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Research Program

TROPICAL ECOSYSTEMS *hub*

Workshop Report

Science to inform Climate Change Planning in North Queensland

Workshop Report
4 June 2013
Cairns Regional Library

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Australian Government
Department of the Environment



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Workshop Report – 4 June 2013 – Cairns Regional Library

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Acronyms and Abbreviations Used In This Report

CFI	Carbon Farming Initiative
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CYNRM	Cape York NRM
GBR	Great Barrier Reef
GIS	Geographic Information Systems
JCU	James Cook University
KB	Knowledge-Brokering hub
NCCIS	National Climate Change Information Service
NCCP	National Climate Change Projections
NERP TE	NERP Tropical Ecosystems
NERP	National Environmental Research Program
NQDT	North Queensland Dry Tropics
NRM	Natural Resource Management
QCSSI	Queensland Centre for Social Science Innovation
R&D	Research and Development
RC	Reef Catchments
RDA	Regional Development Australia
Res	Research institution
RGC	Regional Groups Collective (Queensland NRM groups)
SGC	Southern Gulf Catchments
WT	Wet Tropics

Acknowledgements

We thank all those that contributed to making this workshop a success: Peta-Marie Standley, Cape York NRM; David Hinchley, Gavin Kay and Sharlene Blakeney, Terrain NRM; Robyn Bell, Alice Spencer and Shirley Zheng, Reef Catchments; Sarah Connor, Northern Gulf Resource Management Group; Alistair Buchan and Lea Scherl, NQ Dry Tropics; Peter Jacklyn and Brendan Edgard, Charles Darwin University, Don Pollock, attending on behalf of Southern Gulf Catchments; Sonya Johnson and Jann Crase, Regional Development Australia, Far North Queensland and Torres Strait; Bob Pressey, James Cook University; David Hilbert, Iris Bohnet, Nadine Marshall, Matt Curnock, Petina Pert and Chris Cvitanovic, CSIRO and Richard Musgrove, Reef and Rainforest Research Centre. Special thanks go to Jennifer McHugh, James Cook University, for her support throughout this project.

1 Purpose of meeting

This meeting was held to bring together those undertaking Climate Change planning for Natural Resource Management (NRM) bodies and Regional Development Australia (RDA) in North Queensland with the researchers contributing scientific information and support for these plans. This meeting was a collaborative arrangement between the National Environment Research Tropical Ecosystems Hub Project *CF2 Science integration into regional planning* and the Stream 2 Climate Change *Wet Tropics Cluster Research Program*, and forms part of the Knowledge Brokering activities of both these organisations. A list of attendees is included in Appendix 1.

The aim of the meeting was to provide opportunities for collaboration and relationship building, specifically for.

NRM planners to:

- Discuss approaches to the Stream 1 Climate Change planning with other NRM groups, and explore ideas on how to address significant issues
- Articulate science needs to the researchers working on the Stream 2 and NERP programs
- Explore options for accessing the evidence base needed for Climate Change planning
- Identify research gaps to address future NRM needs (both planning and day-to-day business)
- Map out a process for science integration into NRM business into the future

Researchers to:

- Build strong research partnerships for current and future NRM research programs
- Clarify the information needed for current Climate Change planning activities, and the timeframe needed for delivery
- Get a better appreciation of how NRM groups work and the issues they face, and how best to engage with them in a meaningful way

Regional Development planners to:

- Build linkages with NRM groups and researchers
- Integration NRM activities into the development and delivery of RDA Roadmaps

2 Summary of NRM Climate Change planning

Facilitated by Allan Dale

Each of the NRM bodies described the processes they are currently undertaking to incorporate climate change mitigation and adaptation, including their planning processes: their governance and engagement processes; and their development and use of an evidence base. While each group was using a process that was tail-make to their own region's characteristics and needs, many similarities were identified along with areas where their efforts could be aligned. The regions represented in this discussion are shown in Figure 1.

Planning elements that were shared across one or more regions are presented graphically in Figure 2.

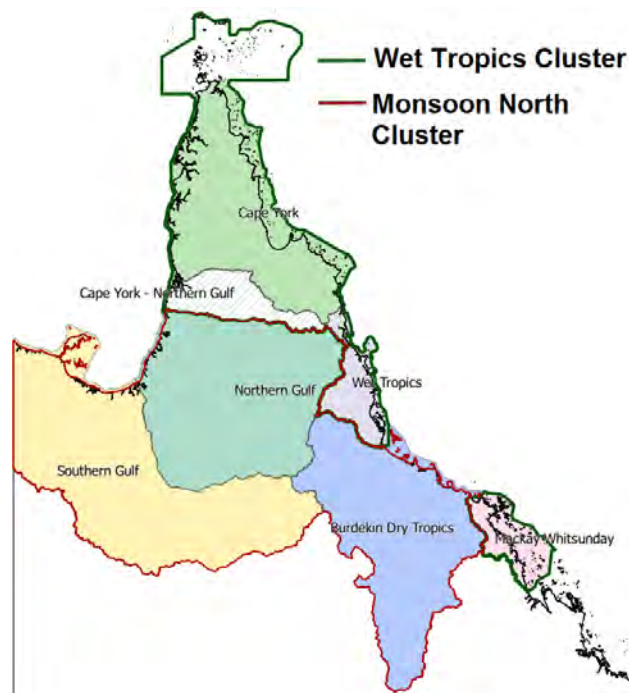


Figure 1. NRM regions represented in workshop

2.1 Monsoon North Cluster – Southern Gulf region – Southern Gulf Catchments (SGC)

Don Pollock

SGC is developing a process rather than a fixed plan. This process will have four key components

- Access to Climate Change science
- Developing a monitoring and assessment process to measure Climate Change impact
- Developing a framework for information sharing and dissemination to facilitate an informed regional view (knowledge management and information retrieval are key aspects)
- Increasing capacity for mapping and spatial analysis to support decision-support tools

2.2 Monsoon North Cluster – Burdekin Dry Tropics region – NQ Dry Tropics (NQDT)

Alistair Buchan, Lea Scherl

NQDT is substantially changing the NRM planning approach to incorporate a continuous rather than a cyclical process for engagement and information and content update. We will be using a dynamic process which reviews learning, capacity and context on an ongoing basis with only broader strategy, vision and objectives remaining fixed over the longer long-term (5-10 years). Climate Change will be fully incorporated into this process. The planning process will have five elements:

- Establishment of context for decision making through an information and context library.
- Governance.
- A short strategy document, with visions and goals,
- An investment strategy (investment exchange), which will facilitate the funding local and cross-regional/organisational projects and will include investment in research.
- A learning tool kit – which will capture the perceptions of different stakeholder groups about what is and isn't working with the investment strategy and include other decision support tools (e.g. around scenario planning process).

NQ Dry Tropics considers such a process will ensure outcomes that extend beyond individual funded projects. It also intends to improve mechanisms for participation and partnerships. Most important is that the planning process will be structured for easy access buy in and update so that it is attractive space for collaborative work and is resilient in the face of rapid and unpredictable change to the socio-ecological systems in the region. The need for a plan of this nature is being driven by the need to address the complex issue of regional climate change adaptation.

2.3 Monsoon North Cluster – Northern Gulf region – Northern Gulf Resource Management Group

Sarah Connor

The Northern Gulf community and board are satisfied with their existing NRM plan. So rather than develop a new plan, the current one will be updated, including by incorporating Climate Change. More information is needed about likely Climate Change impacts, particularly on the grazing industry, Indigenous communities and special places, so there is a strong interest in scenario modelling. The updating of the plan will be a collaborative process, using a socio-ecological approach, applying resilience thinking. As the community has been well-consulted in previous planning processes, stakeholder engagement will be more streamlined and targeted around specific issues.

The updated plan will be more dynamic plan and strongly based on spatial information. Targets and actions will also be dynamic so they can be changed depending on changing circumstance and opportunities.

NGRMG is very keen on collaborative projects and alignment of effort and resources. They are working with neighbouring region and liaising with Terrain NRM and NQ Dry Tropics to identify opportunities to collaborate, especially with regard to identifying and managing significant features.

2.4 Wet Tropics Cluster – Cape York region – Cape York NRM

Peta-Marie Standley

The Cape York region does not have an NRM plan, only a draft plan that was never endorsed by State or Federal Government or the Cape York community. The reference to Climate Change was small and, although it was mentioned as an issue, did not indicate what actions community could take to affect or adapt to impacts. The 2004 Draft plan was developed through consultation with the community rather than involving the community in its development and therefore lacked ownership. Cape York communities are already experiencing the effects of Climate variability.

CYNRM has not committed itself to producing a plan, although this might be an outcome of the project. Rather, it is taking a multi-pronged approach, which will include:

- Communicating Climate Change and its impacts to the community through an Atlas (DVD, online or printable outputs), which will allow access to scientific information and literature, but also allow communities to input their own information
- Action development plan – based on social-ecological-cultural systems, and linked to a regional investment strategy
- Action learning
- Environmental accounts assessment – for which a framework has already been developed
- Developing a framework for engagement for the planning process including the development of a multi-media atlas

As the emphasis will be on communication, the engagement of communication designers and socio-ecological systems experts is being explored to both share information with the community and get feedback from the community about what they already know (e.g. longer dry seasons, eroding of turtle nesting sites, inundation) and what they are already doing, as well as how they have responded in previous periods of Climate Change. This information will be incorporated into the atlas.

Case studies will be developed that illustrate Climate Change issues and how communities are responding to them.

CYNRM has undertaken a number of project evaluations and synthesis of previous planning including the identification of priorities and gaps. CYNRM has also initiated a number of community engagement workshops and meetings to identify community priorities with regards to actions that can contribute to improving and maintaining sustainable communities and environments in Cape York.

2.5 Wet Tropics Cluster – Wet Tropics region – Terrain NRM

David Hinchley, Gavin Kay, Sharlene Blakeney

The Wet Tropics region has an NRM plan and Aboriginal (Bama) plan. Terrain NRM will be building on these current plans but also looking at other relevant plans from within the region and across neighbouring regions (such as water quality improvement plans). Terrain NRM is not yet sure what format the plan will take – possibly a short document, or even a poster. However, it will be an adaptive plan that is modular, an interactive system that communicates with and informs all stakeholders. Issues that will be addressed in the planning process include:

- Broad institutional/governance arrangements – determining how the plan fits within the region considering that NRM groups are not statutory bodies

- Making sure that the plan is useful and relevant to the land managers
- Having a resilience focus
- Having an ecological basis

The plan will include

- An investment portfolio
- An action plan
- Monitoring and evaluation, focusing on condition and impacts
- Opportunities for collaboration – tools, information libraries

As Terrain NRM will be using an adaptive process, timing of information coming from the Stream 2 projects is not an issue.

