Climate Change Science to underpin Q-CAS

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The Climate Change Science work so far:

- Climate Change in Queensland Map Application (Completed)
- Climate Risk Matrix Workshops (6 delivered across Qld)
- High-resolution projections until 2099 for Queensland (10 km) (Completed)
- Climate extremes from high-resolution projections (Almost complete)
- Enhanced Climate Change in Queensland Map Application with high resolution projections (In progress)

Queensland Government

Climate Change in Queensland

Temperature

The average annual temperature (1986-2005) for Queensland is 23.4 °C. By 2050, the median value of annual temperature is projected to increase by 1.4 °C under lower emissions and 1.9 °C under high emissions.

	Lower Emissions			High Emissions		
2030	0.6°C	1.0°C	1.4°C	0.5°C	1.1°C	1.5°C
2050	0.8°C	1.4°C	2.0°C	1.1°C	1.9°C	2.6°C
2070	1.2°C	1.8°C	2.5°C	1.9°C	2.9°C	3.9°C

Projected change (median and range) in average annual temperature

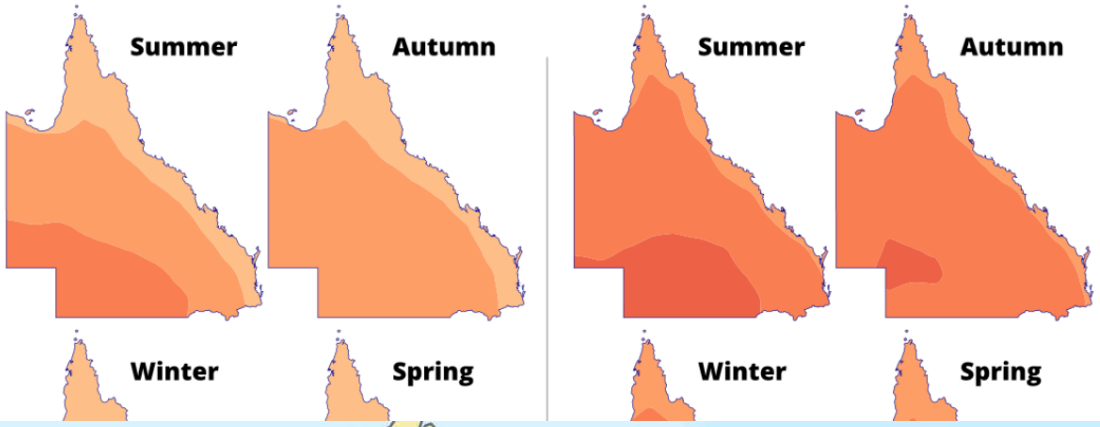
Click on the buttons to show maps of projected changes in annual temperature

2030 High Emissions | 2050 High Emissions | 2070 High Emissions

2030 Lower Emissions | 2050 Lower Emissions | 2070 Lower Emissions

BACK

Projected Temperature Change (°C) at 2050



Queensland Government

Climate Change in Queensland

Cape York

Coconut Island, Torres Strait, Tropical North Queensland. Courtesy of Tourism Queensland. Photographer: Darren Jew

Cape York region has a tropical climate, with monsoonal season that extends from November to April. This section summarises climate change information for the Cape York region at 2030, 2050 and 2070 for both lower and high emissions.

Temperature

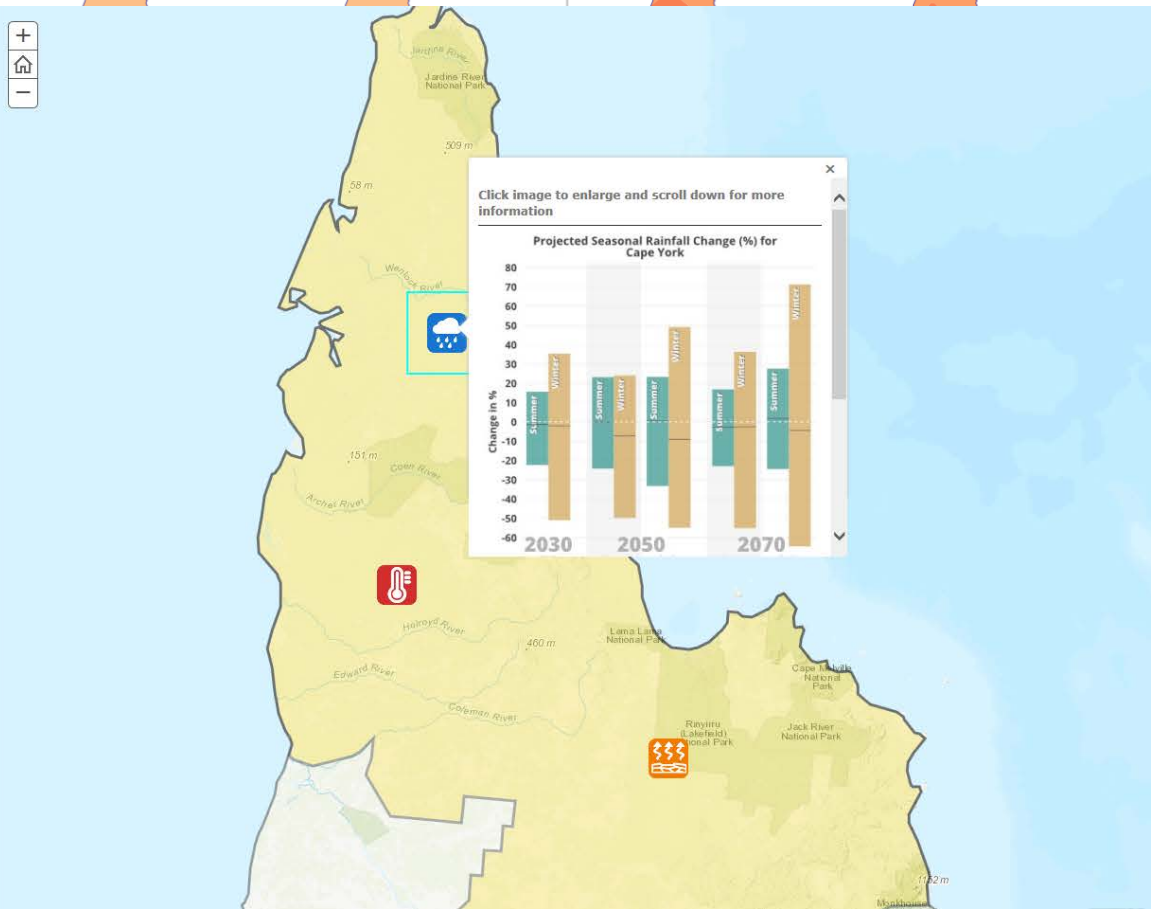
The average annual temperature (1986-2005) for the Cape York region is 26 °C. By 2050 the median annual temperature is projected to increase by 1.1 °C under lower emissions and 1.5 °C under high emissions.

