

CSIRO Climate Adaptation National Research Flagship

Nairobi Work Programme Action Pledge – April 2009

Supporting climate adaptation in the Asia-Pacific region

Background

CSIRO's Climate Adaptation National Research Flagship is developing adaptation responses to counter the expected damaging effects of climate change. The Flagship is analysing future climate changes in Australia and our region, delivering strategies to manage their impact, and developing new ways to combat and even benefit from some of these challenges.

Currently through a number of the Flagship's projects, we are assisting developing countries in the Asia-Pacific region to identify vulnerabilities to climate change, and to develop adaptation options.

This work is being done in partnership with Asia-Pacific regional bodies to address identified priority gaps in information and capacity.

Relevant NWP work areas

This Action Pledge addresses the broad NWP aim "...to assist all Parties, in particular developing countries, including the least developed countries and small island developing States to:

- *improve their understanding and assessment of impacts, vulnerability and adaptation to climate change;*
- *make informed decisions on practical adaptation actions and measures to respond to climate change on a sound scientific, technical and socio-economic basis, taking into account current and future climate change and variability".*

This Action Pledge also addresses the specific NWP objectives to:

- *"Improve capacity at international, regional, national, sectoral and local levels to further identify and understand impacts, vulnerability, and adaptation responses, in order to effectively select and implement practical, efficient and high priority adaptation actions;*
- *Enhance and improve the level and amount of information and advice on the scientific, technical and socio-economic aspects of impacts, vulnerability and adaptation;*
- *Enhance the degree of dissemination and utilization of knowledge from practical adaptation activities;*
- *Enhance cooperation among Parties, relevant organizations, business, civil society and decision makers, aimed at advancing their ability to manage climate change risks; and*
- *Enhance the integration of adaptation into sustainable development plans"*

This Action Pledge contributes to the following NWP areas of work:

- Methods and tools
- Data and observations
- Climate modelling, scenarios and downscaling

- Climate related risks and extreme events
- Socio-economic information
- Adaptation planning and practices
- Research

Activities and key outputs

The CSIRO Climate Adaptation Flagship contributes to the Asia-Pacific region's effort in adapting to the impacts of climate change and variability and informs planning, regulation and investment decisions.

This contribution will be realised through a suite of inter-related projects within the Climate Adaptation Flagship which focus on climate adaptation issues facing developing countries in the Asia-Pacific region.

These Asia-Pacific adaptation projects are spread across the Flagship's four research Themes:

Pathways to Adaptation: providing sound scientific knowledge about potential climate change impacts to underpin decision making, and understanding the socio-economic drivers and barriers that influence the adaptation process;

Sustainable Cities and Coasts: developing planning, design, infrastructure and management solutions to help cities and coastal settlements adapt to a changing climate;

Managing Species and Natural Ecosystems: developing and delivering adaptation options to protect marine and terrestrial species, ecosystems and the services they provide from the impacts of climate change;

Adaptive Primary Industries, Enterprises and Communities: developing adaptation options for the primary industry and resource sectors to reduce vulnerabilities and enhance opportunities created by climate change.

Activities & Expected Results

The following outline represents a range of the activities the Climate Adaptation Flagship will be carrying out in 2009-10 that support this Action Pledge and align with the NWP Areas of Work (note: this is not an exhaustive list of Flagship activities).

Theme 1: Pathways to Adaptation

Our strategy in the Pathways to Adaptation Theme is to develop new or improved methods for generating climate change projections at sufficient spatial and temporal resolution for practical impact assessments, and for assessments of adaptive capacity and vulnerability to the adverse impacts of climate variability and change. Our research capability includes expertise in: seasonal prediction as well as climate change projection; dynamical and statistical downscaling of weather sequences and extreme events (e.g. tropical cyclones); assessments of adaptive capacity and barriers to adaptation from social and economic viewpoints, and the facilitation of adaptation; and assessments of the vulnerabilities of communities, industries and environment. Uptake in the region is being achieved through briefings, workshops, scientific publications and other communication materials.

