

NURSERY PAPERS

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Water use in the nursery and garden industry

In 2006, Nursery & Garden Industry Australia (NGIA) commissioned a team of environmental consultants to conduct a National Water Use Survey of both production and retail businesses. The survey aimed to generate a detailed and accurate picture of water use and water management practices in the industry.

This month's Nursery Paper, written by former National Environmental Policy Manager Rebecca Dawson, explains the results of the Water Use Survey, highlighting how the nursery and garden industry compares to other agricultural sectors. The paper also includes information on the impact of water restrictions on the industry and recommendations on how the industry can continue to improve its water use efficiency.



Water use in the nursery and garden industry - results of the 2006 Water Use Survey

In the first half of 2006, Nursery & Garden Industry Australia (NGIA) commissioned environmental consultants RMCG to conduct a National Industry Water Use Survey. The survey asked a series of detail questions about business water use and water management practices.

The survey attracted a total of 327 responses from retail and production nurseries nationally. The survey is considered to be representative in terms of the national distribution of businesses when compared to information provided by the Australian Bureau of Statistics.

Irrigated area

The median irrigation area of production is 1.17 hectares for the production sector, compared with 0.14 hectares for the retail sector.

The table to the left highlights the contrast in the area of irrigation between production and retail nurseries. These findings indicate that production nurseries have significantly larger areas under irrigation and a more substantial range in size.

Comparison of Irrigated Area

	Production	Retail
	Sq Metres	Sq Metres
25th Percentile	4,000	500
Median	12,000	1,360
75% Percentile	30,000	3,600



Median water use for production nurseries was found to compare favourably to other agricultural industries such as wine grapes and rice.

Total industry water use

The results of this survey provide a good bench mark for industry water use. Notably, median water use for production nurseries (7.7 ML/ha) was found to compare favourably to other agricultural industries, for example, 4-8ML/ha for wine grapes and 7-12ML/ha for rice.

	Production	Retail
Median Annual Water Use (ML/ha)	7.7	13.1
Range	3.3 – 15.6	7.0 – 23.3

Total water use for production nurseries was lowest in NSW at 6.3 ML/ha and highest in WA and QLD/NT (which also had the greatest range). For retail businesses, water use was lowest in South Australia (9.1 ML/ha) and highest in WA and QLD/NT.

Apart from the obvious differences in the nature of business activity, some of the variation in water use figures between production and retail nurseries could be seen as the result of the investment made in recent years into industry research, best practice guidelines and training to support production nurseries to better manage water. This variation highlights the importance of engaging in similar strategies to improve water use efficiency in retail nurseries.



A very high proportion of nurseries have already used a range of initiatives such as improving irrigation systems to enhance their water use efficiency.

Estimated Water Use requirements

The survey also looked at Estimated Water Use Requirements as a way to compare total irrigation figures to the water use efficiency which could be achieved. The water use requirement model for each business was based on regional evapotranspiration data, accepted industry crop factors and a measure of 'effective rainfall'.¹

It was estimated that up to 20% of annual water consumption is used for non-irrigation purposes. Non-irrigation use could include house or office use, cleaning, washing, etc.

62% of production nurseries and 41% of retail nurseries are using less than the estimated irrigation requirement. The analysis suggests that there is wide variation across states and businesses, with real opportunities to make further improvements in relation to water use.

	Water Requirement ETC (current Median use) ML/ha	% of businesses using less than their estimated requirement	Water use above estimated requirement for businesses using above ETC (over irrigation).
Production	9.8 (7.7)	62%	18%
Retail	14.2 (13.1)	41%	37%

The impact of industry programs such as Waterwork training and government support for the development of Irrigation Drainage Management Plans (IDMPs) was seen in the strong performance of some states. Significant savings are achievable for those businesses currently using more than the estimated water requirements.



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1. Effective rainfall is the percentage of rainfall actually available for a crop to use. With the limited 'catch' associated with in-pot production this can be as low as 36% of actual rainfall for production and 20% of actual rainfall for retail.

Cost of water and water management decisions

The cost of water represents a low percentage of business turnover for most nurseries – the median is 0.32% for production nurseries and 0.24% for retail.

However, the actual median cost is \$382/ML for production nurseries and \$995/ML for retail nurseries. This is high in comparison to water charges in the agricultural sector, which range from \$15/ML to \$150/ML.

Additionally, under-watering can be costly relative to over-watering. Production losses may be 30 times greater than the relative cost of water for retail nurseries and six times greater than water costs for production nurseries.

Water sources

The survey indicates that in relation to water sources:

- There is significant variation in water sources across the states/territories
- A minimal amount of water is supplied from rainwater tanks in both sectors
- The retail sector appears to rely largely on potable/urban supply (56%) or treated effluent (37.5%) – although the proportions for treated effluent are due to a few large users rather than widespread use in the sector
- The production sector seems to have greater variation in supply, with four main water sources including bore/groundwater (13%), onsite storage (17%), off-site storage (26%) and river/stream water (34%). Correspondingly, the reliance on potable/urban water supply is much lower (10%).

More than half of production nurseries and 17% of retail nurseries already recycle water on-site, with a third of survey participants planning to invest in recycling systems in the future.



Drip systems and bottom watering, while water efficient, are not suitable for all production types.