	Lower Emissions			High Emissions		
2030	0.6°C	0.7°C	1.2°C	0.5°C	0.9°C	1.2°C
2050	0.9°C	1.1°C	1.7°C	1.1°C	1.5°C	2.2°C
2070	1.1°C	1.4°C	2.2°C	1.8°C	2.2°C	3.3°C

Projected change (median and range) in average annual temperature

Rainfall

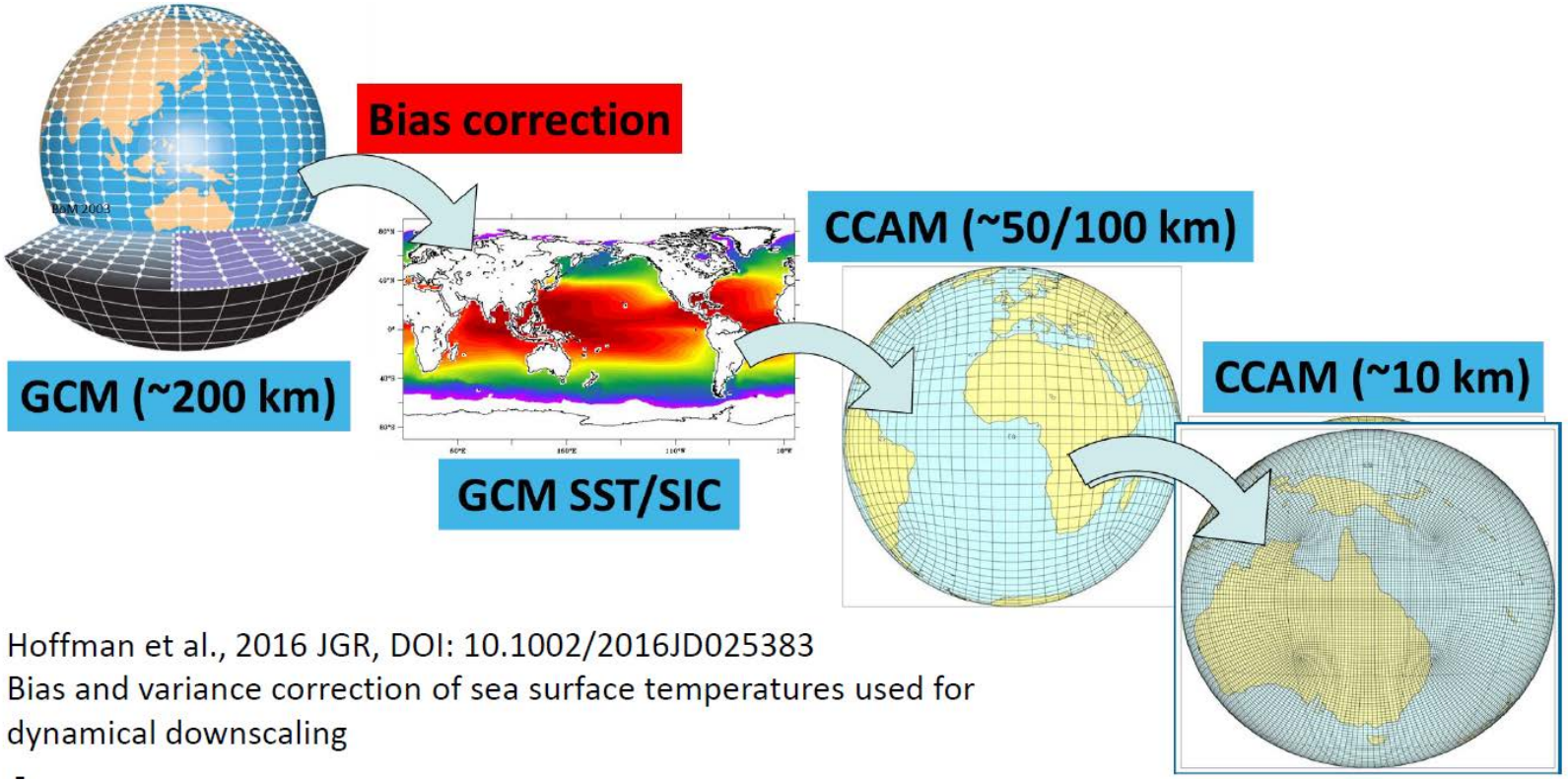
The annual rainfall (1986-2005) for the region is 1305 mm. By 2050 the median value of annual rainfall is projected to increase by 2 % under lower and 1 % under high emissions. However there are a large range of projected rainfall changes from an annual increase of 19 % to a decrease of 18 % under high emissions.



