

variability



“Our rainfall and stream flows are highly variable. This variability will increase with predicted climate change ...”

This climatic unpredictability is something that no-one can change and with which we must learn to co-operate. To have any hope of succeeding we have to have a wide vision, see the ‘big picture’ and understand the co-evolution of this continent, its water resources and its biota through geological time.

Mary White, *Running down: Water in a changing land*, Kangaroo Press, Australia, 2000, p. 1.

Australia has the greatest rainfall variability of any country in the world. We are captive to this variability. Indigenous Australians have known for thousands of years that Australia's rainfall is highly variable. Yet from European settlement onwards, this variability has confronted and bewildered us. Understanding this variability is the key to understanding how we have managed our water resources.

Australia's climatic variability is captured in its extremes: from monsoonal patterns in its tropical north to desert areas where no real rain falls for years (and yet where flash floods periodically

occur, miraculously bringing these arid areas to life). There are places in our warm-temperate zone where summer temperatures soar over 40°C, while winter temperatures fall below freezing.

Early European settlers were struck by the variability of our rainfall. Australian rivers and streams could be raging torrents bursting their banks in the spring yet slow to a trickle by summer. The iconic Murray River is a good illustration of this natural variability in flow. The long-term, average runoff reaching the river is 11 259 GL (gigalitres*), but this can vary from 1670 GL in a very dry year to 30 000 GL in one very wet year.¹ The Ord River in Western Australia has a long-term average flow of 3980 GL. This can be as low as 1000 GL and as high as 12 000 GL.²

These kinds of extremes are in stark contrast to rivers such as the Thames, the Nile, the Mississippi and the Danube, which have appreciable flow throughout the entire year.

This high variability defies prediction. Yet it's important for us to understand the ways in which this climatic variability both dominates and constrains our use of land and water. It has played a huge role in the past and will continue to do so into the future.

*A gigalitre is a thousand megalitres or one billion litres. The volume of water in Sydney Harbour is approximately 500 gigalitres.

THE BEST-LAID PLANS ...

In 1931–32, the NSW Government funded the construction of a new crossing over the Snowy River at McKellar Crossing. The concrete-and-steel bridge was 50 m high and 250 m long. Just a few days before the official opening, a major storm, accompanied by a cloudburst, occurred in the upper catchment. This is how the impact was captured:

‘The ensuing flash flood, thick with uprooted trees and rocks, swept out of the tributary just above the new bridge, shot across the Snowy River and smashed against the far bank, then swung downstream. The water level was 4 m higher than any flood previously recorded. The force tore the bridge's steel trusses from its pylons. The tangled wreckage came to rest a few hundred metres downstream. The construction foreman, Edward ‘Ted’ Kay, contacted Orbost on his short-wave radio to advise that the opening should be cancelled.’³



