THE IRRIGATION DROUGHT
implications for irrigators in 2003-04

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• Unlike much of dryland farming, where 2003-04 promises to be much better than the severely drought affected performance in 2002-03, the irrigated farming sector in southern eastern Australia remains in the grip of drought. Irrigated cotton and rice crops appear to be particularly vulnerable to the current low availability of water in major storages.

• Although still needing some improvement, the development of efficient markets for water has the potential to ensure that scarce water resources are allocated to maximise the economic benefits from Australia’s irrigated agriculture sector.

2003-04 irrigation season

The irrigation season in 2003-04 (September –May) will start with some water storages at their lowest on record. Many of the major irrigation water storages in the Murray–Darling system (map 1) are critically low because of low inflows over the past few years (table 1). Given such low water storage levels, opening allocations for the irrigation season in 2003-04 are substantially below both historical levels and those in 2002-03.

How the season might develop

Inflows during the irrigation season in 2003-04 will be of particular importance to irrigators. Historically, inflows into storages in southern New South Wales and northern Victoria occur predominantly in winter and spring, the period when the irrigation season is just commencing. Hence, while current opening allocations are low, improvements have occurred and further increases are possible as the season progresses. The start and end allocations for some Victorian and New South Wales regions in 2002-03 and their opening allocations for 2003-04 are presented in table 2. Possible scenarios for increases in water allocations in these regions are provided in tables 3 and 4.

Managing storages

Water storages and allocations are managed differently among the states. In New South Wales, the policy for storages is to allocate all water for use during the immediate irrigation year. This partly explains why opening allocations are low in that state. With dams run down over each season, irrigators in New South Wales rely heavily on the volume of inflows into storages between irrigation seasons. During the 2002-03 season, inflows were extremely low and allocations generally did not improve from those announced at the beginning of the season, as can be seen for the New South Wales Murray irrigation area (figure A; Murray Irrigation Ltd).

In contrast, Victoria takes a more conservative approach to the management of water storages by making some effort to meet irrigation needs in the following year. Water is allocated first to fulfil water entitlements in the current year. The policy is then to ensure that there will be enough
water in storage to satisfy water rights in the next season (assuming that there will be minimal inflows). Any water in storage above that needed to satisfy water entitlements in the next season is then available to irrigators as 'sales water'.

In years of abundant water supply, irrigators may receive water allocations that are more than 100 per cent of their entitlements. On average, Victorian irrigators receive substantially more water than their entitlements. In the Campaspe irrigation area, for example, irrigators received more than 150 per cent of their entitlements in all but one year between 1970 and 1999, and above 250 per cent in six of those years.

Map 1: Dams and water storages in eastern Australia
### Capacities and levels of selected storages in Australia

#### Name of storage | River | Capacity | July 2001 | July 2002 | July 2003
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**New South Wales**
Hume dam | Murray | 3 038 000 | 43 | 23 | 20
Menindee lakes | Darling | 1 678 160 | 117 | 22 | 4
Blowering dam | Murrumbidgee | 1 631 410 | 55 | 31 | 15
Copeton dam | Gwydir | 1 361 720 | 62 | 38 | 13
Wyangla dam | Lachlan | 1 220 000 | 76 | 41 | 9
Burrendong dam | Macquarie | 1 188 000 | 86 | 39 | 10
Burrinjuck dam | Murrumbidgee | 1 026 000 | 40 | 27 | 8
Keppit dam | Namoi | 425 500 | 72 | 21 | 16
Pindari dam | Severn/Macintyre | 312 000 | 100 | 65 | 28
Snowy a | Snowy | 5 307 000 | 55 | 59 | 35
**Total New South Wales** b | | 19 015 000 | 74 | 49 | 24

**Queensland**
Fairbairn dam | Nogoa | 1 301 000 | 73 | 53 | 25
Glenlyon dam | Dumaresq/Severn | 254 310 | 54 | 49 | 11
Callide dam | Callide river | 136 300 | 18 | 10 | 24
Leslie dam | Condamine | 106 200 | 35 | 12 | 7
Beardmore dam | Balonne | 81 700 | 71 | 58 | 87
**Total Queensland** b | | 6 887 580 | 72 | 60 | 52

**Victoria**
Dartmouth dam | Mitta Mitta/Murray | 3 907 950 | 82 | 29
Lake Eildon | Goulburn | 3 390 000 | 23 | 12
Warranga | Goulburn | 411 000 | 49 | 23
Lake Mokoan | Broken | 365 000 | 41 | 22
Eppalock | Campaspe | 312 000 | 28 | 7
**Total Victoria** b | | 15 702 000 | 45 | 22

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**Notes:**
- a Includes all water in the Snowy river system including Jindabyne and Eucumbene lakes. Although the primary use of water in the Snowy system is for generating hydroelectricity, the water subsequently becomes available for irrigation and environmental flows in the Murrumbidgee, Snowy and Murray rivers.
- b For major storages only. Totals do not add because smaller storages are excluded. On-farm storage excluded.

**Source:** New South Wales Department of Land and Water Conservation; Queensland SunWater; Victorian Department of Water Resources.
same period, irrigators in the Goulburn–Murray area received over 120 per cent of their entitlements in all but five years.

The policy adopted in Victoria means that opening allocations of water are generally higher than in New South Wales and a secure water entitlement is provided to irrigators. A comparison of the 2001-02 and 2002-03 seasons for some Victorian irrigation areas is provided in figure B. In 2001-02, regions reached 100 per cent of their allocations relatively early in the season. In 2002-03, irrigators generally received 100 per cent of their allocations either much later in the season or not at all, although they had opening allocations of at least 30 per cent.

