



Irrigation, Drainage and Flood Management in Australia

ICID and Irrigation Australia Limited (IAL) will host the largest irrigation event in Adelaide, Australia during 24-29 June. This includes ICID's 63rd IEC meetings, 7th Asian Regional Conference, Irrigation Australia Conference, a large irrigation Trade Show, many international workshops and study tours. Dr. Willem F. Vlotman, Chairman, Irrigation Australia's Committee on Irrigation and Drainage (IACID) and Vice President, ICID provides a brief on the latest irrigation, drainage and flood management initiatives in Australia.

Climate Variability

Australia is the driest inhabited continent on the earth. Rainfall can be extremely variable and droughts and floods at various scales are common occurrences (Figure 1). Since reliable climate records began in the 1820s, Australia has experienced 10 significant drought periods and 11 major floods in various parts resulting in an extremely challenging environment for agricultural production.

estimated at 336 billion m³ (BCM). A storage capacity of about 84 BCM has been created through dams.

Irrigated agriculture

The agriculture industry is a major water consumer in the Australian economy, accounting for 65% (7,359 million m³) of the total water consumption by various sectors. In 2009-10, 1.84 million ha of land was irrigated consuming 6,596 million

and these irrigators are supported by professional irrigation services such as engineers at rural water providers, and irrigation agronomy consultancies, and irrigation design, installation and training services.

Water Act 2007

In response to long and severe droughts across most of the country and with new climate change modelling projecting further

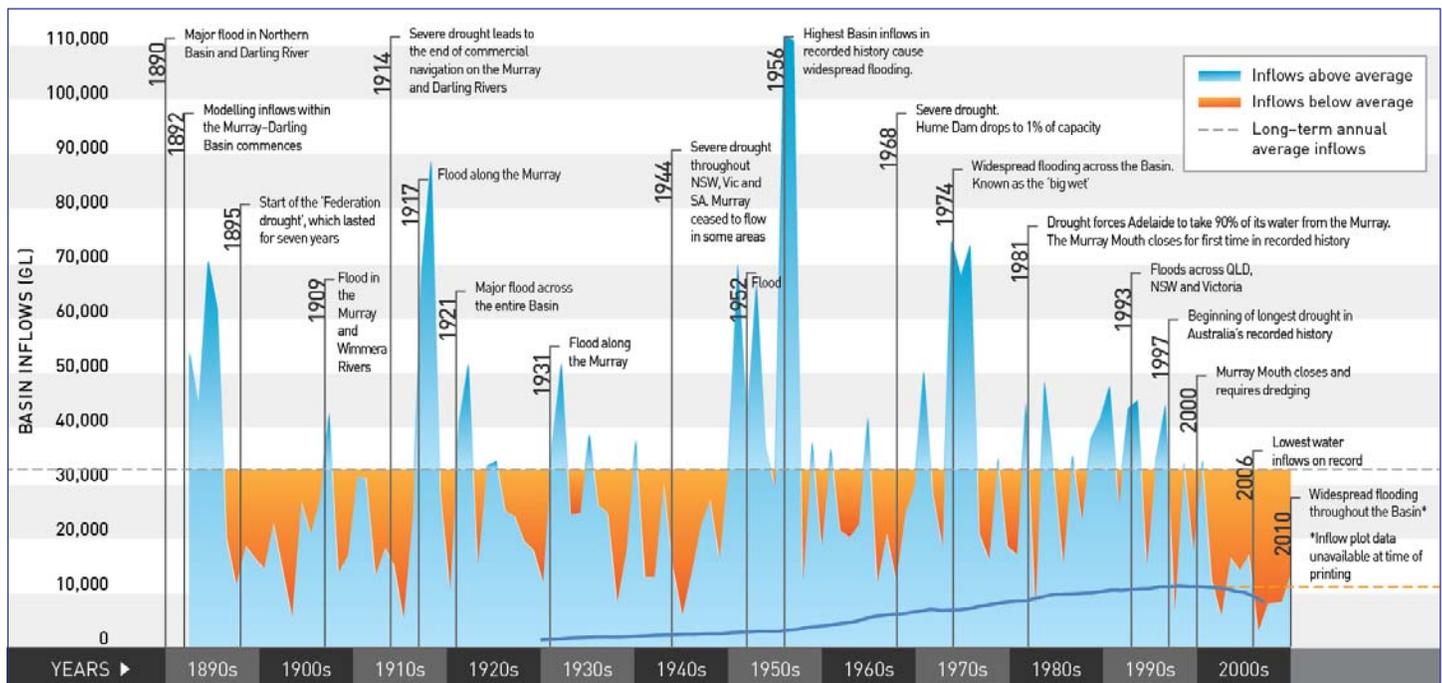


Figure 1. Droughts and Floods in the Murray Darling Basin (Source: MDBA 2012)

During the 20th century, the response to climate variability was mostly to build water storage dams for use in drought periods, with less focus on flood mitigation and response. Irrigation areas expanded significantly during 1930–1990, when at last a cap on diversions was established in the Murray Darling Basin.

Since records began many systems throughout Australia have received some form of regulation, whether it is for drainage or irrigation.