2.6 Wet Tropics Cluster – Mackay-Whitsundays region – Reef Catchments

Robyn Bell (NRM Planning for Climate Change contact), Alice Spencer (NRM plan contact), Shirley Zheng (GIS officer)

Updating of the NRM plan has commenced with the Climate Change elements yet to be determined pending funding delivery to trigger related activities, i.e. project plan. The broader planning process, which will include Climate Change considerations, will cover:

- Context setting – State of the region reports are being updated, and a 'knowledge database' created, to include scientific knowledge, stakeholder analysis, literature, and policy reviews
- Scenario planning to be used to inform potential future realities
- Trade-offs consideration
- Spatial prioritisation a central theme, proportioning the region into planning units and considering where the best return on investment in NRM may occur. RC will engage a research institution to support the development of this work
- In line with RGC guidelines, taking a systems approach
- Adaptive management approach, a living plan, monitoring and evaluation
- Governance – clear line of sight connectivity between NRM issues and priority implementation issues;
- Conservation entrepreneurship/investment portfolio to fill ample gaps left by funding
- Innovation in communication, potential web tools for plan delivery.

Particular concerns are the changing policy environment (e.g. vegetation management) and lack of applicability of current methodologies under the CFI for the region.

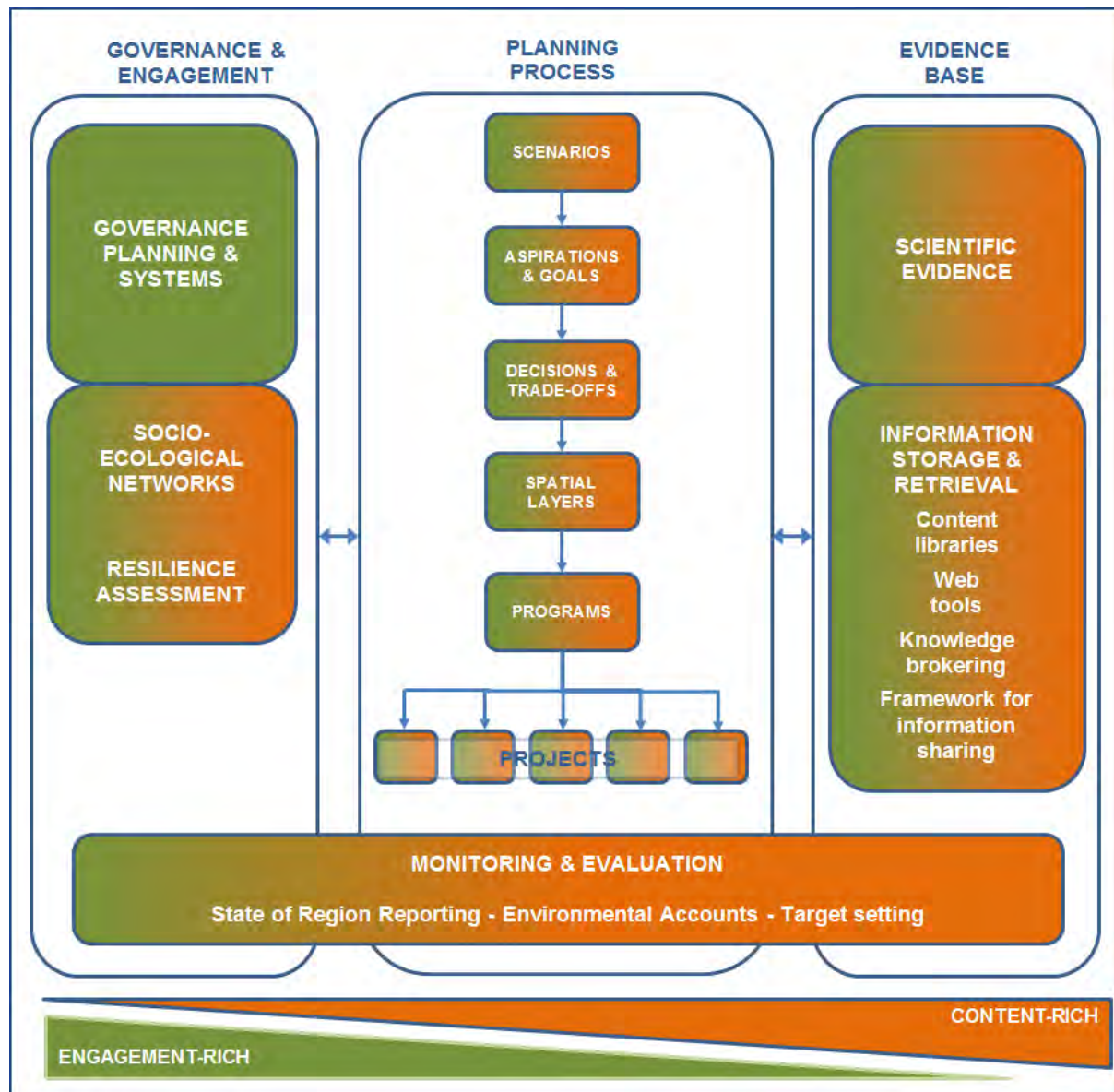


Figure 2. Map of common planning elements identified across NRM regions

3 Presentations

3.1 Climate Change Research and Development

Gabriel Crowley

This presentation provided a background to the Stream 2 Climate Change research by mapping out the investment of Research and Development organisations into climate change research (Appendix 2 R&D Program – Climate Change research). Also provide was a directory of current and recent projects relevant to Climate Change (available on request).

3.2 Stream 2 Climate change program

Steve Turton

This presentation described the Stream 2 Climate Change research program, including nation-wide initiatives. It then described in detail the focus of the Stream 2 Wet Tropics Cluster research program (Appendix 3. Wet Tropics Cluster – Stream 2 Overview).

3.3 NERP TE CF2 - Integration of science into regional planning

Gabriel Crowley

This presentation summarised the findings of the NERP Tropical Ecosystems Hub project CF2 - Integration of science into regional planning (Appendix 4 NERP CF2 – Integrating Science into Regional Planning). It described the process of identifying the relevance of each NERP Tropical Ecosystems Hub projects to Climate Change planning and developing portfolios of projects relevant to each NRM region (available at <http://www.nerptropical.edu.au/publication/climate-change-relevance-hub-projects-nrmcairns-institute>).

4 Cross-regional collaboration and science integration

Facilitated by Allan Dale

Six thematic areas (Figure 3) were identified where NRM groups could collaborate in Climate Change planning, either through sharing of information and experience, or through establishing processes for science integration with contributing research organisations. A number of NERP TE projects and Stream 2 Climate Change were identified as contributing to these thematic areas, and this list has subsequently been extended to include all relevant activities from both programs (Table 1).

1. Governance and engagement

The Governance and engagement theme includes mechanisms for managing the planning process and engaging with stakeholders to ensure the plans reflect community concerns. Identification of socio-ecological networks and their resilience was considered essential to understanding how communities interacted with each other and their environment. Collaborative opportunities under this theme were discussed in Breakout Session 5.1.

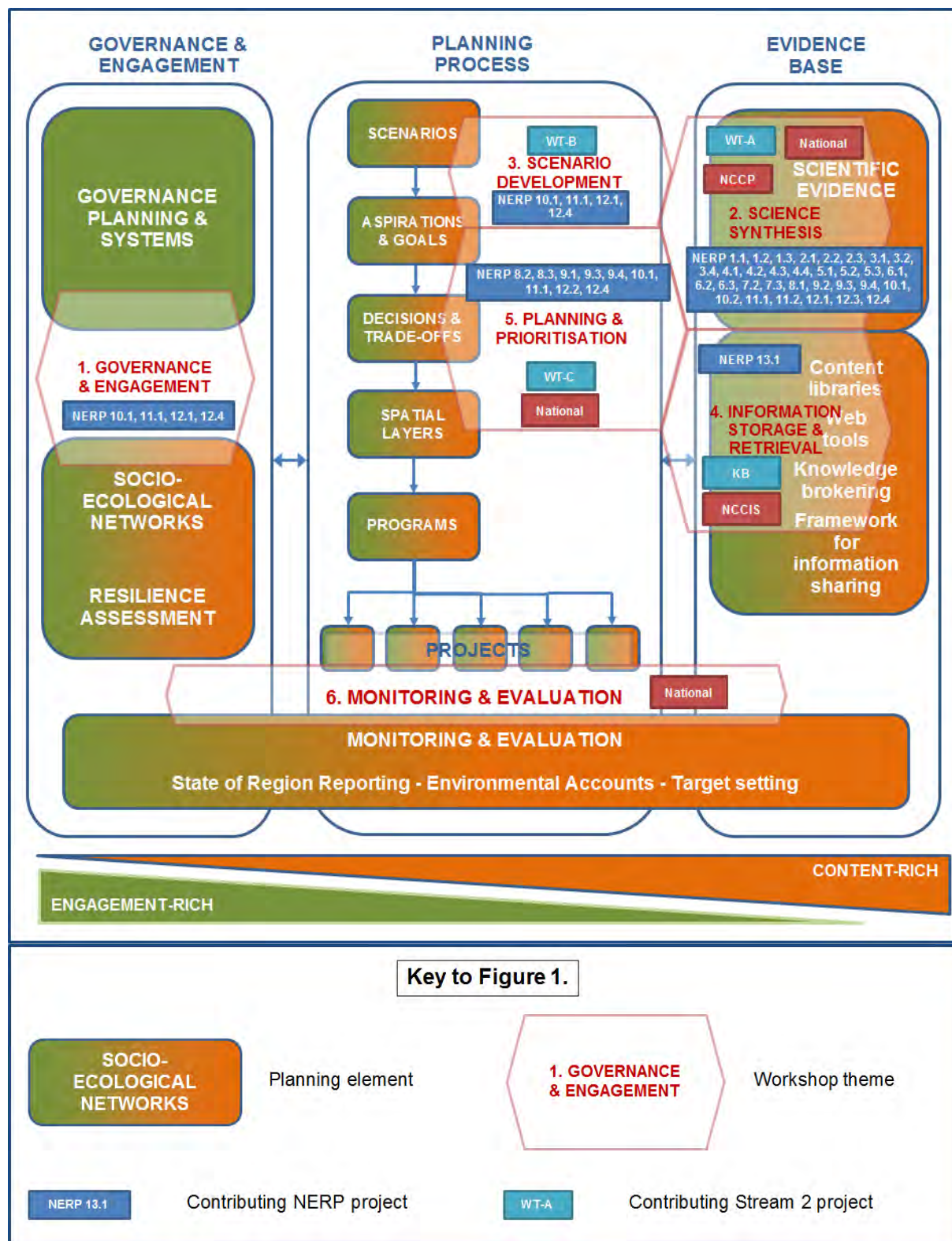


Figure 3. Map of common planning elements from Figure 2, identifying planning themes and contributing NERP and Stream 2 projects

See Table 1 for key to contributing projects.