Climate risk matrix workshops

Element of the industry	Pasture growth	Surface cover	Plant available water capacity	Wind erosion	Rural human health and well-being	Biodiversity
More days over 35°C	Decrease in pasture growth	Decrease in surface cover	Reduced plant available water capacity due to a reduction in water availability/surface cover	Increased wind erosion due to lower surface cover	Large decreases in rural human health and capacity to cope at current rate of functioning	Changes in plant structure and species composition
More droughts	Severe reduction in pasture growth	Severe reduction in surface cover	Severe reduction in plant available water capacity due to reduction in water availability/surface cover	Increased wind erosion due to lower surface cover	Large decrease in human health, potential for stress related incidence	Major changes in plant and animal species composition

Providing climate change projections at regional scale



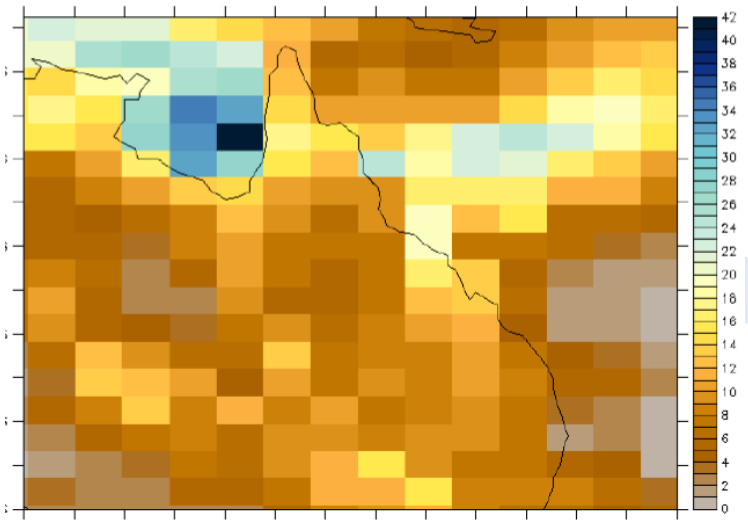
Hoffman et al., 2016 JGR, DOI: 10.1002/2016JD025383
Bias and variance correction of sea surface temperatures used for dynamical downscaling

-

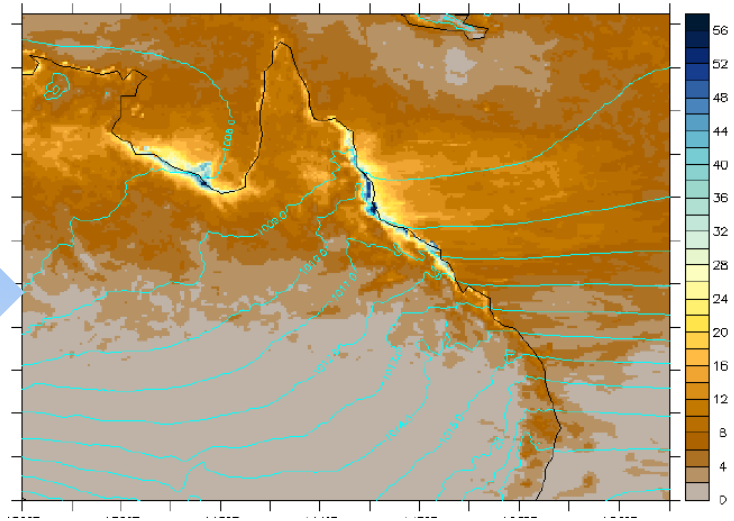
GCM = Global Climate Model
CCAM = CSRIO's Conformal Cubic Atmospheric Model
SST/SIC = Sea Surface Temperature and Sea Ice Concentration

Why downscale?

The higher resolution 10km model more accurately represents localised high rainfall events.



downscaling



Global model
(210 x 130 km)

Regional model
(10 x 10 km)

High Resolution Climate Change Projection Data for Queensland

Updated: 2 months ago

High-resolution climate change projections for Queensland using dynamical downscaling of CMIP5 global climate models. The data storage is facilitated by the Global Change Institute, University of Queensland through NeCTAR QRISCloud.

