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: southern South 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 groundwater 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.
- About 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.
- Approximately 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 South Australia, see the fact sheet for Module 3: Glimpsing South Australia's Future Climate.

Lower Eyre Peninsula – Yorke Peninsula – Upper South East case study

- Annual water diversion in the south-east of South Australia is between 2% (Lower Eyre Peninsula) and 30% (Yorke Peninsula) of water availability.
- By 2030, under a moderate carbon emission scenario, temperatures in the south-east of South Australia are projected to increase by 0.5–1.5°C and rainfall to decrease by 2–10%.
- By 2070, temperatures in the south-east of South Australia could increase by 2.5°C and rainfall could decrease by 20%. This would significantly affect water availability.

The Lower Eyre Peninsula, Yorke Peninsula and Upper South East regions

The Lower Eyre Peninsula, Yorke Peninsula and Upper South East regions (Figure 1) comprise a population of about 100 000 which is mostly located in the major centres of Port Lincoln, Port Pirie, Kadina and Bordertown.

Land use is primarily winter cereal cropping, sheep for wool and meat, and irrigated cropping for hay. Small areas of viticulture, horticulture and commercial plantation forestry occur throughout the region. Most water usage is for horticultural, irrigated cropping and residential purposes.

Figure 1: (Left to right) The Lower Eyre Peninsula, Yorke Peninsula and Upper South East regions

Current and historical water availability

The long-term average rainfall for the region ranges from 425 mm per year on the Yorke Peninsula to around 550 mm per year in the Upper South East region (Millicent coast). Around 93% of this rainfall evaporates or is transpired by plants, so surface runoff is low at around 500 000 megalitres (ML) per year.

Aside from the Murray River, the most significant water courses in the region are the Broughton, Tod and Rocky Rivers. There are seven significant water storages with a combined capacity of around 20 000 ML.

Historical trends in annual rainfall and soil moisture for the Yorke Peninsula are shown in Figure 2.

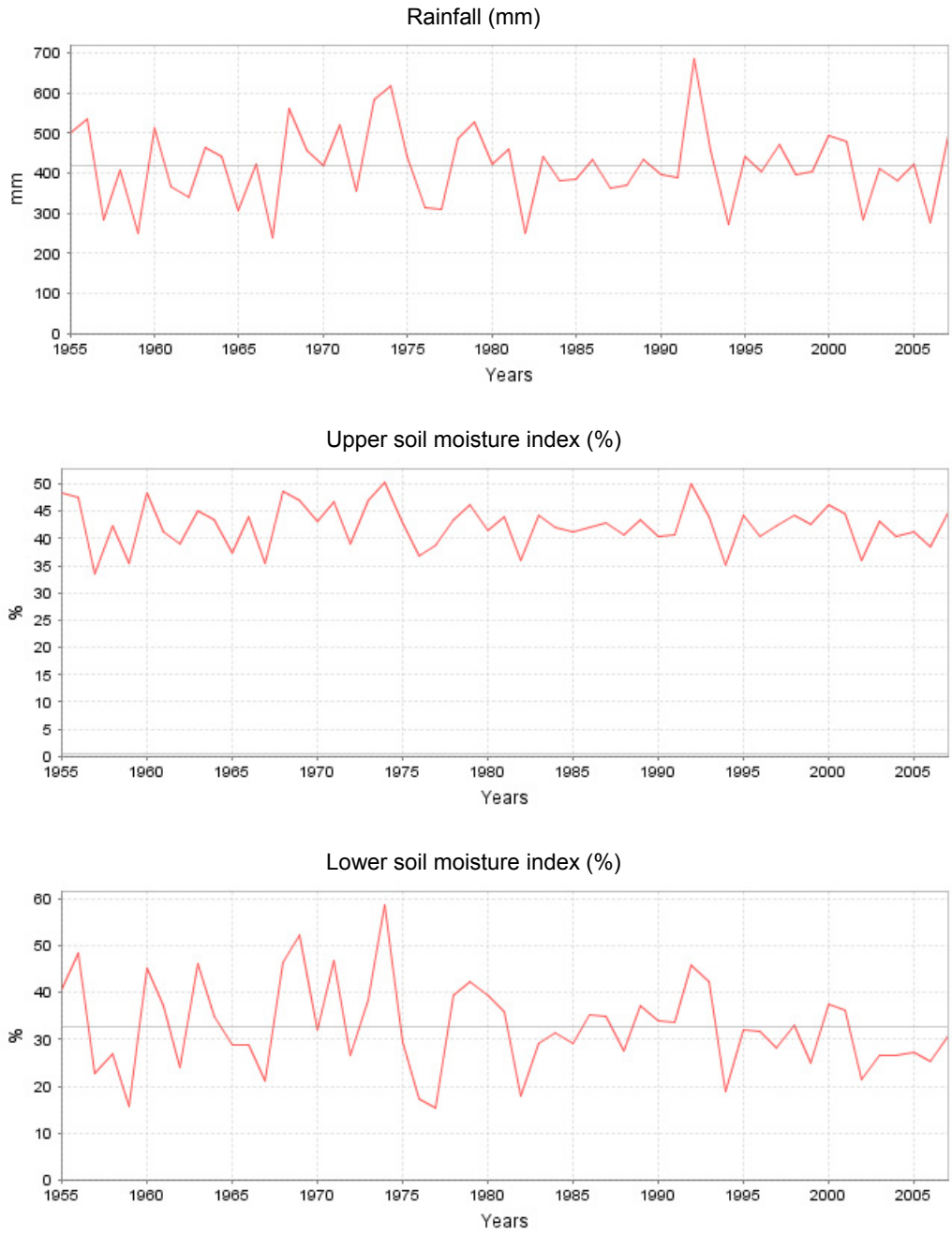

Figure 2: Historical trends in rainfall and modelled soil moisture on the Yorke Peninsula (AWAP 2008)

Projections of future water availability

Water availability in the Lower Eyre Peninsula, Yorke Peninsula and Upper South East regions is likely to decline due to farm dam expansion and climate change.

Total farm dam volume in the nearby Eastern Mount Lofty Ranges could increase by 16% by 2030.

Climate change is also likely to significantly affect water availability in south-eastern South Australia, under a moderate emission scenario:

- By 2030, temperatures may increase by 0.5–1.0°C and rainfall may decrease by 2–5%.
- By 2050, temperatures may increase by 1.0–1.5°C and rainfall may decrease by 5–10%.
- By 2070, temperatures may increase by 2.0°C and rainfall may decrease by 20%.

Studies in the Eastern Mount Lofty Ranges indicate there is a lot of uncertainty in climate predictions for south-eastern South Australia. Reductions in average water availability by 2030 could range from 3% to 52%, depending on the climate model and emission scenario used to generate predictions.

Threats and opportunities for water conservation and efficiency

Producers may be able to manage horticultural tree crops under changed climatic conditions in the region by using regulated deficit irrigation to reduce fruit size, improve soil moisture conservation through weed control, and increase soil organic matter to reduce water loss.

Producers of broadacre livestock in the region may be able to manage climate change by sustainable use of groundwater sources for watering stock.

Sources

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Further information

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