Irrigation methods

Most nurseries (72% production nurseries and 70% of retail nurseries) use fixed overhead sprinklers, although drip irrigation and spray stakes are also popular. The results of the water survey indicate a low adoption of bottom watering in both the production and retail sector. For the retail sector 26% of the total irrigation area was not allocated as having any type of irrigation system in place – it could be assumed that these areas are exclusively hand watered.

Water application varies considerably for nursery production, depending on the crop type, crop mix, crop maturity and the irrigation system in place. Most nursery production involves growing a range of species at variety of growing stages/maturity and therefore, achieving optimum uniformity is difficult.

While drip systems and bottom watering are generally more water efficient than fixed overhead irrigation, these are not suitable for all production types. Small areas, constant and irregular turnover of plants, and a large number of plantings make nursery production unique in comparison to other horticulture. Top watering also provides other benefits such as cooling, washing and, in some cases, frost control.

Hand watering is still popular in many nurseries and continues to be used by 55% of production and 94% of retail businesses. While this is associated with significant labour costs, hand watering is not being used exclusively in many situations, but

rather, to supplement other watering/irrigation systems.

While potentially less efficient, it is expected that some level of hand watering will continue due to a number of other perceived benefits (for example, encouraging active management, monitoring plant health and being a simple option for small production units). The challenge for the industry is to develop best practice guidelines for efficient hand watering and encourage the up take of recycling systems to capture any additional water not taken up by plants, making hand watering more efficient.



The challenge for the industry is to develop best practice guidelines for efficient hand watering.

Irrigation management and operations

A number of indicators help to reflect the level of management and emphasis that is placed on irrigation and water management.

Some of these outcomes suggest areas where gaps appear to exist and improvements could be made. The results highlight that only a small proportion of businesses have a documented water management plan despite incentives offered in states such as NSW.

Irrigation management and operations	Production	Retail
Respondents that knew the approximate application rate	38%	11%
Respondents that knew the operating pressure of the system	64%	20%
Respondents that have automatic irrigation controllers	83%	62%
Businesses that have a documented water management plan	26%	11%
Respondents that use fertigation systems	36%	10%
Businesses that measure and record rainfall	46%	35%

When asked about their plans for future investment in water/irrigation infrastructure 43% of production and 37% of retail businesses indicated that were looking at new or improved irrigation systems.

Impact of water restrictions on the nursery industry

Around 68% of production nurseries and 79% of retail nurseries surveyed in the project reported having been affected by water restrictions. The main response has been a reduction in turnover. Around one-third of businesses have also had to reduce staff numbers.

	Production	Retail
% Businesses with a reduction in turnover	53%	57%
% of businesses who have reduced staff numbers	31%	32%

The results indicate that the impact of water restrictions is being experienced widely at the individual business level. The survey also recorded a significant impact on employment in the industry.

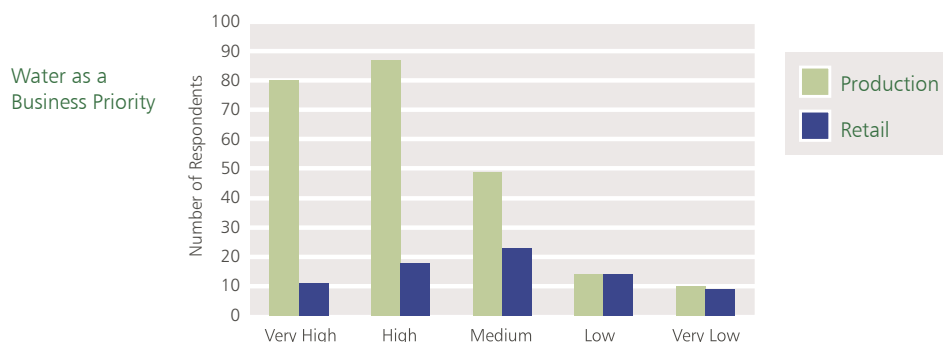
Based on industry figures (NGIA, Industry Size and Structure Report, 2004) these impacts put at risk an industry worth \$5.5 billion a year and providing around 45,000 full time equivalent jobs.



Around one-third of businesses have had to reduce staff numbers in response to the impact of water restrictions.

Industry commitment to water management

The water use survey identified among respondents a strong commitment to water management and improving water use efficiency. Most nurseries view water management as a medium to high priority.



A high proportion of nurseries (94% of production and 90% of retail) of nurseries have already used a range of initiatives to improve water use efficiency. These include:

Industry sector	Production	Retail
Introducing recycling systems	33%	11%
Improving irrigation systems	71%	51%
Participating in a Waterwork course	40%	24%

Some of the key recommendations for NGIA to implement include:

- Promoting the benefits of a documented water management plan,
- Continuing to invest in industry programs such as Waterwork and the development of best practice guidelines
- Facilitating the uptake of on-site recycling by both production and retail nurseries, and
- Encouraging ongoing monitoring and recording of water use so that mm usage per annum (L/m²) is standard information known by all businesses.

Most nurseries view water management as a medium to high priority

Acknowledgements

This Nursery Paper was written by Rebecca Dawson, former National Environmental Policy Manager for Nursery & Garden Industry Australia.

For more information

For more information on water use in the nursery and garden industry or the results of the National Water Use Survey contact National Environmental Policy Manager Robert Prince at NGIA on ph: 02 9876 5200 or email: robert.prince@ngia.com.au.