The data management and distribution were supported by the Terrestrial Ecosystem Research Network.

Completed

Download and links

THREDDS server data access

Data Access

Open link

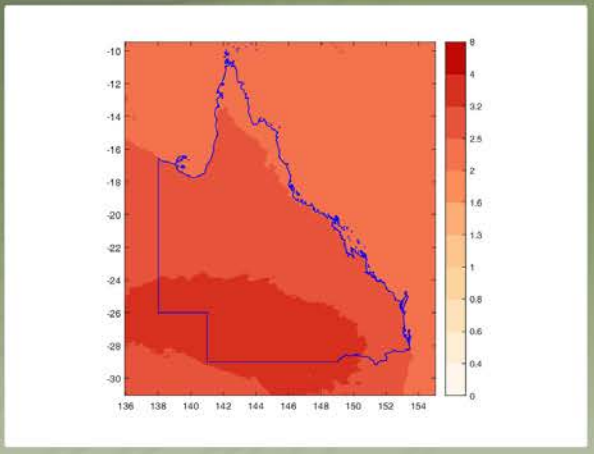
About this resource

Categories	
Keywords	• ATMOSPHERIC SCIENCES • ATMOSPHERE • Climatology, meteorology, atmosphere
Legal constraints	This work is licensed under Creative Commons - Attribution 4.0 International. The licence allows others copy, distribute, display, and perform the work and derivative works based upon it provided that they credit the original source and any other nominated parties. The climate change projection data was generated by the Department of Science, Information Technology and Innovation and is distributed by the Queensland Government as an information source only. To the maximum extent permitted by law, the State of Queensland makes no statement, representation, or warranty about the quality, accuracy, context, completeness, availability or suitability for any purpose of, the data or the application. Users of the data or the application do so entirely at their own risk. The Queensland Government disclaims, to the maximum extent permitted by law, all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you or any other person might incur for any reason in relation to the data or the application. Copyright 2016 DSITI. Rights owned by the Queensland Government Department of Science, Information Technology and Innovation (DSITI). Rights licensed subject to Creative Commons Attribution (CC BY 4.0), http://creativecommons.org/licenses/by/4.0
Contact for the resource	Point of contact **Department of Science, Information Technology and Innovation** Jozef Syktus (Science Leader) Dutton Park, Queensland, 4102, Australia
Status	• Completed

