



Economics
Consulting
Services

Harvey Water Irrigation Area
- Logue Brook Dam
Water Value for Agriculture
July 2006

1. Background

1.1 Report Purpose

This brief report has been prepared by Economics Consulting Services for Harvey Water. It provides a précis of the value of water for agricultural purposes in the Harvey Water Irrigation Area. In particular, it examines the agricultural value of the water supplied by the Logue Brook Dam.

1.2 Logue Brook Dam

The Dam was built in 1963 to supplement the water supply to the then South West Irrigation Scheme. The lake created has also been opportunistically used for a range of water sports including boating and fishing activities as a secondary activity. The catchment is used for outdoor activities and includes a caravan park and adjacent holiday camp.

The Dam has a supply capacity of 24 Gigalitres of water but dry seasons in recent years have reduced this supply potential. The irrigation cooperative, Harvey Water, is licensed to take 11 GL per annum of water from the dam.

The dam supplies water to the irrigation area around the town of Yarloop and can supply water to around half of the irrigation area around the town of Harvey. There are very few developed land uses in the catchment area and the resulting water quality is high. The water thus tends to be held until late in the irrigation season when it can be mixed with lesser quality water to maintain good quality water standards. Because of the lack of reliability of the dam it is also managed conservatively to ensure that it is not overdrawn relative to the need to supply irrigation water from it.

Harvey Water proposes to redevelop the irrigation area supplied by Logue Brook Dam using pipes to replace the open channel system. This will greatly reduce the water losses leaving surplus water available for other water uses.

The high quality of the Logue Brook Dam water makes it suitable for drinking purposes and Harvey Water has proposed to permanently trade 5.3 GL of water to the Water Corporation in return for funding to install the pipe system.

1.3 Harvey Water Irrigation Area

The Harvey Water Irrigation Area encompasses an area of 112,000 hectares with water supplied from seven dams. The total farm area is 34,400 hectares of which close to 10,000 hectares are irrigated. There are around 500 irrigation properties

3. Logue Brook Dam Water Value

3.1 Water Valuation

Increasing water demands and lower rainfall years have increased the demand for water in Western Australia and made it necessary to regard water as an economic good. However, estimating the value of water is complex and controversial. The distribution of natural water sources and the high cost of transport mean that water can have a very low value in some locations and high in others.

As recently as the year 2000 there has been a reasonable level of international agreement that water should be regarded as an economic good and that the value should reflect economic, social, cultural and environmental attributes.

While experts agree on the attributes that should be included in the value estimate, the complexities that arise in trying to reconcile such disparate values makes the task very difficult. Economic values can be estimated in a number of ways while social and environmental value measurement remains highly qualitative.

Value has many meanings in economic texts but is based on the concept of choice. Value is demonstrated by the choices people make. In agriculture, this means that value can be observed in the price that farmers will pay for additional water, the price they will pay for land with an assured water supply or the price they pay for substitutes for water such as grain to supplement dairy cow rations.

Willingness to pay and willingness to accept alternatives or compensation are the accepted measures of economic value in a sustainability context.

While these measures reflect the choice of the individual, it can be argued that the value to the community as a whole must include the externalities that arise from the decision. Flow – on impacts can be highly significant to the broader community.

3.2 Value of Irrigation

It follows that the value of the water is not the economic output that results from the irrigation of farmland but the difference in economic output when water is available and when it is not. In the absence of irrigation water, farmers will still use the land but for other purposes or even for the same purpose but in a different seasonal way or difference in land use intensity.

For a closed economy with no external trade, the food and fibre produced in agriculture will be sourced from farmers in some way. Irrigation water may provide greater certainty, and/or allow new or alternative crops to be produced.

The Harvey Water Irrigation Area developed primarily for irrigated pastures with some fruit and vegetable production but this is changing towards higher value uses of water in recent years. Irrigated pastures were focused on dairy production with the irrigation water allowing year round fresh milk production and greater certainty of production. Some pastures are also used for beef cattle production.

Water use by the key commodity sectors in the Peel-Harvey irrigation area was estimated as part of the State Water Strategy to close to 100 ML of water (Table 1). This included close to 10,400 hectares of irrigated land.

Table 1: Water Used by Key Commodity Groups (megalitres)

Pasture	Vegetables	Fruit	Other	Total
81,161	10,713	4,881	1,578	98,333
82.5	10.9	5.0	1.6	

Pasture production dominates water use accounting for over 82% of the total.

The Department of Agriculture estimated water use values for a range of irrigation enterprises as part of the Irrigation Review. Work by Donna Brennan of CSIRO demonstrated that the economic returns to water (the asset value of water within the production system) is high for most horticultural production in Western Australia. This work was summarised in the State Water Strategy as follows:

The asset value of water for vegetables lies within the range \$2,500 to \$13,500 per megalitre for typical crops and averages \$7,600 per megalitre in southern regions of the State¹. For fruit production in southern regions, the asset value for water ranges from \$3,000 to \$9,000 per megalitre for typical crops. In contrast, the asset value for water for irrigated dairy production is around \$300 to \$600 per megalitre for typical dairy farms, with highly productive farms achieving up to \$1,500 per megalitre. For irrigated beef production, the asset value for water is almost zero. The asset value for water within horticultural industries is high enough to be competitive with most other consumptive uses in the State, particularly where water sources and irrigation are located away from the main Water Corporation system, which is the main competitor for agricultural water.

Average water use values from this work suggest around \$500 per ML for dairy pasture and \$5,000 per ML for fruit crops and \$7,600 per ML for vegetables.

Harvey Water advice is that the water distributed from Logue Brook Dam is around 8 GL per annum. This volume can be distributed assuming the same pattern of use as the whole region (from Table 1).

Assuming that 75% of the pasture irrigated was used for dairy production, the total asset value using the Brennan estimates is \$11.1 million per annum (Table 2). This does not include any value for the “other” category.

¹ Brennan, D 2004, Department of Agriculture

Table 2: Water Asset Value

	Pasture	Vegetables	Fruit	Other	Total
Water proportion (%)	82.5	10.9	5.0	1.6	100
Water use (ML)	6,600	872	400	128	8,000
Asset value (\$/ML)	\$500	\$7,600	\$5,000		
Total value (\$million)	2.47	6.63	2.00		11.1

This asset has a flow on effect to the broader region and State economy. Work by the Centre of International Economics on the Murrumbidgee irrigation project demonstrated that income lost from a reduction in water availability, would see 60 per cent of the loss from agriculture itself, while the remaining 40 per cent was because of the indirect and flow on effects within the region.

Put another way, for every dollar of lost income in agriculture, 65 cents is lost from other activities. The reverse is equally true with an estimated 40% flow on benefit to the region from the increase in agricultural enterprise value associated with the irrigation.