THE BIG PICTURE variability

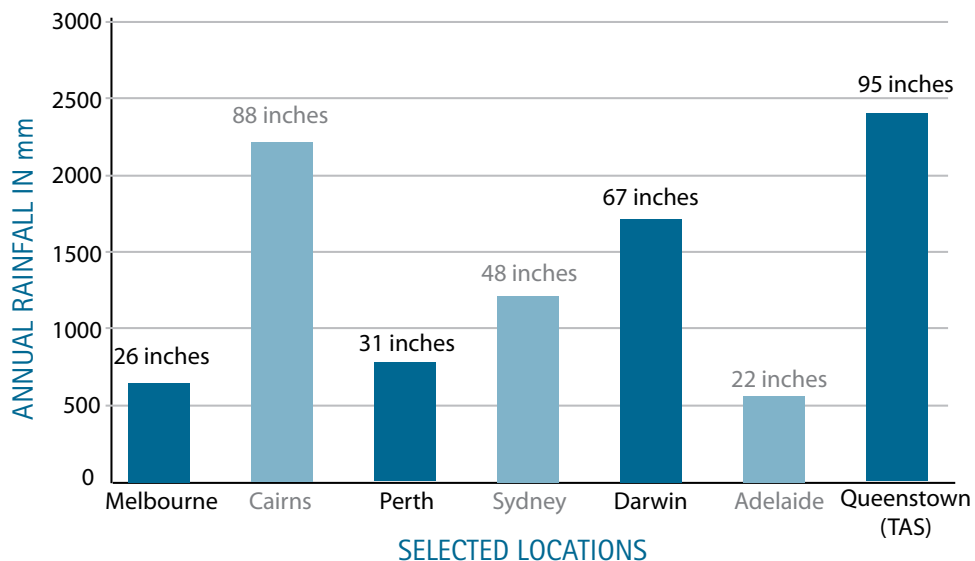


Figure 1. Rainfall variation around Australia

The extreme nature of this rainfall variability becomes apparent if we compare long-term (80- to 100-year) rainfall records from various places around Australia. A consequence of this variability is that our streams and rivers display huge variations in their natural flow rates due to varying amounts of runoff – between winter and summer and also from year to year.

Source: Watermark Australia, session notes no. 2, Melbourne, 2005, <www.watermarkaustralia.org.au>.

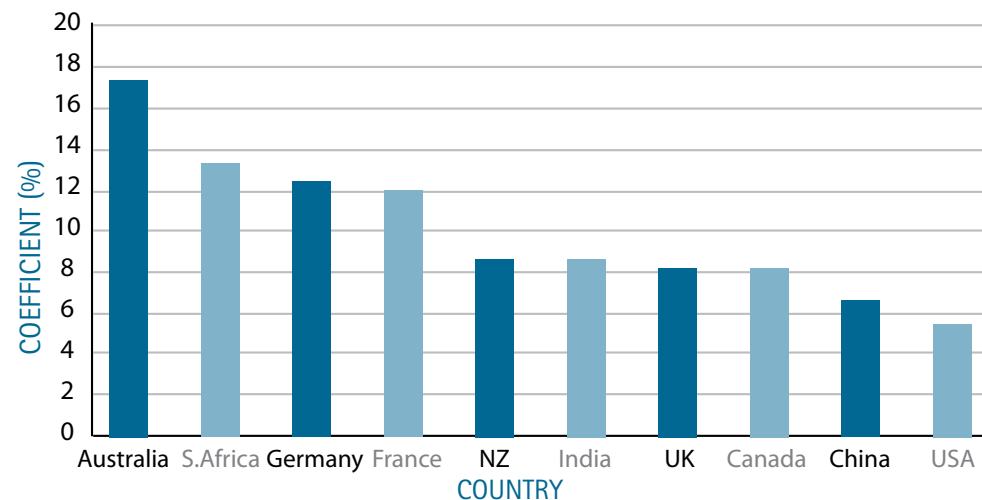


Figure 2. Rainfall variability in several countries including Australia

The height of each bar is a measure of variability. Australia's variability is twice that of the UK's and more than three times that of the USA.

Source: G Love, *Impacts of climate variability on regional Australia*, paper presented at ABARE Outlook 2005 Conference, Canberra, 2005, <<http://www.abareconomics.com/outlook>>

▶ REFERENCES

1. W Craik, *The drought along the Murray*, ABC News Online, 18 December 2006, <<http://www.abc.net.au/items/200612/51813633.html>>.
2. Water and Rivers Commission Report to Environment Australia, *Productivity and water flow regulation in the Ord River of north Western Australia*, Department of the Environment and Water Resources, 2003, pp. xii-xiv, <www.environment.gov.au/water/publications>.
3. C Miller, *The Snowy River story*, ABC Books & Audio, Sydney, 2005, p. 240.

Some other useful sources

- D Smith, *Water in Australia*, Oxford University Press, Australia, 1998, ch. 1.
- M White, *After the greening – the browning of Australia*, Kangaroo Press, Sydney, 1994.