Technical information

Update frequency	As needed
Representation type	Grid

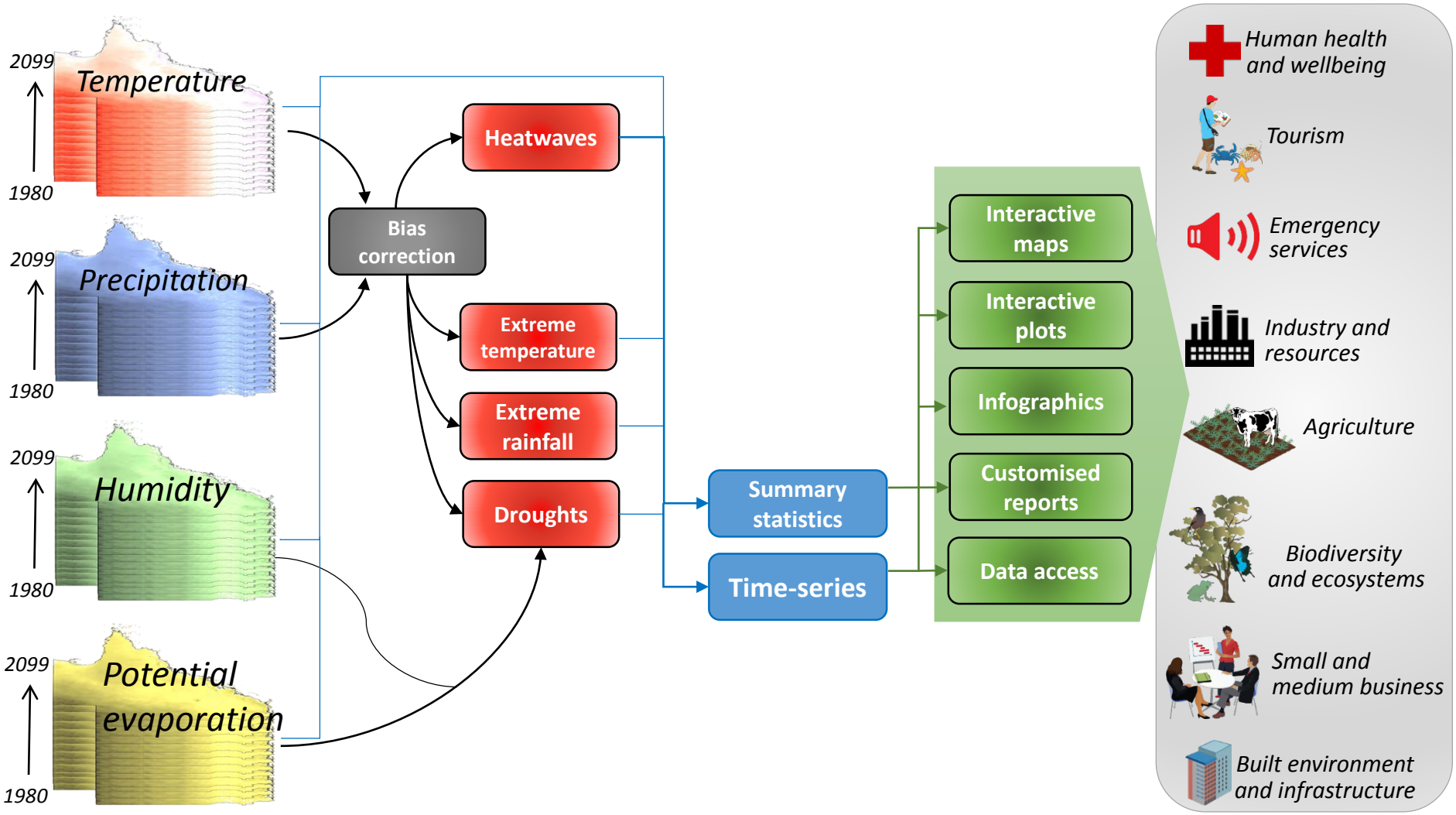
Overview



Spatial extent

• Queensland, Australia

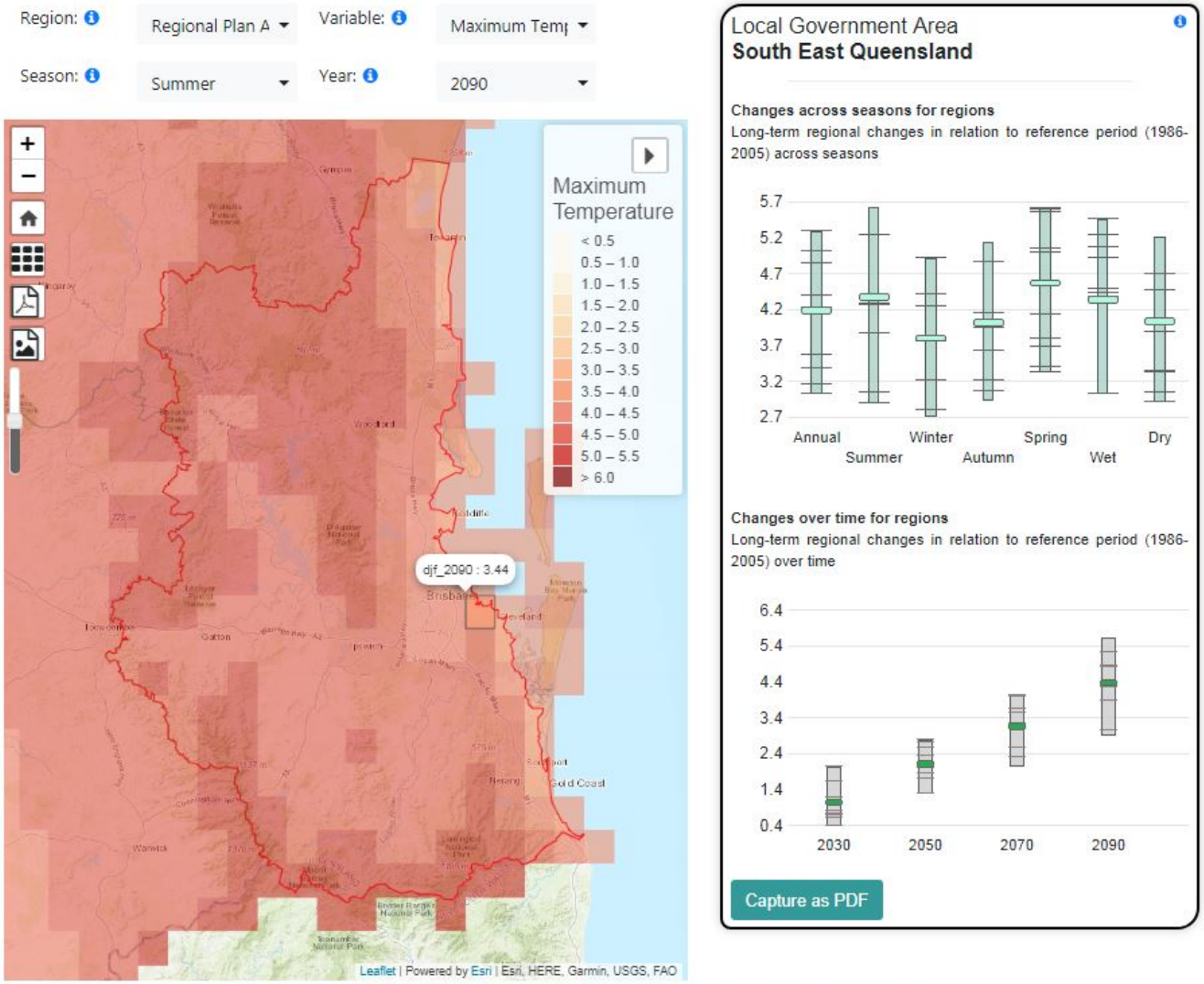
Bridging the gap between regional projections and policy needs