Table 1. Contributing projects

Climate Change Stream 2 Projects			
Element 1 – National activities		Element 2 - Wet Tropics Cluster activities	
National	National – themes Decision making; Invasive species; Biodiversity; Monitoring & Evaluation	WT-A	Science synthesis node: Themes: Climate; Biodiversity, Socio-economic, Cultural/social
		WT-B	Participatory scenarios node
NCCP	National Climate Change Projections	WT-C	Planning and prioritisation node
NCCIS	National Climate Change Information Service	KB	Knowledge Brokering hub
NERP TE Hub Projects			
NERP 1.1	Monitoring status and trends of coral reefs of the GBR	NERP 7.1	Fire & rainforests
NERP 1.2	Marine wildlife management in the GBR World Heritage Area	NERP 7.2	Invasive species risks and responses in the Wet Tropics
NERP 1.3	Characterising the cumulative impacts of global, regional and local stressors on the present and past biodiversity of the GBR	NERP 7.3	Climate change and the impacts of extreme events on Australia's Wet Tropics biodiversity
NERP 2.1	Marine turtles and dugongs of the Torres Strait	NERP 8.1	Monitoring the ecological effects of GBR zoning plan on mid and outer shelf reefs
NERP 2.2	Mangrove and freshwater habitat status of Torres Strait Islands	NERP 8.2	Assessing the long-term effects of management zoning on inshore reef of the GBR
NERP 2.3	Monitoring the health of Torres Strait coral reefs	NERP 8.3	Significance of no-take marine protected areas to regional recruitment and population persistence on the GBR
NERP 3.1	Rainforest Biodiversity	NERP 9.1	Dynamic vulnerability maps and decision support tools for the GBR
NERP 3.2	Rainforest refugia and hotspots of plant genetic diversity in the Wet Tropics and Cape York Peninsula	NERP 9.2	Design and implementation of management strategy evaluation for the GBR
NERP 3.3	Targeted surveys for missing and critically endangered rainforest frogs in ecotonal areas, and assessment of whether populations are recovering from disease	NERP 9.3	Prioritising management actions for GBR islands
NERP 3.4	Monitoring of key vertebrate species	NERP 9.4	Conservation planning for a changing coastal zone
NERP 4.1	Tracking coastal turbidity over time and demonstrating the effects of river discharge events on regional turbidity	NERP 10.1	Social and economic long-term monitoring program
NERP 4.2	The chronic effects of pesticides and their persistence in tropical waters	NERP 10.2	Socio-economic system and reef resilience
NERP 4.3	Ecological risk assessment for water quality of the GBR	NERP 11.1	Building resilient communities for Torres Strait futures
NERP 4.4	Hazard assessment for water quality threats to Torres Strait marine waters, ecosystems and public health	NERP 11.2	Improved approaches for the detection and prevention of wildlife diseases in the Torres Strait
NERP 5.1	Understanding GBR diversity: spatial and temporal dynamics and environmental drivers	NERP 12.1	Indigenous peoples and protected areas
NERP 5.2	Combined water quality-climate effects on coral and other reef organisms	NERP 12.2	Harnessing natural regeneration for cost-effective rainforest restoration
NERP 5.3	Vulnerability of seagrass habitats in the GBR to changing coastal environments	NERP 12.3	Relative social and economic values of residents and tourists in the WTWHA
NERP 6.1	Maximising the benefits of mobile predators to GBR ecosystems: the importance of movement, habitat and environment	NERP 12.4	Governance, planning and the effective application of emerging ecosystem service markets: climate change adaptation and landscape resilience
NERP 6.2	Drivers of juvenile shark biodiversity and abundance in inshore ecosystems of the GBR	NERP 13.1	e-Atlas
NERP 6.3	Critical seabird foraging locations and trophic relationships for the GBR		

2. Science synthesis

The Science synthesis theme addressed the core information needed on which to base Climate Change planning. This need is being addressed by the Stream 2 Wet Tropics Cluster Science Synthesis Node as well as by the Stream 2 National project and National Climate Projections project, and similar activities being undertaken by the Monsoon North Cluster research program. Numerous NERP TE projects also involve synthesis of scientific evidence about the extent and condition of terrestrial and marine resources, the pressures and drivers affecting them, and – to some extent – how these will be affected by Climate Change. However, as current NRM planning activities and daily business extend beyond considerations of Climate Change, other on-going mechanisms for synthesising relevant scientific evidence may also be required. Further collaborative opportunities under this theme were discussed in Breakout Session 5.3.

3. Scenario development

The Scenario development theme includes mechanisms for visualising and engaging with changes likely to be experienced in each region and their implications for NRM in order to identify appropriate planning and management responses.

This need is being addressed by the Stream 2 Wet Tropics Cluster Scenario Development Node, and similar activities being undertaken by the Monsoon North Cluster Research Program. Several NERP projects also involve scenario development in relation to both Climate Change and other pressures and drivers. However, as current NRM planning activities and daily business extend beyond considerations of Climate Change, other on-going mechanisms for scenario development may also be required.

Collaborative opportunities under this theme were discussed in Breakout Session 5.2.

4. Information storage and retrieval

The Information storage and retrieval theme includes mechanisms for ensuring that data, information and synthesised information are made accessible to NRM groups in useable formats that can be incorporated in both planning and day-to-day business, and that knowledge of both this evidence and the systems for accessing it is maintained to ensure NRM activities are informed by a stable evidence base. Collaborative opportunities under this theme were discussed in Breakout Session 5.3.

5. Prioritisation and planning

This includes mechanisms for marrying scientific evidence with stakeholder concerns to prioritise where NRM efforts are invested. This need is being addressed by the Stream 2 Wet Tropics Cluster Planning and Prioritisation Node, and similar activities being undertaken by the Monsoon North Cluster Research Program. Several NERP projects also involve prioritisation and planning to address both Climate Change and other stakeholder concerns. However, as current NRM planning activities and daily business extend beyond considerations of Climate Change, other on-going mechanisms for prioritisation and planning may be required.

Collaborative opportunities under this theme were discussed in Breakout Session 5.4.

6. Monitoring and evaluation

This includes mechanisms for managing the planning process and engaging with stakeholders to ensure the plans reflect community concerns. Identification of socio-ecological networks was considered essential to understanding how communities interacted with each other and their environment. Further discussion of collaborative opportunities across this theme was postponed to a further meeting.

5 Breakout sessions

Breakout sessions explored each of the above themes, except Monitoring and evaluation. Discussions were broadly organised around the following topics

- Current situation – where we are now
- Alignment opportunities – what NRM groups and/or researchers should be doing together
- Collaborative efforts required – how can efforts be aligned to achieve these alignments?
- Next steps

5.1 Governance and Engagement

Current situation

- Wanting to ensure our plans are highly influential (See Figure 4)
- Need to keep the story about improving governance simple.
- Need to know who are the key players that we to influence/ involve.
- What are the mandates of the various players?
- Where are their synergies and conflicts?
- How can we best position the plans to be influential?
- Collectively need analytical tools to support these considerations.

Alignment opportunities

- New Governance Risk analysis framework developed by JCU (NERP).
- New sub-regional social resilience analysis emerging via JCU (QCSSI).
- Emerging work on Social Network Analysis could be of value (Pressey/NERP).

Collaborative efforts required

- Collaborative risk assessment of the governance systems.
- Collaboration on finding tools for social network analysis.
- Collaborative opportunities to explore social resilience.

Next steps

- Work across the regions to support Social Network Analysis approaches.
- Progress a whole of region (systemic) Governance Risk Analysis as a basis for higher level collective and strategic decision making among the Wet Tropics Regions.
- Continue to progress current JCU Social Resilience Benchmarking work across the regions as a basis for integration into the Wet Tropics cluster and adaptation planning.