The Theme's current areas of research in the Asia Pacific region include:

Pacific Climate Change Science Program (PCCSP):

In close collaboration with the Australian Government, Australian science agencies have developed a comprehensive climate change research plan to provide better information for decision-makers and planners about the likely impacts of climate change in the Pacific and Timor

Leste. CSIRO is one of the major research partners in the PCCSP, with the Climate Adaptation Flagship playing a central role. Our PCCSP projects are:

- a) Regional drivers – describing and investigating the impact that ENSO has on all the Pacific Island countries to provide sound advice on how these impacts are changing and how they might change in response to future global warming.
- b) Regional climate change projections – including dynamical and statistical downscaling, tropical cyclones and extremes, and tailored products for vulnerability studies.

Regional climate projection development and interpretation for Indonesia

This project will provide:

- country-scale information for Indonesia based on a range of IPCC Fourth Assessment climate simulations (i.e. specific climate data)
- expert targeted training for Indonesian scientists, enabling them to run regional climate models (models which have already been provided to them by CSIRO) to supply additional climate data on a regional scale, and enabling them to build required expertise to interpret this data
- a training course to enable Indonesian scientists to identify the implications of climate scenarios and develop appropriate country-based responses including targeted responses to extreme events such as monsoons, rainfall changes, temperature changes and typhoons.

Theme 2: Sustainable Cities and Coasts

Low-lying coastal and floodplain cities are a feature of the Asian landscape, as well as parts of Australia. Many cities, towns and villages are experiencing rapid urbanisation, a population shift from rural to urban areas, and increasing vulnerability of communities and built environments to the severe effects of extreme events such as floods, storm surge and tropical cyclones. Exposure to changing extreme events is a vulnerability also experienced by coastal cities in Australia. Our strategy in the Sustainable Cities and Coasts theme is to develop user-inspired research that responds to the needs of governments, communities and industry for climate adaptation research that influences policy development, changes in design and management practice and better preparedness for communities before and after extreme events. Our research capability includes expertise in climate-adapted buildings, materials and infrastructure; sustainable urban development; urbanisation and health; coastal vulnerability and planning; and, community adaptation and resilience. We are developing partnerships in Asia to extend the reach and influence of this Australian research capability.

The Theme's current areas of research in the Asia Pacific region include:

Urbanisation in Asia – in partnership with AusAid

Different spatial units of the built environment of a city have very different planning, design, and construction requirements as part of their urban development trajectories. Their current requirements for energy use offer systematic opportunities for prioritising urban management actions and different investment strategies, both aimed at reducing greenhouse gas emissions and introducing energy efficiency measures. As part of this spatial typology there are often similar patterns of decay in the function of buildings and materials, energy and water use, social-economic status, urban vegetation, hydrology and drainage; there are also typically repeating problems with urban infrastructure, particularly transport systems.

This project will develop a scoping database of available information for the development of urban archetype research, leading to a better understanding of investment opportunities for urban environments. It will develop and apply the technique of spatial analysis of urban archetypes for use in a variety of urban settings around Asia. The possible focal areas include cities of .05 to

1.5 million, such as Makassar in South Sulawesi, Indonesia, or towns in the Hanoi region in Vietnam or urbanised coastal areas of the climatically-active Central Coast of Vietnam.

Theme 3: Managing Species and Natural Ecosystems

The strategy of the Managing Species and Natural Ecosystems Theme is based around providing the underpinning knowledge needed by people who manage ecosystems to allow them to cope with climate change. We are developing the capability to anticipate and quantify changes in species and ecosystems, to understand their implications, to design effective adaptations to minimise losses of species and services, and to capture opportunities for positive change. The methods are relevant to helping to conserve biodiversity at the genetic, species and ecosystem levels. The ecological assets study below has shown how generic methods developed originally in Australia can be successfully applied in the Asia-Pacific region. Uptake in the region is being achieved by workshops and publications.