Regional scale information

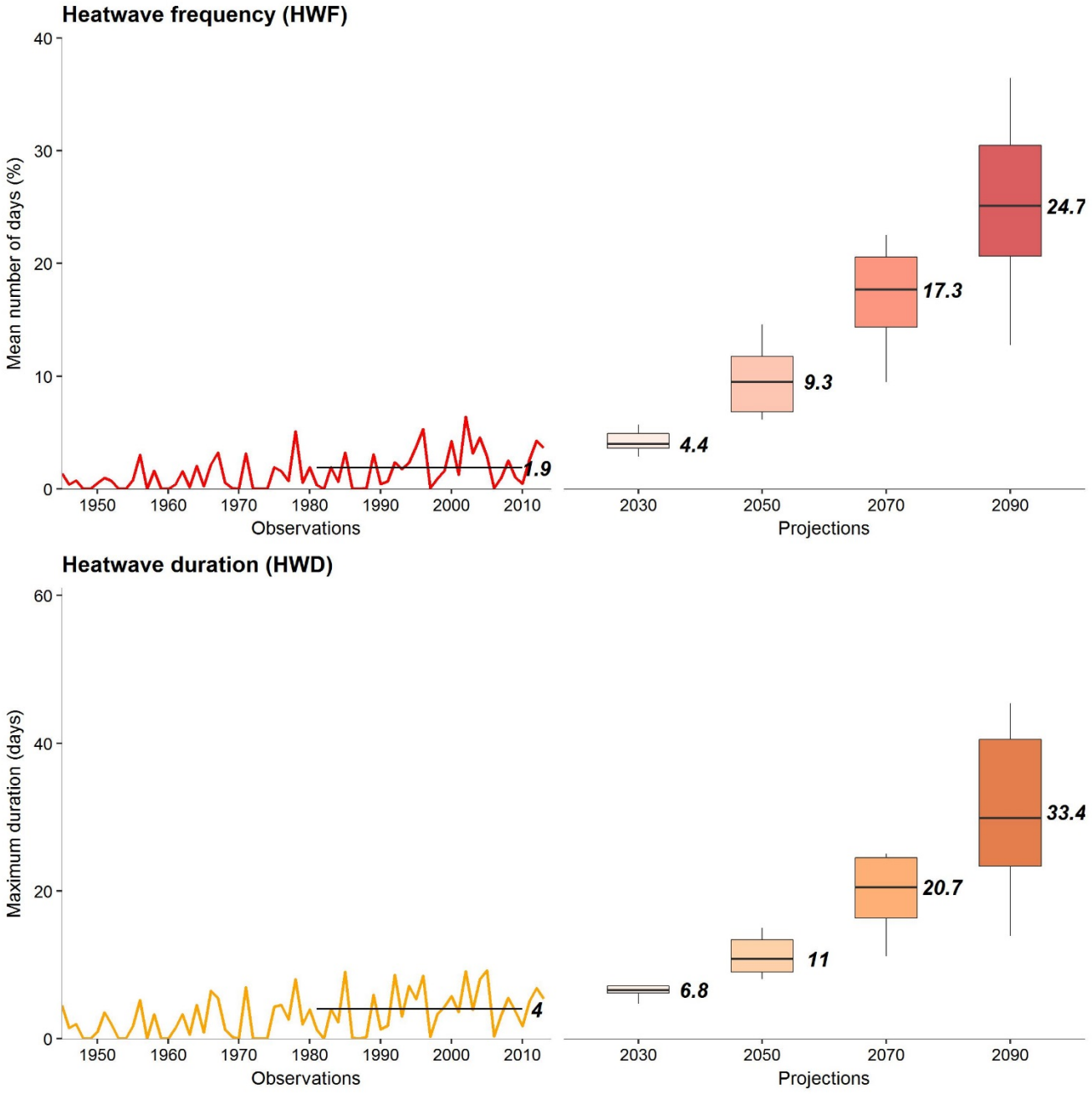
Queensland Future Climate Dashboard

The **Queensland Future Climate Dashboard** summarises information of 11 state-of-the-art climate models with regional scale simulations until the end of the current century. The dashboard is a visualisation platform composed of drop-down menus, maps, plots and tables where users can customise, visualise and export summarised future climate information according to their interest.



Check out what climate models say about future **Heatwaves**, **Extreme Temperature**, **Extreme Precipitation** and **Droughts**

Future heatwaves in SEQ

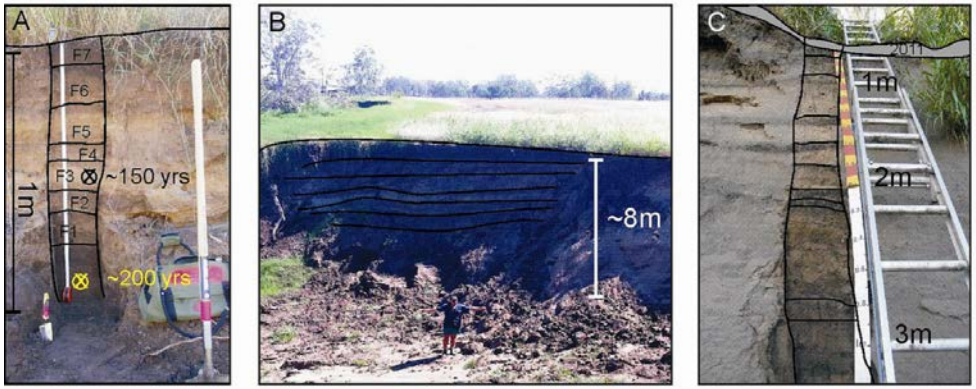


More work still needs to be done….