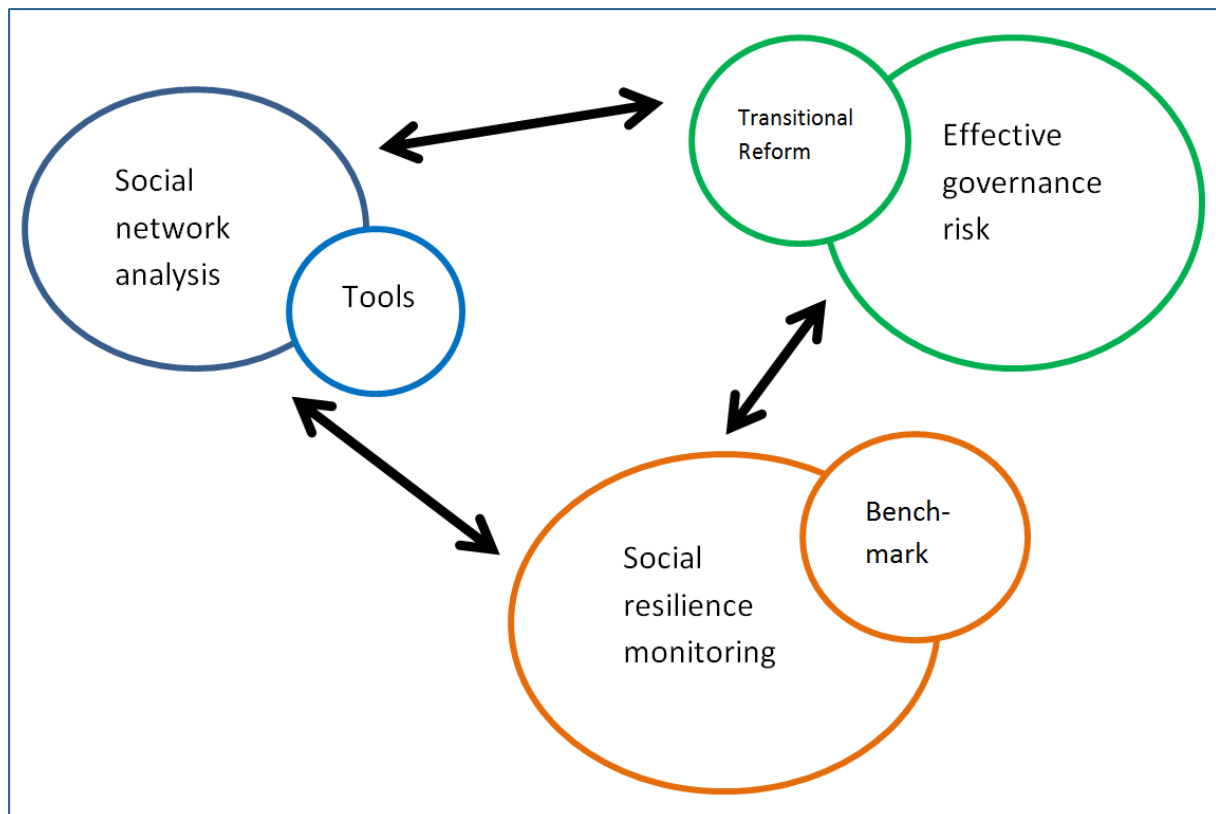


Figure 4. Interaction between governance, engagement and resilience planning elements

5.2 Scenario Development

Current situation

- Some climate projections are available, but there is a lot of uncertainty
- Stories from Indigenous people and other sectors (local knowledge) need to be captured
- No mechanisms for incorporating science into planning
- Poor understanding of scenario planning
- Climate Change information is already available, but it is difficult to engage stakeholders when there are long time periods, as they feel it doesn't apply to them

Alignment opportunities

- Spatial biophysical information coming from the national Stream 2 initiative is needed before any scenario planning can be done for the region
- Scenario planning needs to be undertaken separately for each region, as they are all different
- Bring spatial information together across the region for scenario planning
- Provide links to the scientists

Collaborative efforts required

- Alignment through the Wet Tropics cluster knowledge hub

Next steps

- Bring spatial information together for individual regions and across regions
- Each NRM group to work out delivery of scenario planning engagement activities

- Run two types of scenario planning
 - climate scenarios
 - social-ecological system
- Scientists to compose a local compendium of science information

5.3 Information synthesis and access

Current situation

- Wet Tropics Cluster has identified issues and knowledge gaps affecting Climate Change planning to inform the Science Synthesis Node activities
- The Science Synthesis Node activities will include workshops on the impacts of Climate Change and Climate Change adaption in relation to Biodiversity, Socioeconomics, Communities (cultural/social aspects). It will also identify major Climate Change threats, and identification of where and how soon change is likely to occur. There will be a chapter on Climate Change adaptation science. A bibliography will be provided.
- These workshops will be held after the knowledge broker is appointed
- The Science Synthesis Node activities will draw on datasets provide by the Stream 2 National project as well as material provided by the NRM groups.
- The Stream 2 Wet Tropics Cluster Knowledge Brokering Node will help formulate products from the science synthesis that will be useful to the NRM groups.
- Data and information systems that are available for accessing scientific information, and could be expanded to meet growing NRM needs, include
 - North Australian Fire Information www.firenorth.org.au
 - North Australian Land Manager www.landmanger.org.au
 - e-Atlas <http://maps.e-atlas.org.au/>

Alignment opportunities

- Improve communication between researchers and NRM groups about suitable formats for outputs

Collaborative efforts required

- Alignment through the Wet Tropics cluster knowledge hub

Next steps

- Discuss examples of good science synthesis and swap them between the NRM groups and the science synthesis team
- Arrange for draft formats for Science Synthesis Node products to be circulated to NRM groups for feedback before completion
- Define the role of the Wet Tropics Cluster Knowledge Broker, to be appointed soon
- Knowledge gathering/synthesis needs to be an iterative process
- Develop information storage and access systems that leave a legacy beyond current project funding
- Make sure information is available in a spatially detailed and relevant basis

5.4 Prioritisation and planning

Current situation

- Both the Monsoon North Cluster and Wet Tropics Cluster Stream 2 programs include prioritisation and planning projects
- A postdoctoral fellow will be appointed soon by the Wet Tropics Cluster Stream 2 program's Prioritisation and planning node
- This node's activities will include information about trade-offs in decision making as well as and understanding spatial information
- Most NRM plans in the Wet Tropics cluster include little spatial information in it, which makes it difficult to prioritise efforts (e.g. wildlife corridors)
- Southern Gulf Catchments has little mapping and spatial analysis capacity
- Information is required at both the regional and local scale
- Specific gaps include springs of Cape York, water assets in the Wenlock catchment, coal seam gas information
- CYNRM has developed an online tool that allows people to upload information on what they are seeing, e.g. Videos. This will be used as a community monitoring tool

Alignment opportunities

- Develop consistent landscape objectives
- Develop consistent information and approaches to trade-offs
- Ask the right questions for the planning and prioritisation tools to answer
- Design of tools
- Bioregional planning
- Identifying and filling spatial gaps (e.g. water resources)
- Consistent communication of data layers

Collaborative efforts required

- Spatial staff network
- Keep link to state approach to supporting NRM planning

Next steps

- Formalise planners' alliance
- Network among NRM GIS staff, NRM Planners and Wet Tropics Cluster Prioritisation and planning node staff (Bob Pressey and Petina Pert)

6 Wrap up and next steps

The meeting confirmed the usefulness of bringing together NRM planners with each other and with contributing researchers, and that the objectives of the meeting to enhance collaboration were achieved. Next steps identified in the breakout sessions are listed in Table 1.

It was resolved to organise a follow-up meeting in approximately six months' time to be organised around an identification information need or process development.

Table 1. Identified next steps

Governance and engagement
Work across the regions to support Social Network Analysis approaches
Progress a whole of region (systemic) Governance Risk Analysis as a basis for higher level collective and strategic decision making among the Wet Tropics Regions
Continue to progress current JCU Social Resilience Benchmarking work across the regions as a basis for integration into the Wet Tropics cluster and adaptation planning
Work across the regions to support Social Network Analysis approaches
Scenario development
Bring spatial information together for individual regions and across regions
Each NRM group to work out delivery of scenario planning engagement activities
Run two types of scenario planning <ul style="list-style-type: none"> • climate scenarios • social-ecological system
Information synthesis and access
Discuss examples of good science synthesis and swap them between the NRM groups and the science synthesis team
Arrange for draft formats for Science Synthesis Node products to be circulated to NRM groups for feedback before completion
Define the role of the Wet Tropics Cluster Knowledge Broker, to be appointed soon
Knowledge gathering/synthesis needs to be an iterative process
Develop information storage and access systems that leave a legacy beyond current project funding
Make sure information is available in a spatially detailed and relevant basis
Prioritisation and planning
Formalise planners' alliance
Network among NRM GIS staff, NRM Planners and Wet Tropics Cluster Prioritisation and planning node staff (Bob Pressey and Petina Pert)



Appendix 1. List of attendees

Sector1	Person	Organisation
NRM	Peta-Marie Standley	Cape York NRM
NRM	Sarah Connor	Northern Gulf Resource Management Group
NRM	Alastair Buchan	NQ Dry Tropics
NRM	Lea Scherl	NQ Dry Tropics
NRM	Alice Spencer	Reef Catchments
NRM	Robyn Bell	Reef Catchments
NRM	Shirley Zheng	Reef Catchments
NRM	Don Pollock	Southern Gulf Catchments
NRM	David Hinchley	Terrain NRM
NRM	Gavin Kay	Terrain NRM
NRM	Sharlene Blakeney	Terrain NRM
RDA	Jann Crase	Regional Development Australia FNQTS
RDA	Sonja Johnson	Regional Development Australia FNQTS
Res	Chris Cvitanovic	CSIRO / Stream 2 National Project
Res	Dave Hilbert	CSIRO / Stream 2 Wet Tropics Cluster
Res	Iris Bohnet	CSIRO / Stream 2 Wet Tropics Cluster
Res	Matt Curnock	CSIRO / Stream 2 Wet Tropics Cluster
Res	Petina Pert	CSIRO / Stream 2 Wet Tropics Cluster
Res	Nadine Marshall	CSIRO / Stream 2 Wet Tropics Cluster / NERP Tropical Ecosystems Hub
Res	Steve Turton	James Cook University / Stream 2 Wet Tropics Cluster
Res	Bob Pressey	James Cook University / Stream 2 Wet Tropics Cluster / NERP Tropical Ecosystems Hub
Res	Allan Dale	James Cook University / Stream 2 / NERP
Res	Brendan Edgar	NERP Northern Australia Hub / Stream 2 Monsoon North
KB	Gabriel Crowley	James Cook University / NERP Tropical Ecosystems Hub
KB	Richard Musgrove	NERP Tropical Ecosystems Hub
KB	Peter Jacklyn	Charles Darwin University
Minutes	Dale Bennett	James Cook University

¹ NRM: Natural Resource Management body; RDA: Regional Development Australia; Res: Research institution; KB: Knowledge Brokering role.


