Communicating Climate Change
Module 11
An initiative of the National Agriculture and Climate Change Action Plan
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Water resources in a changing climate: central west Western Australia

Water availability is a key issue in Australia. A changing climate will place greater demand on water resources. We need to factor the risks associated with climate change into the ways we use water.

Key facts

- Around 89% of Australia's total rainfall evaporates or is transpired by plants into the atmosphere. Only around 9% runs off into streams, rivers and storages. The remaining 2% drains below the root zone into groundwater aquifers and, from there, into rivers.
- Exactly how much rainfall returns to the atmosphere and how much is available to recharge soil, surface, and ground water stores depends mainly on the amount of energy from sunshine, and to a much lesser degree on the type of soil and vegetation, and the management practices on the land.
- Annual crops and pastures use less water per year than perennial vegetation, including trees, primarily because of their short growing seasons and shallower root systems. The larger canopies of native and plantation forests add to their higher evapotranspiration.
- Around 65% of continental Australia's runoff occurs in far northern Australia and coastal Queensland. Only about 7% of runoff occurs in the Murray-Darling Basin where more than 50% of Australia's water is used.
- Around 65% of water extracted from the environment in Australia is used for irrigated agriculture (almost 90% of this in the Murray-Darling Basin), 14% for industrial uses, 11% for urban household consumption and 3% for other rural uses, such as stock and domestic needs.
- Pastures use about 35% of irrigation water in Australia, followed by horticulture (16%), cotton (15%), cereals (13%), sugar (12%) and rice (6%).
- Climate variability has by far the greatest impact on seasonal water availability and water balances in Australia—significantly greater than impacts from human extraction or land management practices. Certain river basins are exceptions.
- Shifts in climate that result in less rainfall and higher temperatures are the greatest threat to our water resources.

A cooperative venture between

MANAGING CLIMATE VARIABILITY R&D PROGRAM
mla MEAT & LIVESTOCK AUSTRALIA
BCG shared solutions

Australian Government
Department of Agriculture, Fisheries and Forestry
Bureau of Meteorology
Bureau of Rural Sciences

Climate change projections

Australia and the globe are experiencing rapid climate change. Average temperatures in Australia have risen about 1°C since the middle of the 20th century. We had one of the most severe droughts on record in 2002–2007. Prolonged high temperatures have increased evaporation rates, dehydrated soils, and increased stress on crops, animals and vegetation.

Projections are for continued warming, less rainfall and more intense drought episodes across the temperate regions of Australia throughout the coming decades. This will affect wheat and sheep production. Anticipating and dealing with these changes in climate is critical to protect our agricultural industries.

For more information on climate change projections for specific regions of Western Australia, see the fact sheet for Module 3: Glimpsing Western Australia's Future Climate.

Yarra Yarra – Greenough – Moore Hill case study

- Annual water diversion in the central west of Western Australia is between 8% and 17% of water availability, and is mostly for industrial use.
- By 2030, under a moderate carbon emission scenario, temperatures in the central west are projected to increase by 0.5–1.5°C and rainfall to decrease by 2–10%.
- By 2070, temperatures in the central west could increase by 2.5°C and rainfall could decrease by 20%. This would significantly affect water availability.

The Yarra Yarra – Greenough – Moore Hill region

The Yarra Yarra, Greenough and Moore Hill catchments are located in the central west of Western Australia (Figure 1). Geraldton, Mullewa and Morawa are the major population centres, with a total population of less than 50 000.

Land use is primarily dryland cropping and broadacre grazing. Most water usage is for commercial and industrial purposes.

Figure 1: Yarra Yarra, Greenough and Moore Hill catchments

Current and historical water availability

Rainfall in the Yarra Yarra, Greenough and Moore Hill catchments ranges from 280 mm per year in the north-east of the region to 500 mm per year in the south-west. Around 95% of this rainfall evaporates or is transpired by plants, so surface runoff is low at around 300 000 megalitres (ML) per year.

Major water courses include the Greenough, Salt, Moore and Hill Rivers. There are six small water storage facilities with a combined capacity of around 500 ML.

Historical trends in annual rainfall and soil moisture in the Greenough River Basin are shown in Figure 2.