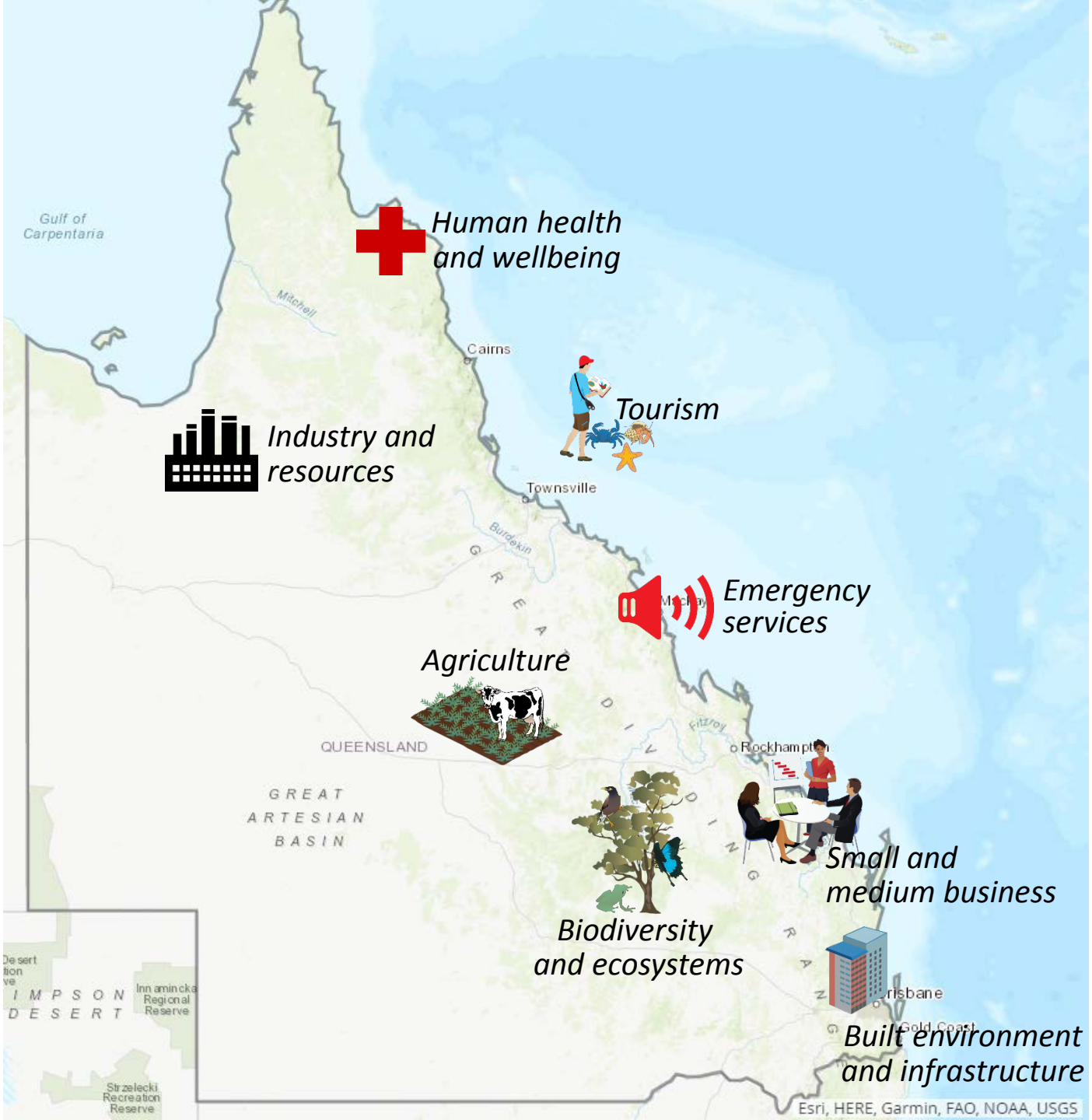
- Key climate change related issues facing Queensland more extreme El Niño and La Niña events, tropical cyclones, convective storms, severe wind, fire weather, heat stress and multi-year droughts.

- Validating the future projections with the past experience.

