

Understanding climate science and research

The Office of Climate Change (OCC) within the Department of Environment and Resource Management (DERM) leads the development of climate change policy and programs underpinned by the best available climate science and research.

The Queensland Climate Change Centre of Excellence (QCCCE), within OCC, is the only state-based government climate science research centre in Australia. It supports Queensland's policy response to challenges posed by climate change, climate variability and extreme events by undertaking targeted climate research and delivering specialised information.

Priority projects

A range of specialised information is available to improve understanding of Queensland's climate and to help make decisions on how to adapt to climate change impacts and climate variability:

- **Global climate modelling** experiments are providing updated data for the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5). This is being conducted jointly with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) using DERM's High Performance Computer and the CSIRO Mk3.6 climate model.
- The **Improved Coastal Mapping** project will provide easy access to data and tools, including interactive, computer-based maps, which show the impacts of climate change on the Queensland coast. These will support improved planning, disaster preparedness and risk assessment.
- The **Climate Change Risk Management Matrix** is being used to identify the impacts of climate change and determine appropriate adaptation options. The matrix is being used by primary producers, land managers and industry groups such as the horticulture, grain, cotton and sugar, fisheries, aquaculture and game, intensive livestock, and beef and feedlot industries.
- **Monthly climate outlook statements**, commentary and maps of seasonal rainfall probabilities for Queensland are based on the El Niño Southern Oscillation (ENSO), the Southern Oscillation Index (SOI) and the QCCCE's experimental SPOTA-1 system. This seasonal conditions information is used by primary producers, industry and catchment groups, land managers and government departments to help make resource management decisions.



Climate system research

Modelling and understanding the processes driving climate change and climate variability in the Queensland region is an important component of climate research:

- Improved **climate change projection data** and information on extreme events such as droughts, floods, heat waves and tropical cyclones is being delivered by the Climate System Research group.
- Research is also being conducted to understand how and why Queensland's climate is changing and the drivers behind those changes.

Research collaborations

Research collaborations with key national and international climate science research agencies inform the latest climate modelling. These include collaborations with:

- **CSIRO** to produce data for the IPCC AR5 across a range of climate modelling and data analysis projects.



- **University of Queensland** to evaluate the potential role of reforestation of native woody vegetation to mitigate the regional impact of climate extremes in a warming climate.
- **Walker Institute** (University of Reading, UK) to generate an improved understanding of the key processes that influence Queensland rainfall.
- **UK Met Office Hadley Centre** through a Queensland–UK Climate Change Fellowship Program to improve our knowledge of the way climate change will affect the Queensland coast.

Coastal impacts

Climate change poses considerable risks to the Queensland coast through inundation, erosion and increased frequency of extreme weather events:

- Coastal scientists and engineers monitor the coastal environment with an extensive network of **storm tide gauges** and **wave buoys**. Daily data is used to help determine the magnitude of changes in coastal processes and to assist with planning and emergency response activities.
- Southern Gold Coast beaches are replenished through the **Tweed River Entrance Sand Bypassing System** which transports sand from the southern side of the Tweed River entrance and pumps it under the river to outlets on the northern side. From there the sand is transported by wave currents to nourish southern Gold Coast beaches. This is a joint initiative between the Queensland and New South Wales governments and the Gold Coast City and Tweed Shire councils.

Climate data and information

QCCCE produces and maintains a range of state-of-the-art climate information and data resources on climate change, climate variability and extreme events, many of which are not available from any other source. This information is provided through several channels, including the Long Paddock website <www.longpaddock.qld.gov.au>:

- The **Specialised Information for Land Owners (SILO)** climate database provides continuous historical daily climate data from 1889 to present for use in climate system modeling by state government agencies, research organisations and universities across Australia.
- Data from SILO is being used to develop consistent climate change projections data for 2030 and 2050 to be used in ecosystem modelling across Australia in a range of projects supported by the Australian Government Department of Agriculture, Fisheries and Forestry.

- The **AussieGRASS environmental calculator** produces maps and GIS layers of historical rainfall, pasture growth, biomass and grass fire risk, seasonal pasture growth outlook, and flow to stream for use by Australian primary producers to help make land management assessments and decisions.
- The **FORAGE web-based system** generates and distributes specific information on climate and pasture conditions at user-specified locations to landholders to inform land management assessment.
- The **Climate Change in Queensland: What the Science is Telling Us** 2010 edition provides up-to-date scientific information on the causes of climate change and the potential impacts for a number of Queensland's key sectors.



- The **Queensland Coastal Processes and Climate Change** report focuses on providing information on coastal processes and the impacts of climate change on the Queensland coast and coastal communities.
- The information in these reports is of use to local and state governments, business, industry and the general public to help make decisions related to the impacts of climate change.
- Weekly articles in the Rural Weekly and Queensland Country Life provide information on **seasonal conditions** to help primary producers, industry and catchment groups to make land management decisions.
- The 30-day average **Southern Oscillation Index (SOI)** and rainfall probability is provided to ABC television for its weekly weather bulletins across Queensland.

For more information about actions you can take to address climate change, visit www.climatesmart.qld.gov.au or www.climatechange.qld.gov.au