Appendix 2 R&D Program – Climate Change research

Gabriel Crowley



R&D Programs - Climate Change research

Gabriel Crowley – The Cairns Institute JCU



Session Aims

1. Familiarise NRM planners with the range of R&D programs contributing to Climate Change science
2. Identify science projects that will inform Climate Change planning
3. Identify outputs that will be useful from research projects
4. Provide background for session on knowledge brokering / science integration
5. Provide context for research being undertaken in NERP and Stream 2 Climate Change programs

R&D Program	CC Research Focus
Climate Change Research Strategy for Primary Industries	Primary Industries
National Climate Change Adaptation Research Facility	Adaptation planning
Managing Climate Variability	Building farmer capacity
Sugar Research and Development Corporation	Building farmer capacity through improving productivity, profitability, innovation & sustainability
Meat and Livestock Australia	
Grains Research & Development Corporation	
Fisheries Research & Development Corporation	
Horticulture Australia	
CSIRO Climate Adaptation Flagship	Adaptation; Cities & coasts; biodiversity; Primary industries
Australian Research Council Centre of Excellence for Climate System Science	Climate and its drivers
Australian Centre of Excellence for Local Government	Governance & capacity
Rural Industries Research & Development Corporation	Innovation, adaptation, policy
Productivity Commission	Policy development
National Health and Medical Research Council	Health implications

CCRSPI

CLIMATE CHANGE RESEARCH STRATEGY FOR PRIMARY INDUSTRIES

AIMS:

Towards more efficient and effective research, development and extension to address the challenges and opportunities of climate change for primary industries in Australia

Activities:

Leading national collaboration, coordination and communication of climate change research, development and extension activity for Australia's primary industries

www.ccrspi.org.au



CLIMATE CHANGE RESEARCH STRATEGY FOR PRIMARY INDUSTRIES

Partners

Rural research and development corporations, *including*

Fisheries Research and Development Corporation
 Grains Research and Development Corporation
 Horticulture Australia Limited
 Meat and Livestock Australia
 Rural Industries Research and Development Corporation
 Sugar Research and Development Corporation

Government agencies, *including*

Department of Agriculture, Fisheries and Forestry
 Department of Agriculture, Fisheries and Forestry - Queensland

Research organisations

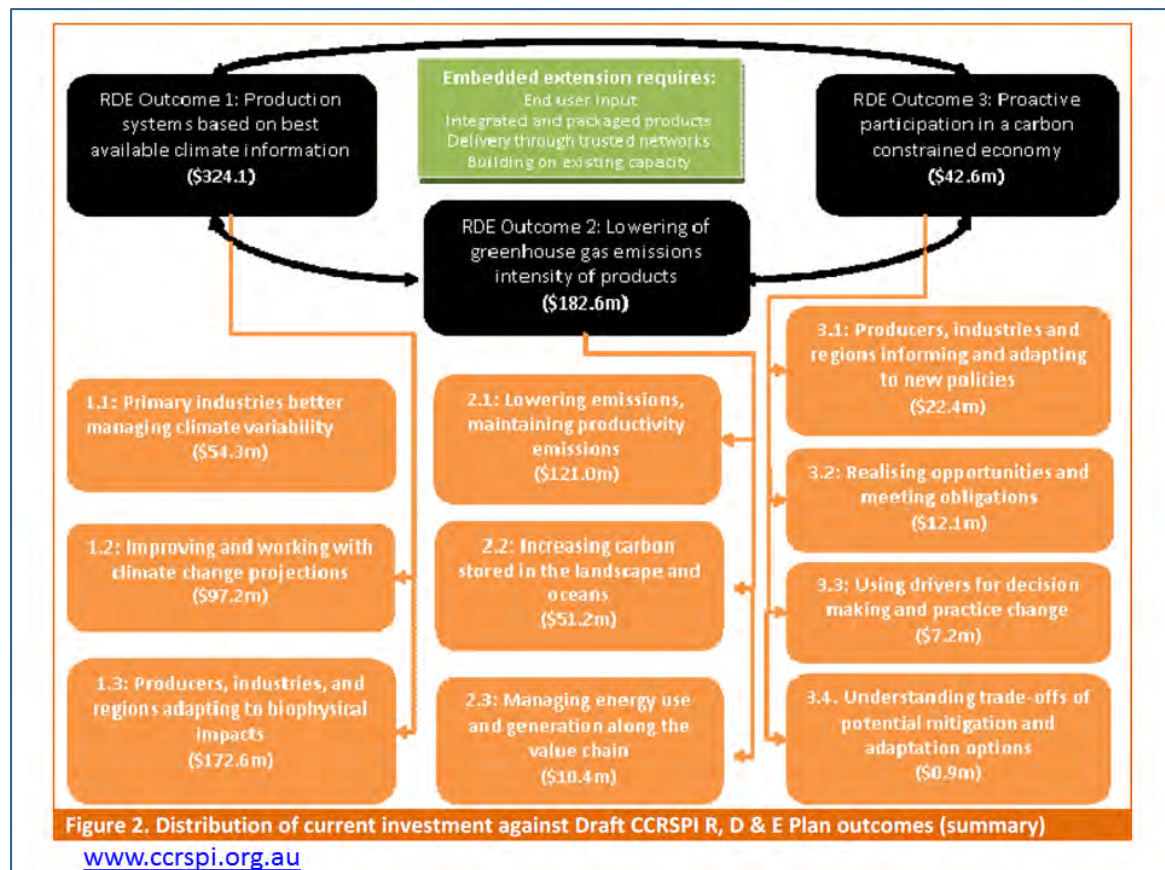
CSIRO

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Table 1: Current investment in primary industries-related climate change R, D & E

Lead managing agency	# Projects	Total Investment
Australian Egg Corporation Limited	0	0
Department of Agriculture and Food, WA	13	\$11,139,455
Australian Meat Processors Corporation Limited	18	\$1,155,110
Australian Pork Limited	8	\$1,889,724
Australian Wool Innovations Limited	4	\$1,559,586
Australian Research Council	106	\$57,846,870
Cotton R&D Corporation	6	\$6,424,153
CSIRO	75	\$50,549,237
Dairy Australia	6	\$8,760,424
Department of Agriculture Fisheries and Forestry	16	\$81,106,968
Department of Agriculture Fisheries and Forestry, Qld	7	\$14,238,000
Department of Natural Resources, NT	3	\$3,991,600
Department of Primary Industries, NSW	70	\$33,662,698
Department of Primary Industries, Vic	65	\$86,398,254
Department of Primary Industries, Parks, Water & Environment /Tasmanian Institute of Agriculture	21	\$8,648,363
Fisheries R&D Corporation	24	\$19,155,309
Forest & Wood Products Australia	1	\$1,164,614
Grains R&D Corporation	24	\$69,927,669
Grape & Wine R&D Corporation	6	\$9,352,190
Horticulture Australia Limited	20	\$7,525,544
LiveCorp	0	0
Meat & Livestock Limited	61	\$45,723,476
Primary Industries Research, South Australia	14	\$18,567,509
Rural industries R&D Corporation	18	\$7,757,728
Sugar R&D Corporation	3	\$2,453,136
Totals	589	\$548,997,618

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NCCARF
National Climate Change Adaptation Research Facility

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The National Climate Change Adaptation Research Facility
Leading the research community in a national interdisciplinary effort to generate the information needed by decision-makers in government and in vulnerable sectors and communities to manage the risks of climate change impacts.

Featured

- New Policy Guidance Briefs
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climateadaptation 2013
knowledge + partnerships
NATIONAL ADAPTATION CONFERENCE
25-27 June 2013
Hilton Hotel, Sydney

NCCARF's Adaptation Conversation 2012-13
NCCARF's policy guidance briefs deliver evidence-based guidance to decision makers in key areas of climate change knowledge.

Climate Adaptation in Action 2012
Sharing knowledge, building resilience
Conference Website

NCCARF Next Phase
Visit the NCCARF channel for our latest videos

This week in NCCARF
Week starting Monday, May 27, 2013
NCCARF launches results from more than 140 peer reviewed research projects at Parliament House in Canberra on Thursday. The projects are across all aspects of climate change adaptation science and practice. A series of seminars throughout the day will showcase some of the results.
Also on Thursday we will publish three reports from the Indigenous Communities theme on strengthening institutions for *Indigenous resilience*, *adaptive housing in Alice Springs*, and *Indigenous women's approach to aquaculture*.
The National Climate Adaptation conference is offering discounted registration this week until Thursday 5pm. [Register here](#). [Read more >>](#)

What is Adaptation?
In a world where climate impacts are increasingly observable and adaptation actions are increasingly required, we showcase leading impacts and adaptation research and explore the contribution of adaptation science to planning and policy making. [Read more >>](#)

Publications
A range of information products, including research reports, fact sheets, data, presentations and other outputs from NCCARF's research programs are now available. [Read more >>](#)

Research
Across Australia NCCARF has funded research projects addressing priorities identified through the nine National Adaptation Research Plans to provide information needed by decision-makers in key vulnerable sectors and regions.

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National Climate Change Adaptation Research Facility

Role:

Harness and coordinate the capabilities of Australia's researchers, to generate and communicate the knowledge decision-makers need for successful adaptation to climate change

Objectives:

- Identify knowledge needs of end users
- Build and harness the capacity of the research and end user community
- Generate the knowledge to meet end user needs
- Make knowledge available to end-users

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- CLIMAG Issue 24, May 2013
- New free CliMate app for farmers
- Climate Analyser decision-support system tools

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We have been helping Australian farmers to manage climate risk on-farm for over a decade, providing them with practical tools to incorporate climate information into farm business decisions.

Our goals are to:

- improve seasonal forecasting – its accuracy, lead-time and ease of use
- provide farmers with [tools and information for managing climate risk](#)
- get more farmers and natural resource managers managing their climate risk

Last updated: Friday, August 6, 2010

www.managingclimate.gov.au



Managing Climate Variability

Aims:

- improve seasonal forecasting – its accuracy, lead-time & ease of use
- provide farmers with tools & information for managing climate risk
- get more farmers & natural resource managers managing their climate risk

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Dung beetle release a step closer
With MLA support, CSIRO scientists are breeding two new species of dung beetles.
A second shipment of the two species is being imported for breeding and testing for a September 2014 release.
The dung beetles will provide an extra option for southern producers who currently lack a species that is active in late winter and early spring.
[Read more about the dung beetle release](#)

Highlights
Many producers are looking at their options for managing cattle on deteriorating pastures
MLA releases new calculator to help northern producers work out breeder mortality rates
Widespread rainfall helped stem recent falls in cattle and sheep prices nationwide
Applications for producers to participate in the MLA challenge close 31 May
Despite several challenges, Australian beef exports to Korea are bouncing back

Latest market information
Cattle Sheep
EYCI (¢/kg cwt) Daily indicators 28 May '13
EYCI (cwt) 297.75 ▲ 2.25
Hvy Steer (lwt) 172.60 ▲ 4
Med Cow (lwt) 101.60 — NC
J A S O N D J F M A M J
23/05/13 US market failing to attract Aussie beef
23/05/13 Alternate beef markets ease tough conditions in Russia
23/05/13 Wet winter forecast for most of Australia
22/05/13 Canadian numbers on feed decrease
22/05/13 Cattle market alert
16/05/13 Beef and lamb sales strong
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2012 Marine Climate Change Report

The 2012 Report Card demonstrates that climate change is having significant impacts on Australia's oceans and marine ecosystems. Many new changes have been documented since the 2009 Report Card. There is now striking evidence of extensive southward movements of tropical fish and plankton species in southeast Australia, declines in abundance of temperate species, and the first signs of the effect of ocean acidification on marine species with shells. The report card highlights that the Australian science community is widely engaged in research, monitoring and observing programs to increase our understanding of climate change impacts and inform management. The comprehensive information shows that adaptation planning is already underway, from seasonal forecasts for fisheries and aquaculture, to climate-proofing of breeding sites for turtles and seabirds. The up-to-date information presented will assist ocean managers and policy makers to improve and justify actions to help our marine ecosystems adapt to the threat of climate change.

