change to support effective science-based adaptation decision-making.

The Council of Australian Governments (COAG) recognised the urgency of the adaptation challenge and the wide range of associated information needs when it endorsed the National Climate Change Adaptation Framework in April 2007. The Australian Government provided funding in late-2007 to establish the National Climate Change Adaptation Research Facility (NCCARF) to lead the Australian research community to generate the biophysical, social and economic information needed by decision-makers in government and in vulnerable sectors and communities to manage the risks of climate change impacts.

The key functions of the Facility include:

- developing National Adaptation Research Plans to identify critical gaps in the information needed by sectoral decision-makers and to set research priorities
- synthesising existing and emerging national and international research on climate change impacts and adaptation and developing targeted communication products for stakeholders
- undertaking a program of integrative research to address national priorities
- identifying potential funding sources for priority research and helping researchers access these funds; and
- establishing and maintaining adaptation research networks to link together key researchers and assist them in focussing on national research priorities.

NCCARF is a partnership between the Australian Government Department of Climate Change and a strong consortium of institutions led by Griffith University. The consortium is drawn from across the country and comprises:

- The Queensland Government
- James Cook University
- Macquarie University
- Murdoch University
- Queensland University of Technology
- University of Newcastle
- University of Southern Queensland
- University of the Sunshine Coast.

NCCARF welcomes the opportunity to make a submission to this Inquiry. It notes that its submission is that of the Facility itself, and does not necessarily reflect the views of any individual member of the NCCARF consortium. The focus of this submission will be on the training and employment implications of climate change adaptation. We expect that other submissions will focus more closely on the training requirements arising from mitigation initiatives.

2. Undergraduate training needs in climate change adaptation

The impacts of climate change will affect virtually every aspect of the Australian economy, society and environment. Changes will force us to re-think agricultural practices, conservation and management of terrestrial and marine biodiversity, water planning, urban design, infrastructure planning and construction, emergency services and disaster management and health care. Practitioners in all of these fields will need to understand the likely impacts of climate change and how those impacts will affect professional practice in their sector and in their specific geographical region. This calls for profession-specific training needs. Rather than developing new undergraduate training opportunities in “climate change adaptation”, adaptation skills will need to be embedded in substantive courses in such diverse fields as:

- Engineering
- Architecture
- Landscape architecture
- Urban planning and built environment
- Law
- Finance
- Economics
- Public policy
- Environmental science
- Hydrology and water management
- Agricultural science
- Medical sciences

Graduates from these disciplines will need to have additional skills in risk assessment methodologies, systems analysis and modelling. For example, practitioners will need to be able to take accepted Intergovernmental Panel on Climate Change (IPCC) and Australian scientific projections for a particular location, and:

- understand the science behind the models well-enough to be able to select the most appropriate model for their purposes;
- integrate those climate projections into other models such as water planning, urban flooding and stormwater flowspublic health strategies

The revision of degree programs and curricula to incorporate these new skills and topics will place a heavy burden on institutions that are already addressing pressures to internationalise their curricula and incorporate a wider suite of generic graduate attributes. Additional resources will be needed to support institutions in updating courses to ensure graduates are “climate impacts-ready”.

A further challenge is that despite the pressing need for graduates in these fields, a number of the disciplines listed above (environmental science, hydrology and water management, agricultural science) have been suffering declining undergraduate student demand and enrolment, and there is no sign of a reversal of this trend. Meeting employment needs is not only about managing curriculum content but also attracting students into the relevant disciplines. Increased investment is therefore required to recruit and retain undergraduate students in relevant disciplines. These recruitment strategies need to be underpinned by secondary school programs that articulate into climate adaptation-related programs.

3. Postgraduate training needs in climate change adaptation

For professionals already working in these fields, there is a growing need to up-skill in the areas of climate change adaptation in order to provide public and private sector employers with the specialist adaptation advice and services.

The skills required of these professionals includes:

- Interpretation of climate projections and application to local context
- Risk and vulnerability assessment
- Environmental and resource economics (or at least a working knowledge of valuation techniques)
- Social and economic impact assessment techniques – to model the social and economic consequences of various adaptation options and strategies
- Governance, engagement, facilitation and public education techniques – to work with governments and communities in adaptation option generation.

There is only one tertiary institution – University of the Sunshine Coast - currently offering a multidisciplinary masters program in Climate Change Adaptation that offers courses aimed at building this skill set. Others have offered undergraduate and postgraduate courses in climate science for several years.

While professional masters programs of this sort should ultimately be self-sustaining (and indeed revenue-raising), the lead-in time creates a disincentive for many institutions considering their development.

4. Research training needs in climate change adaptation

Over the next few decades there will be an increasing need for research that can inform adaptation decision-making. Typically, this research requires cross-disciplinary and multi-disciplinary expertise and analytical skills. Our early experience at NCCARF suggests that the pool of researchers currently available to perform this essential research is very shallow indeed.

Three strategies are called for:

1. increased PhD and post doctoral opportunities to bring on a new generation of adaptation research specialists;
2. development of early career researchers, for example through opportunities to undertake intensive training in climate science in order to complement their substantive disciplinary expertise; and
3. incentives to encourage advanced researchers in relevant disciplines (engineering, economics, planning, etc) to realign the focus of their research towards climate change adaptation.

NCCARF is well-placed to advance each of these strategies but significant additional investment in research training and capacity building is required across the sector. While some of this investment will come from the public sector, the private sector will also play a crucial role. Incentives are needed to encourage private sector investment and collaboration in adaptation research and research capacity building.

In addition, current barriers to the promotion of adaptation research should be removed. This includes reversing the expectation of high levels of institutional co-funding, which shifts universities from the role researcher to research investor. Incentives should also be considered, such as clear national research priorities that prioritise research investment in adaptation. In this regard, we endorse the recommendations on research of the 2007 PMSEIC Independent Working Group Report, **Climate Change in Australia – Regional impacts and adaptation.**

5. Industry and vocational training needs

University-based courses such as the professional coursework masters outlined in (3) above will not fully meet employers' adaptation needs. There will also be a need to introduce training on climate impacts, risk assessment and management, and adaptation planning into relevant vocational courses and industry-specific professional development programs.

6. The needs of the Asia-Pacific region

It is widely recognised that many of our near neighbours in Southeast Asia and the Pacific will be adversely affected by the impacts of climate change. These impacts will exacerbate current problems of economic underdevelopment, poverty, environmental degradation, and food insecurity; and will in turn be exacerbated by systemic limits on adaptive capacity. For workers in these countries, undertaking tertiary programs may be less valuable than a work experience opportunity. Such industry mentoring, placements, internships and other short-term on-the-job opportunities will provide longer-lasting professional relationships and create regional networks of practitioners and mentors that can offer on-going support. The opportunity to participate in an Australian workplace will also build capacity in a range of other professional skills beyond climate change adaptation.