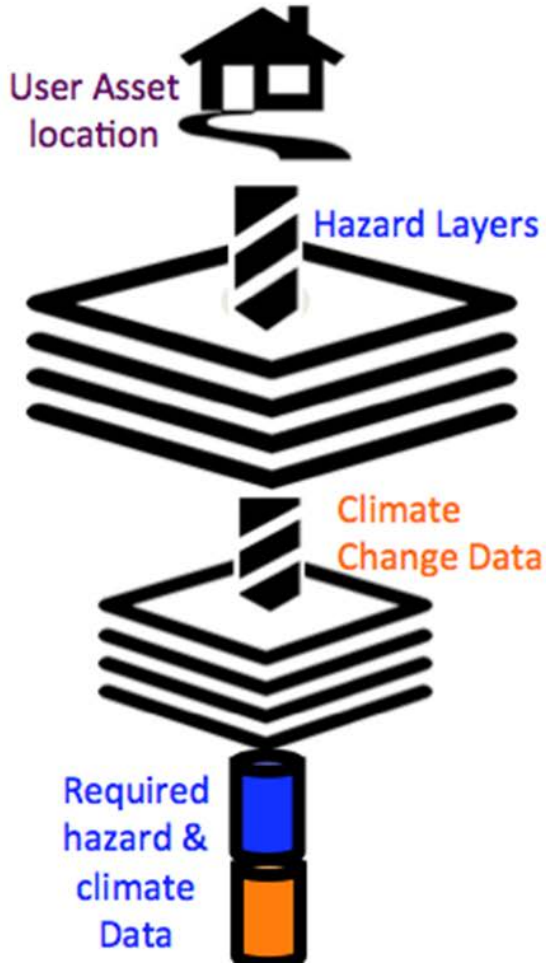
We can do this using the palaeoclimate record



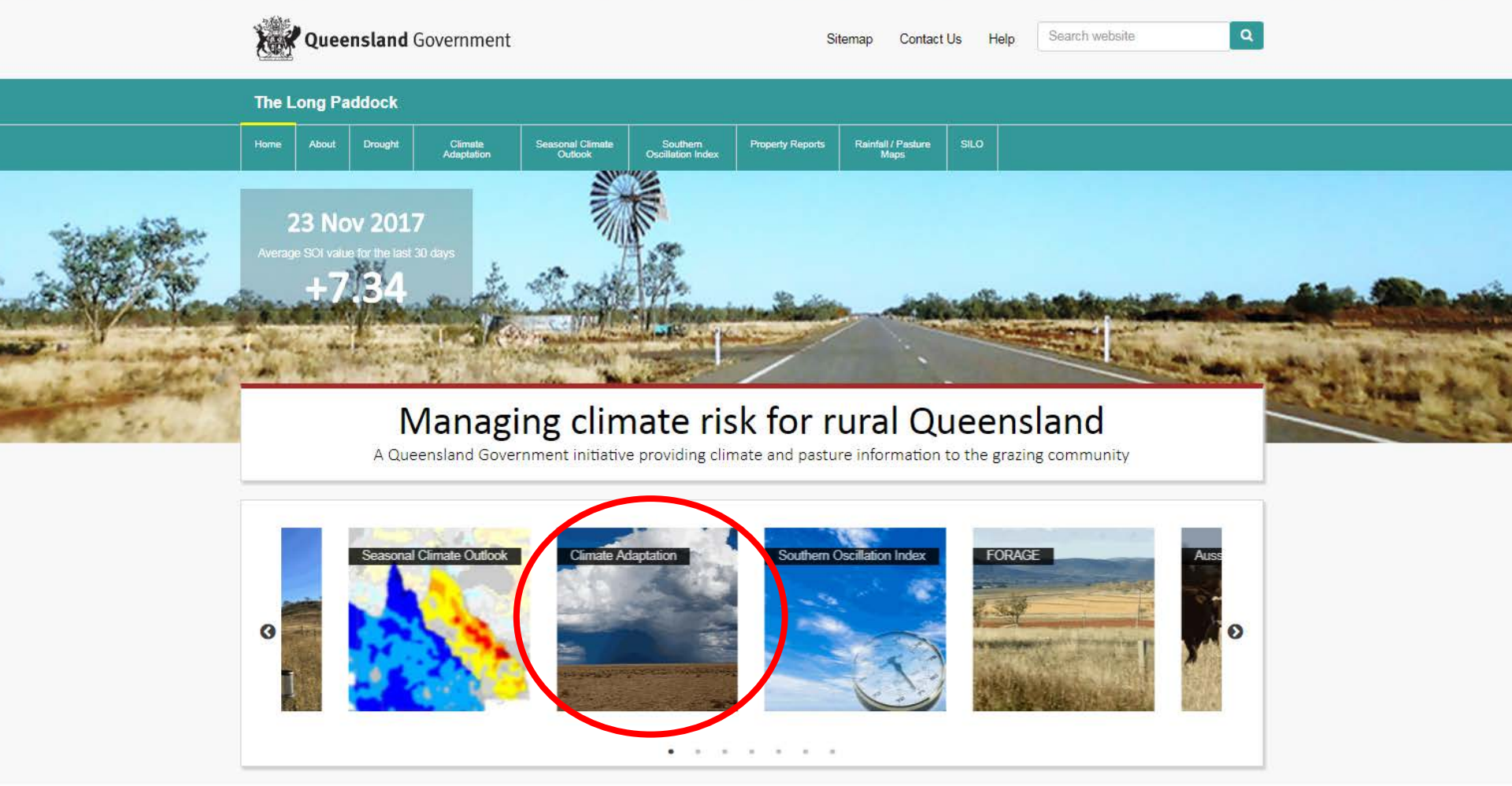
But to enable practical and meaningful decisions to be made using the climate change projections, we need to actively engage with industry and businesses.



Case study



Mount Crosby Water Treatment Plant on the Brisbane River.



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