98 of Australia's leading marine scientists from 37 universities and research organisations contributed to the 2012 Report Card. Each section contains information on what is already happening, what may happen if future, and describes the actions underway to prepare and adapt to changes.

Download the 2012 Marine Climate Change Report Card [PDF]

To read more about the background and individual chapters that make up the report card visit http://www.oceanclimatechange.org.au/content/index.php/2012/report_card/

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Farm Business Management - Recent poor seasons have highlighted the need for farm business management in order to manage resources in a

Herbicide Resistance - Herbicide resistance is a fact of life for growers in the western and southern grains regions, and is spreading through the northern grains region.

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Inaugural Pulse Conference
Pulse Breeding Australia will host its inaugural pulse... 17.04.2013
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PROGRAM OVERVIEW

OVERVIEW | PRIORITIES AND DELIVERABLES | PERFORMANCE INDICATORS | R&D PLAN | KEY CONTACTS AND LINKS

Overview

The Rural Industries R&D Corporation's Global Challenges R&D Program addresses impediments and opportunities to Australian agriculture that have arisen as a result of global forces. Initially, these challenges have been identified as:

- International and domestic trade policy.
- Improving agricultural productivity.
- Food security.
- Climate change.
- Emerging rural issues.

Climate change and increasing variability poses a significant challenge to agriculture. There are a significant number of climate change policies and initiatives (e.g. emissions trading) that are being considered or implemented domestically and internationally. The need to investigate the implications of the policies and initiatives is growing in importance and urgency.

From a trade perspective, there is a growing trend to implement barriers to trade in key markets. An analysis of these is required to better inform industries, governments, trade negotiators and policy makers.

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The Office of Northern Australia will enable better coordination across the Australian Government and between governments, businesses and communities on issues affecting northern Australia.

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Barriers to Effective Climate Change Adaptation



Inquiry report

This inquiry report was released on 14 March 2013.






See also

- [More about Barriers to Effective Climate Change Adaptation](#)

Download the report

-  [Barriers to Effective Climate Change Adaptation Inquiry report \(PDF - 2300 Kb\)](#)
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Welcome to the Australian Research Council's Centre of Excellence for Climate System Science



Century-old science helps confirm global warming won't help

Ocean measurements taken more than 135 years ago during the scientific expedition of HMS Challenger have provided further confirmation of human-produced climate change.

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The Centre of Excellence for Climate System Science is a major initiative funded by the [Australian Research Council](#). The Centre is an international research consortium of five Australian universities and a suite of outstanding national and international Partner Organizations. It will build on and improve existing understanding of the modeling of regional climates to enable enhanced adaptation to and management of climate change, particularly in the Australian region.

The Centre was established in 2011 with extensive investment from the Australian Research Council, the [University of New South Wales](#), the [Department of Climate Change and Energy Efficiency](#), New South Wales Government, [Monash University](#), the [Australian National University](#), [The University of Melbourne](#), and the [University of Tasmania](#). It has strong links with the [Australian Community Climate and Earth System Simulator \(ACCESS\)](#) initiative and works in partnership with the [National Computational Infrastructure \(NCI\) Facility](#).

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Climate Adaptation


To equip policy makers, industries and communities with practical and effective adaptation options to climate change and variability and in doing so create in the national interest \$3 billion per annum in net benefits by 2030.

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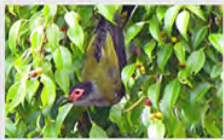
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Australian Centre of Excellence
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*"The Australian Centre of Excellence for Local Government is a unique collaboration of universities and professional bodies committed to the advancement of local government. The Centre's vision is: **World-class local government to meet the emerging challenges of 21st century Australia**"*

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Australian Local Government and Climate Change

6th September 2010



This ACELG working paper provides a snapshot of what is happening in local government in Australia in relation to climate change. It explores the resources available to councils on the science and potential impacts at the local government level; current national, state and local initiatives that local government decision makers should know about; actions that the local government sector are taking in response to climate change; and, the gaps, needs and challenges related to these actions.

The paper can be downloaded here. [PDF-2MB]

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Recent Publications

- 2013 Local Government Researchers' Forum Booklet
- Community Wellbeing Indicators: Measures for Local Government
- Knowledge City: The Difference an In-House Research Team made to a Council and its Community
- Social Enterprises and Local Government: A Scoping Study
- In Our Hands: Strengthening Local Government Revenue for the 21st Century

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Project Plan

Full details about ACELG's structure, programs and planned activities

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The ARC is a statutory agency under the Industry, Innovation, Climate Change, Science, Research and Tertiary Education portfolio within the Australian Government. Its mission is to deliver policy and programs that advance Australian research and innovation globally and benefit the community.

In seeking to achieve its mission, the ARC provides advice to the Government on research matters, manages the National Competitive Grants Program (NCGP), and administers Excellence in Research for Australia (ERA).

Through the NCGP - a significant component of Australia's investment in research and development - the ARC supports the highest-quality fundamental and applied research and research training through national competition across all disciplines, with the exception of clinical medicine and dentistry.

ERA assesses research quality within Australia's higher education institutions and gives government, industry, business and the wider community assurance of the excellence of research conducted. It also provides a national stocktake, by research discipline areas, of research strength against international benchmarks.

Industrial Transformation Research Program - Round 2

Proposals are now open for Industrial Transformation Research Hubs for funding commencing in 2013 and for Industrial Transformation Training Centres for funding commencing in 2014. The closing date for submission of proposals for both schemes is 5:00pm (AEST) Wednesday, 7 August 2013.

The Funding Rules, Instructions to Applicants and Sample Application form for Industrial Transformation Research Hubs for funding commencing in 2013 have been released and are available on the Industrial Transformation Research Hubs page.

The Funding Rules, Instructions to Applicants and Sample Application form for Industrial Transformation Training Centres for funding commencing in 2014 have been released and are available on the Industrial Transformation Training Centres page.

Special Research Initiative for a Science of Learning Research Centre for funding commencing in 2012

Science and Research Minister, the Hon Dr Craig Emerson MP has announced \$16 million in funding to The University of Queensland for the Special Research Initiative for a Science of Learning Research Centre.

For more information, visit the Science of Learning Research Centre page.

What's New

- The ARC has released its second edition of ARChway
- CONGRATULATIONS to ARC Laureate Fellow Professor Peter Hall for his election to the prestigious US National Academy of Sciences.
- The Funding Rules and Instructions to Applicants are now available for Industrial Transformation Research Hubs for funding commencing in 2013
- The Funding Rules and Instructions to Applicants are now available for Industrial Transformation Training Centres for funding commencing in 2014
- Media Release: ARC CEO Welcomes Additional

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NHMRC funding for climate-change health research

NHMRC invested about \$1.7 million from 2000 to 2008 into research on health related climate change issues.

Year	Funding (\$)
2000	0
2001	0
2002	0
2003	73,250
2004	58,250
2005	57,462
2006	21,231
2007	369,116
2008	1,085,419

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CLIMATE CHANGE

Adapting to climate change

- Climate change adaptation program
- Australia's coasts and climate change
- Adaptation framework
- Australia's Biodiversity and Climate Change
- Climate science
- Going carbon neutral
- Greenhouse gas measurement and reporting
- Multi-Party Climate Change Committee
- Select Council on Climate Change
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- Consultations
- Publications

Adapting to climate change

Between 2007 and 2013 the Australian Government invested \$129 million in the [National Climate Change Adaptation Program](#) which is helping Australians to better understand and manage risks linked to the carbon pollution already in our atmosphere and to take advantage of potential opportunities.

The Australian Government is:

- Investing \$12.9 billion to secure Australia's water supply in the single largest investment in climate change adaptation. [Water for the Future](#). Scientists predict climate change will reduce the amount of rainfall in parts of Australia—particularly in southern areas. Water for the Future focuses on four national priorities: taking action on climate change, using water wisely, securing our water supplies, and supporting healthy rivers and wetlands. Part of the funding is being provided for alternative water supplies in our major cities and to improve irrigation efficiency in areas such as the Murray Darling Basin.
- Supporting Australian farmers as they adapt to climate change through [Australia's Farming Futures](#) program, which will improve the ability of primary producers to respond to climate change and manage their emissions.

The Australian Government's position paper, [Adapting to Climate Change in Australia](#), sets out the government's vision for adapting to the impacts of climate change and proposes practical steps to realise that vision.

It outlines the Australian Government's role in adaptation, which includes building community resilience and establishing the right conditions for people to adapt, taking climate change into account in the management of Commonwealth assets and programs; providing sound scientific information; and leading national reform.

The position paper identifies six national priority areas for action: water, coasts, infrastructure, natural ecosystems, natural disaster management, and agriculture.