Australia's current population is 22.8 million and the country's average annual renewable water resources have been

m³ of water. Pasture for grazing accounted for the largest share of irrigated land (542,000 ha) consuming 26% of the total volume of irrigation water applied. About 10% of the agriculture water is used for livestock drinking, and dairy and piggery cleaning purposes. Sprinkler and micro irrigation is adopted on about 50% of the irrigated area. Drained area is about 2.2 million ha.

Irrigated agricultural production is valued at between AU\$ 9 -11 billion a year, producing 30% of all agricultural production value on less than 5% of agricultural land in Australia. There are about 41,000 irrigators across Australia,

rainfall declines across the more heavily populated and farmed southern half of the country, the Australian Government established the 'Water Act' in 2007 as a national level response to improving long term water management. Up until this time, states were solely responsible for managing water resources. Emphasis of the Water Act is on restoring health of the various rivers sustainably. Many of Australian rivers are rated to be in poor ecological health due to drought and over extraction of water for consumptive use and agricultural production. Australia is leading the way in responding to various

extremes in the climate through a range of water sector policy reforms with the Murray-Darling Basin being a major pilot area for these new initiatives.

Modernization of Irrigation

Even before the latest round of improvements to sustainable Integrated Water Resources Management (i.e. the Water Act 2007 and subsequent 2008 intergovernmental agreement for the Basin Planning to proceed) many water efficiency projects were already well under way. For instance, the Victorian State Government in 2002-03 commenced a major project using Total Channel Control as new irrigation management technology. This technology includes channel lining, computer controlled operation, improved metering accuracy (Figure 2), and optimization of channel layout which was subsequently rolled out across the entire 6,500 km long GMW channel network. The Victorian Government announced additional modernization projects in 2006, 2007, and 2008 to save estimated 500 million m³ of water to be shared equally among the environment, the irrigators and the Melbourne urban community. The investment was based on the premise that delivery efficiency could be increased from 70% to 85%.

The average off farm efficiency (from the storages to the farms) and the system efficiency (from storage to plants) of large irrigation schemes in Australia are about 70% and 50%, respectively. The Australian government has allocated AUS \$12 billion to invest in water projects and strategic programs across the nation including infrastructure investment to help water

users adapt to a future with less water, purchasing water for the environment, and a renewed commitment to water reform nationally with the idea of making the environment healthier.

Australia being a water-scarce country has instituted markets for trading water - the term used to describe transactions (between a buyer and a seller) involving water access entitlements. Trading can occur on a permanent or temporary basis. Since the reforms began large volumes of water have been bought and sold both within and outside the Murray-Darling Basin. This water market remains the centrepiece of national water reform. The unavoidable fact for Australia's irrigation industry is that there will probably be a lot less water available in future for irrigated agriculture.

Murray-Darling Basin Plan

Almost a quarter (24%) of all agricultural land in Australia is located in the Murray-Darling Basin (MDB). In 2009-10 the MDB accounted for 37% of Australia's irrigating agricultural businesses, 53% of all irrigated agricultural land and 54% of irrigation water applied. In December 2011, the draft Basin Plan was released for public consultation. The primary focus of the Basin Plan is to set binding 'sustainable diversion limits' on water use across the Basin to ensure sufficient water to meet environmental needs, after also taking into account socio economic considerations. Sustainable Diversion Limits will set new constraints of extractions for consumptive use for all basin valleys. Assumptions about minimum inflows are core to planning and seasonal water allocations.

To meet the challenge of reduced water availability in the future, the Government has committed more than AUS\$ 4 billion so far to upgrade and modernise water and irrigation infrastructure in the Murray-Darling Basin. As part of its support for irrigators to modernise their infrastructure, the Government has invested more than AUS\$ 4.6 million to assist 18 water providers to develop modernisation plans for irrigation districts and covering about 75% of total irrigation entitlements in the Murray Darling Basin.

Flood Management

River Murray System Operators are required to observe the Emergency Action Plan (EAP) which includes annual flood training. The EAP is regularly reviewed to ensure currency. MDBA uses flood software (MIKE) to establish hydraulic models for icon sites and has contingency plans for managing episodic river salinity following flood events Flood plain management plans for basin creeks and rivers are developed by each state by adopting community owned strategies to manage flood risk and support the requirements of the floodplain environment. The focus is upon 'a floodplain managed for the socioeconomic interest of the community that provides a healthy and sustainable environment for floodplain ecosystems'.

Situations in the Murray Darling are experienced in other regions and states as well. For instance, in Queensland, over 70% of the state was in drought for around 6 years and then in 2010-11 saw most of the state either affected by flood or by a major cyclonic event. Queensland has a suite of demand management tools which were effectively used in south east Queensland during the Millennium drought to cut residential water usage by more than half. The Queensland Government invoked the International 'Charter for Space and Major Disasters' during this event resulting in a large amount of spatial information being captured.

The National Water Commission is responsible for driving national water reform under the National Water Initiative - Australia's blueprint for how water will be managed into the future. For more information on current Australian Government programs, please access 'Water for the Future' at www.environment.gov.au/water/.

Reference

MDBA 2011/2012. Proposed Murray Darling Basin Plan. Murray Darling Basin Authority (MDBA), www.mdba.gov.au/draft-basin-plan.



Figure 2. Modernization in Northern Victoria irrigation systems (Source: Willem Vlotman)