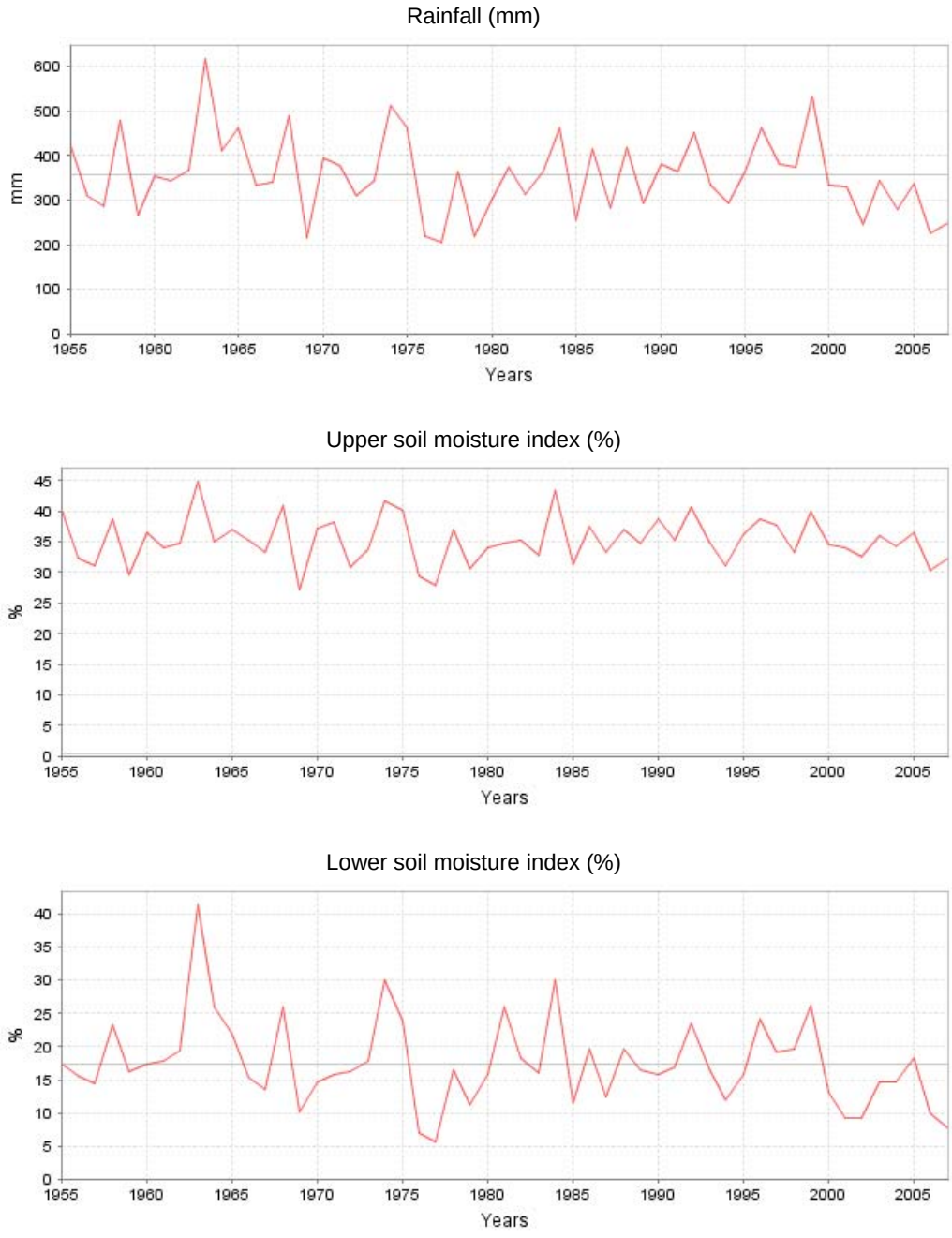

Figure 2: Historical trends in rainfall and modelled soil moisture in the Greenough River Basin (AWAP 2008)

Projections of future water availability

Water availability in the Yarra Yarra, Greenough and Moore Hill catchments is likely to decline due to industrial development and climate change.

In the central west of Western Australia, under a moderate emission scenario:

- By 2030, temperatures may increase by 1–1.5°C and rainfall may decrease by 5–10%.
- By 2050, temperatures may increase by 1.5–2.0°C and rainfall may decrease by 10–20%.
- By 2070, temperature may increase by 2.5°C and rainfall may decrease by 20%. A reduction in rainfall of this magnitude would significantly affect water availability.

Threats and opportunities for water conservation and efficiency

There is not enough rainfall to support significant development of commercial plantation forestry in the Yarra Yarra – Greenough – Moore Hill region, except in the far south-western corner of the Moore Hill River Basin.

Expansion in farm dams by 2030 is also expected to be small and not enough to significantly affect runoff volumes.

Aside from climate change, the main threat to water availability in the region is the expansion of mining operations.

Sources

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Further information

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