It is important that Australia reduce its carbon pollution to minimise the severity of climate change. However, because some greenhouse gases stay in the atmosphere for about 100 years after they are first emitted, there will be some changes that cannot be avoided due to past and inevitable future global emissions.

www.climatechange.gov.au

R&D Projects																	
Category	ACELG	ARC	CCRSPI	DAFF	DCCEE	FRDC	GRDC	HAL	MCV	MLA	NCCARF	NERP	ONA	PC	RIRDC	SRDC	Total
Climatic & environmental conditions		25		1					6		2	6			1	3	44
Biodiversity		45				3					17	33			3		101
Communities & organisational arrangements	2	28			1					2	54	7	1	1	5		101
Industries & livelihoods		15	1	61	1	3	4	7		3	9	6	3	3	6	8	130
Infrastructure		4									12		1				17
Resource access & cost		4									6		2		2		14
Data, resources & tools		3										2	1				6
Total	2	124	1	62	2	6	4	7	6	5	100	54	8	4	17	11	413


Topic.....(Page)	NRM relevance score (Region x Format x Planning relevance)					All
	High..... ★★★★★	Moderate..... ★★★★	Low..... ★★★☆☆	Low..... ★★☆☆☆	Low..... ★☆☆☆☆	
Climate and environmental conditions(2)						
At-risk areas.....(2)				1		1
Forecasting & risk assessment – general.....(2)		3	5	11	12	31
Rainfall &/or temperature.....(2)						0
Climate variability.....(2)						0
Extreme events.....(10)					3	3
Fire.....(11)				1	1	2
Sea-level rise.....(11)				1	1	2
Hydrological cycles.....(12)						0
Water quality.....(12)	1	1	3			5
	1	4	8	14	17	44
Biodiversity(13)						
At-risk areas/ecosystems.....(13)	7	3	7	1	5	23
At-risk species.....(18)		7	6	4	9	26
Corridors, connectivity & refugia.....(25)		2	3		2	7
Distribution & abundance of species & communities.....(27)			1	1	1	3
Ecological function, processes, critical thresholds (resilience)/.....(28)	1	2	6	2	21	32
Ecological condition (monitoring).....(28)			1	2	1	4
Disease & disease vectors.....(36)			1	1		2
Invasive species & emergent risks.....(37)	2	2				6
	10	16	25	11	39	101
Communities & organisational arrangements(39)						
At-risk social systems & communities.....(39)		2	2	1		5
Indigenous people, communities & cultural sites.....(39)	4	2	1	1	1	9
Well-being & resilience.....(43)	3	8	4	6	3	22
Livelihoods & culture.....(49)						2
Capacities, capabilities, interests & aspirations.....(50)		2	4	4	1	11
Motivations & barriers to adaptation.....(54)	2	5	1	3	1	12
Governance systems (including decision support systems).....(57)	6	5	8	16	5	40
	15	24	21	31	11	101
Industries & livelihoods(67)						
Rural & primary industries.....(67)	7	14	12	5	7	45
Carbon & ecosystem services (terrestrial & marine).....(83)	3	17	10	22	22	74
Indigenous land & sea management.....(106)		4				4
Tourism.....(107)			1			1
Other industries.....(107)			4		2	6
	10	35	27	27	31	130
Infrastructure(108)						
General.....(108)	1		2		2	5
Coastal.....(110)		1	2	2		5
Urban centres.....(111)		1	1	1	2	5
Population growth and distribution.....(112)	1	2	5	4	5	17
Resource access & cost(113)						
General resources.....(113)				1		1
Land (tenure & use).....(113)		2	1	1		4
Water.....(114)	2		1			2
Energy.....(115)		1	1	2	1	5
Food security.....(115)	2	3	3	4	2	14
	2	3	3	4	2	14
Mapping & regional planning(116)						
	2					6
Total	41	84	89	91	108	413

R&D publications



Appendix 3. Wet Tropics Cluster – Stream 2 Overview

Steve Turton

***Knowledge to manage land and sea:
a framework for the future***

Wet Tropics Cluster

Stream 2 overview

Elements 1 and 2



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Stream 2 Program Objectives

- To improve the **quality** and **accessibility** of **regionally relevant** information on **climate change impacts** and **potential adaptation responses** available to regional NRM organisations;
- To provide regional NRM organisations with access to **expert advice** on how **to apply climate change information in their planning**;
- To encourage **local knowledge** and **experience** to be integrated into understanding of climate change **impacts, opportunities** and potential **adaptation responses**; and
- To assist regional NRM organisations to plan for the **biodiversity impacts** of climate change and capitalise on the **opportunities** provided by the **Carbon Farming Initiative** and the **Biodiversity Fund** to improve the long term **resilience** of the landscape, communities and agricultural economies.

National Project (Chris Cvitanovic, CSIRO)

- Aim is to deliver 'tailored' information to each of the NRM groups to use for climate change planning. Science team provides information on 4 key issues: 1) **Decision making**, 2) **Invasive species**, 3) **Biodiversity**, and 4) **Some form of M & E**.
- Science team will feed this information and this information will be used to pass along to NRM groups for their planning. Specifically **high-level cluster based**. If data is available it will be used – no new data will be collected. If no data available will have to look at extrapolating what data you do have across regions.
- **Will be rolled out by January 2014.**

Wet Tropics Cluster Objectives

- To undertake research to **synthesise** and **model climate change impacts** and **adaptation responses** for **priority issues** identified by the Wet Tropics Cluster, including: biodiversity shifts, rural and Indigenous community responses, extreme events (in particular cyclones), coastal development, weeds, feral animals and fire.
- To **identify best 'no regrets' solutions** for the Wet Tropics Cluster and the most **effective and influential mechanisms** for **integrating** these into the **NRM planning** and **investment strategy** development process.

Wet Tropics Cluster Objectives



- To provide **targeted new knowledge** generation for identified **priority information gaps**.
- To develop **user-friendly decision making tools** that support stakeholder engagement and education.
- To support workshops and other **participatory processes** for training, information sharing and advice.
- To use information to **develop a framework** for the ongoing incorporation of knowledge for **adaptive management** of terrestrial and marine environments as **socio-ecological systems** beyond the time-frame of this project.

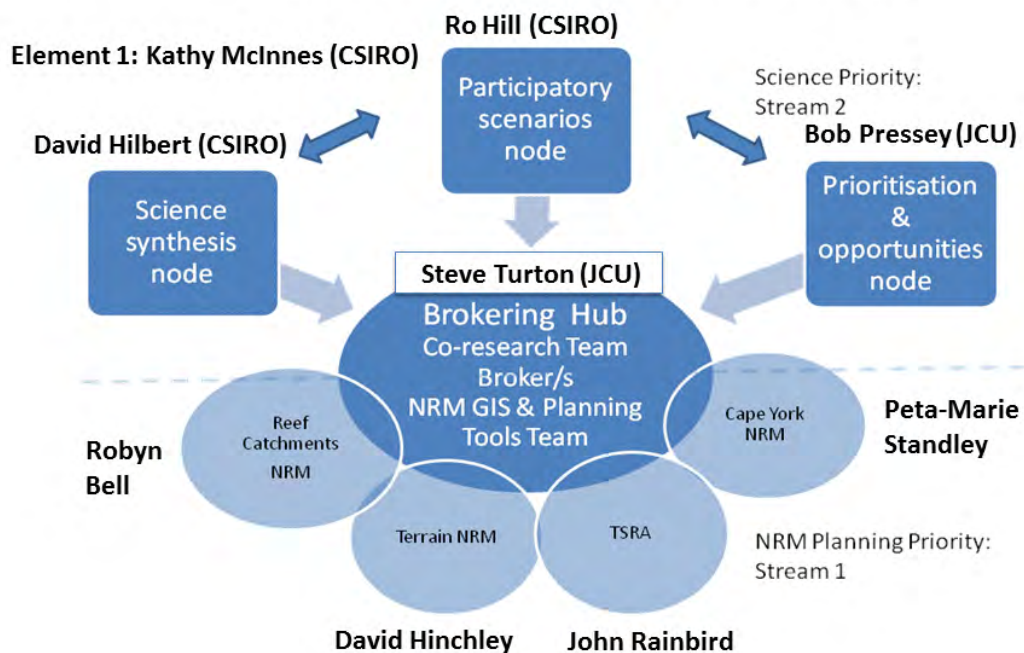
Wet Tropics Cluster Activities

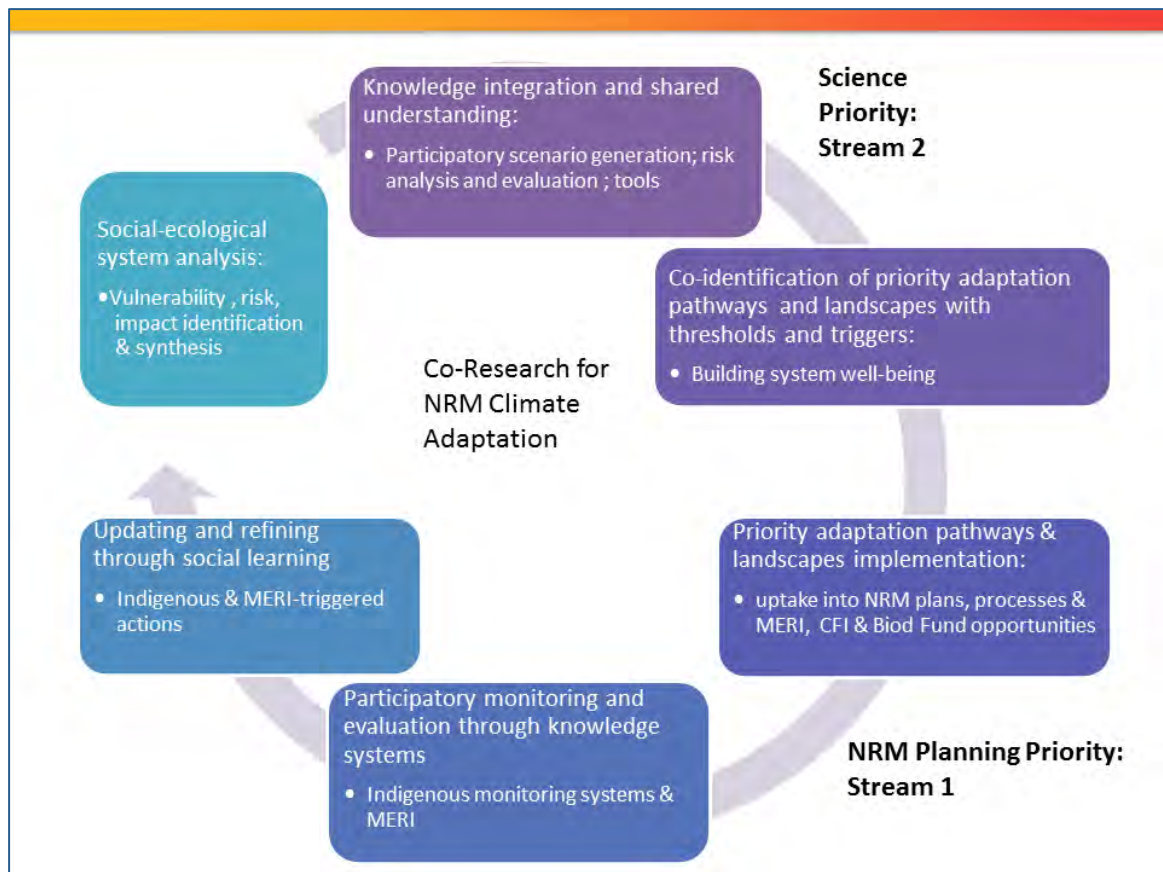
- An **exploratory analysis** of the social-ecological system (multi-scalar), including a **science gap analysis and synthesis**, data collection for **spatial prioritisation** and the identification of **focal issues, drivers and measures for participatory scenarios**.
- **Vulnerability and risk identification**, including **participatory processes** to collect and incorporate **local knowledge** and experiences and the development of data and models for **prioritisation** and **spatial scenarios**.
- **Participatory scenario generation**, including the synthesis of science on **adaptation pathways** and **opportunities**, and the identification of **potential optimal solutions** for biodiversity and carbon sequestration.