Given that Victorian irrigators have historically been able to obtain substantially more water than their basic entitlements, the possibility that some water entitlements in Victoria may not be fulfilled during 2003-04 is unusual from a historical perspective.

Effects of lower storage levels in 2003-04

Although 2003-04 will start with lower water storages than last season, the effect of this on agricultural production could be partially offset by more favorable seasonal conditions. Information from the Bureau of Meteorology (2003) indicates that the probability of receiving average rainfall is higher than in 2002-03. Improved soil moisture levels and pasture growth provided by rainfall through the season should reduce the dependence of at least some crop and pasture production on irrigation water.

The timing of inflows will be a critical issue for irrigated crops. While the probability of greater inflows is higher than last season, farmers are likely to again face the situation of having to plant summer crops with low allocations and hope that allocations will increase. If substantial inflows do not arrive prior to planting, or in time to suit crop needs, then plantings and production could be adversely affected even if water becomes available later in the season.

In response to low water storages, cotton farmers are likely to delay planting in the coming
season for as long as possible to get a more accurate feel for the water situation. Production in most cotton growing regions is forecast to fall in 2003-04 mainly because of low water allocations.

Given the large quantity of water required for production, the rice industry can be one of the hardest hit sectors when the availability of irrigation water in major storages is low. In the 2003-04 irrigation season, all irrigators in the Murrumbidgee and Coleambally irrigation areas will have an option to secure additional water through a deal negotiated between NSW State Water, Murrumbidgee Irrigation and Snowy Hydro Limited. The deal will be conditional on any water acquired being repaid equally over the next two years from future allocations.

To make this water option more attractive to rice growers, the Ricegrowers’ Cooperative SunRice will partly subsidise the water taken up for rice production. The arrangement, to secure an additional 150 000 megalitres of water in total, is an attempt to maintain sufficient rice production in order to sustain important export markets and the industry’s processing infrastructure. It has been claimed that in a similar deal in 2002-03, the purchase of additional Snowy water through Murrumbidgee Irrigation resulted in extra production of around 150 000 tonnes of rice (SunRice 2003).

Water markets have a role to play

In years like the current one, with major irrigation water storages being particularly low, the efficacy of a properly functioning physical water market as an efficient mechanism for allocating a scarce resource is readily apparent. Water markets can facilitate the physical transfer of water to higher value uses, allowing the benefits generated from the available water to be maximised (Goesch 2001).

Water markets offer irrigators some flexibility by providing them with the opportunity to buy or sell water. Some irrigators may decide to buy water during periods when their own allocation is insufficient to meet their requirements. Other irrigators in the same situation may instead choose to accept the revenue from selling their allocation at a time of relatively high water prices. Both of these perspectives serve to illustrate the important role of water markets in the risk management strategies of irrigators.

For regions that have significant climatic or production variability, intraregional trade may be a sufficient form of risk management. However, where there is little climatic or production variability within a region, there may be additional benefits from reducing the impediments to interregional and interstate temporary trade.

Water markets can also be used to help manage and provide water for environmental purposes. If the environment (or an environmental manager) owned a share of available water, this allocation could potentially be managed to maximise the environmental benefits it provides. Water could be sold during periods when it was not required, with any revenue used to either buy additional flows when needed or invest in engineering works to increase the effectiveness of environmental releases in subsequent years. The merits of making environmental allocations tradable is an issue that would be worth further investigation, especially in the context of the debate over environmental flows in the Murray River.

Water trade can also be instrumental in minimising the cost of sourcing additional flows for environmental or social objectives. Any increase in stream flows for these types of objectives may be at the expense of existing consumptive uses such as irrigation. Hence, the costs of providing flows can be influenced by the value of activities from which water is withdrawn. Trade can help reduce the costs of sourcing additional flows since water would ultimately be diverted from the lowest value uses (Heaney, Beare and Goesch 2002).

Water trade limited by institutional impediments

Currently, trade in permanent water entitlements is very restricted, with most trade occurring within irrigation districts. Physical or temporary water trade is, by comparison, relatively unrestricted. Nevertheless, there are some administrative impediments, and temporary trade volumes between irrigation valleys and states remain small.
One reason for restricting trade in the longer term is the risk of ‘stranded assets’. With existing water property rights there is potential for irrigators to leave an irrigation district, thereby imposing higher costs on those remaining in the system (Goesch 2001). This could lead to a situation where the delivery charges are so high that they are beyond the financial capacity of those remaining in the system. If this were to happen, the irrigation authority would be left with large costly infrastructure but no customers (hence, the concept of stranded assets).

However, there may be more effective mechanisms for dealing with these problems besides placing restrictions on trade. The stranded assets problem, for example, may be better dealt with by using a multipart pricing regime or long term contracts that still allow trade (Goesch 2001).

Central to establishing a more effective physical market for water is the establishment of well defined access rights to both water resources and storage and delivery infrastructure. In some cases, the costs involved with establishing a perfectly defined water access right conducive to efficient trade would be greater than the potential benefits derived from trade (Beare, Heaney and Mues 2003). In these situations imperfect access rights that may lead to some forms of market failure may still generate a more efficient allocation of water resources than an administered allocation system.

At a meeting in August this year, the Council of Australian Governments (COAG) recognised the importance of addressing institutional barriers to trade. COAG has agreed to develop a National Water Initiative, which, in part, will encourage the expansion of water markets and trading across and between districts and states. This initiative will also consider pricing regimes that can take into account the full cost, including environmental cost, of using and trading water. The National Water Initiative will further indicate specific actions for addressing these issues and form part of an intergovernmental agreement for consideration at the first COAG meeting in 2004.

References