The Theme's current areas of research in the Asia Pacific region include:

Climate change and ecological assets in the South East Asian region – in partnership with AusAid

This project is producing a simple GIS-based classification process to explicitly and spatially define social-ecological differences between regions (at any scale). Such a systematic classification process is a necessary first step before making assessments of vulnerability to climate change and/or developing tailored policy options. As part of the project, a workshop was held at Los Banos (Philippines) involving participants from Australia, Cambodia, Indonesia, the Philippines, and Vietnam. The overarching purpose was for participants to consider the effects of climate change and how communities, industries and governments might respond to identified issues. Participants were also prompted to identify the threats to preferred conservation outcomes and opportunities that might be used to improve conservation outcomes.

Subsequently we have commenced working with the participants from Indonesia to look more closely at climate adaptation issues and options in a region of Java. Part of this research will consider how markets for ecosystem services could be established in rural areas where subsistence farming is the norm, farm unit sizes average 0.5 ha, land tenure is mixed, and the land is vulnerable to extreme climatic events.

Theme 4: Adaptive Primary Industries, Enterprises and Communities

Agriculture, forestry and fisheries are amongst the most vulnerable activities to climate changes in the Asia-Pacific and African regions. However, these activities also contribute substantially to national economies and local livelihoods. We are working with local communities and governments 1) to build adaptive capacity, 2) to increase the capability of research teams within other countries to assess climate variability and climate change issues and options, and 3) to enhance the climate inputs and analysis tools used in these assessments.

The Theme's current areas of research in the Asia Pacific region include:

Developing options to mainstream climate adaptation into farming systems in Cambodia, Laos, Bangladesh and India – in partnership with ACIAR

This study focuses on farm-level adaptation research in India (particularly Andhra Pradesh state), Bangladesh, Cambodia and Laos, where there are considerable opportunities to build on past and ongoing ACIAR farming systems projects. The study will work with 16 organisations across these countries to:

- Assess the constraints and opportunities to climate adaptation at the farm level in the four target countries.
- Assess the ability of selected farming systems modelling tools to adequately capture biophysical and socio-economic dimensions of rice-based cropping and mixed crop-livestock systems prevalent in the target regions
- Develop benchmarking methods and data collection (survey) protocols

Rural Industries Vulnerability and Adaptation to Climate Change – in partnership with AusAid

This short scoping study is undertaking an assessment of the relative vulnerability of rural livelihoods in Pacific countries/island types/sub-regions in the context of climate change projections. This is occurring by applying existing knowledge within a strategic research context by identifying the risks, adaptive capacity and hence, vulnerability of key cropping, grazing and forestry activities (focussing primarily on subsistence and cash crop production) in the Pacific region and East Timor to climate change based on current and future constraints to production.

Building adaptive capacity to cope with increasing vulnerability due to climatic change in Zimbabwe and Zambia – in partnership with ICRISAT and IDRC. This 3-year study aims to build the capacity of institutions that work towards the economic empowerment of the rural poor to deal with climate change. It is improving the climate data (historical and future) and delivering training to continue to do this, enhancing farming systems analysis capabilities and delivering training to use these capabilities, and improving the ability of institutions to train the next generation of applied researchers, who will subsequently support smallholder communities in adapting their agricultural practices to current climate variability and future climate change.

Indicators of Achievement

Like Australia, many countries in the Asia-Pacific are highly exposed to the impacts of climate change; unlike Australia, many will have low adaptive capacity. The work of CSIRO's Climate Adaptation National Research Flagship will have achieved value for the region's future if:

- It is demonstrably absorbed into use by decision-makers, particularly at national and provincial government levels
- The resulting decisions take greater account of the potential impacts of climate change in planning and program delivery, particularly in sectors with long development times, and in respect of interactions among sectors
- Local people and communities are thereby exposed to less impacts over time than those in regions that do not benefit from similar work

Proximate indicators (such as uptake by decision-makers, and increasing awareness of climate change impacts and of adaptation options in response to these) are followed during and after our projects through assessments that are mainly qualitative. Longer-term indicators (community benefits, etc) are detectable in some cases where there is a very long working relationship with particular regions, but these are necessarily be harder to quantify.