Wet Tropics Cluster Activities

- Co-identification of **priority adaptation pathways** and landscapes with **triggers & thresholds**, and the participatory **prioritisation** of adaptation pathways for building **system well-being**, including prioritised opportunities and locations.
- Providing **expert support** for the implementation of **adaptation pathways & landscapes** in NRM groups planning.
- Undertake **Monitoring and Evaluation (M&E)** at the project level and provide input into Stream 2 Program M&E.

Co-research approach that promotes long-term system well-being and social learning





Wet Tropics Cluster Deliverables

- Syntheses of ***regionally relevant*** ecosystems and landscape impact and adaptation responses to climate change, that include information from the scientific literature and incorporates work that the NRM organisations are championing (e.g. resilience and adaptation planning, carbon and ecosystem services, no regrets solutions, marine and terrestrial corridors).
- ***Regionally specific case studies*** that encapsulate key issues.
- ***Participatory scenario analysis*** to build on existing work and integrate local knowledge and experience.
- ***Planning tools.***

Achievements to date

- Establishment of a ***Knowledge Brokering Hub***, comprising of key researchers from JCU and CSIRO and representatives from the four NRM regions in the Wet Tropics Cluster, together with developing our ***Terms of Reference*** and agreeing on a ***co-research framework for the Hub***
- Completion of three meetings of the Brokering Hub.
- Workshop to discuss ***knowledge gaps and to identify focal issues, drivers and measures for participatory scenarios.***
- Completion of a ***Stakeholder Engagement Plan*** (living document)
- Completion of our ***Project M & E Plan*** in consultation with Clear Horizons
- Preparation for a ***Stream 2/NERP TE Workshop*** (Science to inform climate change planning in north Queensland) to be held on June 4 (Today)

Appendix 4 NERP CF2 – Integrating Science into Regional Planning

Gabriel Crowley





Integrating Science into Regional Planning

NERP Project CF2

Gabriel Crowley & Allan Dale – The Cairns Institute JCU



National Environmental
Research Program

TROPICAL ECOSYSTEMS *hub*


NATIONAL ENVIRONMENT RESEARCH PROGRAM

SCIENCE TO INFORM ENVIRONMENTAL POLICY

Improving our capacity to understand, manage and conserve Australia's unique biodiversity and ecosystems through the generation of world-class research and its delivery to Australian environmental decision makers and other stakeholders



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NATIONAL ENVIRONMENT RESEARCH PROGRAM

NERP Tropical Ecosystems Hub

GBR, Rainforest, Torres Strait

NERP Northern Australia Hub

Savannas – Terrestrial, Freshwater, Estuaries

NERP Environmental Decisions Hub

NERP Landscapes & Policy Hub

NERP Marine Biodiversity Hub

NERP emerging priorities



Australian Government

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Water, Population and Communities



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Theme	Program	No. Projects
Assessing Ecosystem Condition and Trend		
1	Historical and current condition of the Great Barrier Reef	3
2	Natural Resources of the Torres Strait land and sea	3
3	Condition and trends of North Queensland rainforests	4
Understanding Ecosystem Function and Cumulative Pressures		
4	Water quality of the Great Barrier Reef and Torres Strait	4
5	Cumulative impacts on benthic biodiversity	3
6	Movements and habitat use by marine apex predators	3
7	Threats to rainforest health	
Managing for Resilient Tropical Systems		
8	Effectiveness of spatial management on the Great Barrier Reef	3
9	Decision support systems for Great Barrier Reef managers	3
10	Socio-economic value of Great Barrier Reef goods and services	4
11	Resilient Torres Strait communities	2
12	Managing for resilience in rainforests	4
13	e-atlas	1

CF2 - Integrating Science into Regional Planning

- Identify NRM & RDA scientific info needs
- Understand how and when NRM & RDA use scientific info
 - Planning
 - Delivery
- Identify best scales for info delivery
 - NRM region / NRM clusters
/ Northern Australia / State / National
- Make sure research programs meet NRM planning and delivery needs

NERP Tropical Ecosystems Projects relevant to Mackay Whitsundays region

This document describes the Climate Change (CC) relevance of National Environmental Research Program Tropical Ecosystems (NERP TE) projects covering the Mackay Whitsundays region. These summaries will be used to identify options for project findings to be incorporated into NRM planning and management.

There are 22 NERP TE projects relevant to the Mackay Whitsundays region. Their CC relevance is summarised in [Section 1](#). The projects are then classified in relation to Knowledge sources and systems and CC Knowledge needs ([Section 2](#)). A full-page fact-sheet for each project can be found in [Appendix 1](#).

NRM groups will be invited to further discuss their knowledge needs in relation to climate change planning and management and more broadly, and to indicate their interest in particular projects and preferred methods of knowledge integration.

Please direct any queries to Gabriel.Crowley@jcu.edu.au.

Section 1. Summaries of NERP projects relevant to the Mackay Whitsundays region

1.1 Monitoring status and trends of coral reefs of the Great Barrier Reef					
Project Leader(s) Dr Hugh Sweatman, Australian Institute of Marine Science					
Environmental domain	Mainland	Islands	Coastlineshore	Offshore	Terrestrial impacts on marine
	No	No	Yes	Yes	Yes
Relevance of project for Climate Change (CC) planning & management					
This project will provide baseline condition assessment of the GBR, and analysis of trends and threats. It will provide information on the impacts of climate change factors (coral bleaching, cyclonic damage), and their interaction other stressors (crown-of-thorns).					
1.3 Characterising the cumulative impacts of global, regional and local stressors on the present and past biodiversity of the Great Barrier Reef					
Project Leader(s) Prof Jianxin Zhao, University of Queensland Prof John Pandolfi, University of Queensland					
Environmental domain	Mainland	Islands	Coastlineshore	Offshore	Terrestrial impacts on marine
	No	No	Yes	Yes	Yes
Relevance of project for Climate Change (CC) planning & management					
This project will provide baseline information on climate variability and how it has affected the condition of the GBR in combination with other stressors. It will provide information on the likely impacts of climate change on reef health, and the interactions with other factors (e.g. water quality). It will therefore inform action on water quality management under climate change conditions.					
3.3 Targeted surveys for missing and critically endangered rainforest frogs in eocotonal areas, and assessment of whether populations are recovering from disease					
Project Leader(s) Dr Robert Puschendorf, James Cook University Dr Conrad Hoskin, James Cook University					
Environmental domain	Mainland	Islands	Coastlineshore	Offshore	Terrestrial impacts on marine
	Yes	No	No	No	No
Relevance of project for Climate Change (CC) planning & management					
This project will identify the current status of critically endangered and possibly extinct rainforest frogs, as well as refuge areas that currently support any surviving species. This information will assist in the prioritisation of areas with high values for biodiversity protection under climate change planning. It will also provide information on the distribution of chytrid fungus, which will assist in identifying the climatic envelope in which this threat to endangered frog is active.					



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Example CC profile

1.1 Monitoring status and trends of coral reefs of the Great Barrier Reef

Project Leader(s)

Dr Hugh Sweatman, Australian Institute of Marine Science

NRM Region	TS	CYP	NG	WT	BDT	MW	FB	BM	Terrestrial impacts on marine
	No	Yes	No	Yes	Yes	Yes	Yes	Yes	
Environmental domain	Mainland		Islands		Coast/inshore		Offshore		
	No		No		Yes		Yes		Yes

Relevance of project for Climate Change (CC) planning & management

This project will provide baseline condition assessment of the GBR, and analysis of trends and threats. It will provide information on the impacts of climate change factors (coral bleaching, cyclonic damage), and their interaction other stressors (crown-of-thorns).



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	NRM Region								
Environmental domain	TS	CYP	WT	NG	BDT	MW	FB	BM	Total
General (planning)	1	1	1	1	1	1	1	1	1
Mainland		3		10	2	4	2	2	11
Islands	5	2	3		2	3	3	2	7
Coastal / Inshore marine	6	19	20		18	18	19	19	26
Offshore marine	4	13	14		12	13	13	13	17
Terrestrial impacts on marine	4	9	9		8	8	8	8	13
Total	9	22	31	11	20	23	22	21	39



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PROJECT FOCUS	Baseline info	CC impacts	Planning	Management	CC Interactions	All
Climatic & environmental conditions	8	10	3	4	5	16
Biodiversity	27	14	7	12	3	34
Communities & organisational arrangements	5	3	4	3		10
Industries & livelihoods	3	3	2	2	2	11
Infrastructure	2	1	2		1	5
Resource access & cost	2	1	2	2	1	6



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KNOWLEDGE SOURCES & SYSTEMS	NO. PROJECTS
KNOWLEDGE SOURCES	
Indigenous knowledge	5
Other community knowledge & experience (e.g. pastoral)	4
Science & social science	39
DATA, RESOURCES & TOOLS	
Bibliographic search & display	3
Mapping & regional planning	26
Scenario modelling	8
Prioritisation	11
Monitoring & evaluation	15
SYNTHESIS & ASSESSMENT	
Knowledge synthesis	12
Availability & access	7
Adequacy & gap analysis	7