Water management for production nurseries

Water is the horticultural and nursery industries' most precious resource. The efficient and effective management of water use should be top of mind for production nurseries throughout the year, but even more so as we head into the warmest months across the country.

In addition to ensuring that plants are receiving the optimal levels of water to support growth, plant health and nutrient absorption, nursery production managers must also be cognisant of the environmental impact of water use, particularly as much of the country comes off one of the most severe droughts in recent history.

This Nursery Paper provides advice on best practice water management, irrigation methods as well as providing information on the environmental, economic, and social importance of efficient water use.

SUMMARY

- Water management is an important task for a production nursery, particularly as we enter warmer months
- As society becomes more environmentally conscious, there is a greater expectation among agricultural industries to manage the volume of water they use, and the impact of water runoff into ecosystems
- Good water management is also good for the bottom line of production nurseries, reducing input costs and improving quality of stock
- The Nursery Industry Water Management Best Practice Guidelines leverage robust research to provide growers with best practice strategies to improve their water management operations, enhancing productivity and profitability
- The EcoHort guidelines assist production nurseries in being good custodians of water in the ecosystems in which they operate
- Consultation of available resources will assist growers in ensuring their water infrastructure is set up to be efficient and effective during warmer months, and improving their environmental footprint at the same time.

BACKGROUND

The use of water in production nurseries has been a focus for managers and researchers for a long time. Correct water use has clear and demonstratable benefits.

General improvement in crop health including quicker and healthier plant growth, improved crop uniformity, higher production and reduced stock losses and discards, are all typical outcomes from a successful watering program.

Increased temperatures and threats to water supply mean businesses are often required to buy in more water, more frequently. With the price of water on the rise, this critical input should be monitored closely.

The importance of water management transcends the productivity and profitability of the business itself. With issues like climate change and the most recent drought firmly at the forefront of national conversation, water use in agriculture and horticulture production is under increased public scrutiny.

This means there is greater pressure on nursery managers to be socially and environmentally conscious of their water use. By implementing effective water use minimisation strategies, production nurseries can build their "social license to operate" and position themselves as responsible custodians of the land.

The Nursery Industry Water Management Best Practice Guidelines provide production nurseries with a starting point on building effective water management strategies. Nursery managers are also encouraged to stay up to date with the latest innovation on water use, irrigation technologies and remote monitoring technologies to stay ahead of the curve.

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Hort Innovation Strategic levy investment | NURSERY FUND

NURSERY INDUSTRY WATER MANAGEMENT BEST PRACTICE GUIDELINES

Overview

The Nursery Industry Water Management Best Practice Guidelines have been developed to ensure production nurseries have a resources available to advise on best practice water management. Leveraging robust research, developed over a number of years both locally and abroad, the guidelines are focused on achieving the most favourable productivity and efficiency outcomes for growers contributing to environmental sustainability and reducing production costs.

The guidelines look at six key elements of water use in production nurseries

1. Efficient water use to minimise the business' demand on the water resource.
2. Irrigation management tools to ensure more productive and efficient use of water.
3. Increased reuse of wastewater to minimise the demand of the business on the water resource.
4. Effective management of sediment and litter.
5. Maximising the retention of nutrients to improve efficiency of production and maintain water quality.
6. Environmentally responsible use of plant protection products to produce quality products

Capillary irrigation at Cameron's Nursery – an example of bottom watering.

The following pages provides an overview of the advice provided in the guidelines. Please consult the guidelines for more detailed, technical information.

Efficient water use to minimise the business' demand on the water resource.

Ineffective and uneven irrigation are contributing factors of poor or inconsistent product quality.

Applying the correct amount of water evenly will result in reduced water consumption, less wastewater and more efficient fertiliser uptake, driving further cost saving through reduced inputs.

The best way to ensure correct watering volumes is choosing and implementing an irrigation system that is best suited and designed for your business and the types of stock grown.

Nurseries should consider whether top watering (fixed overhead sprinklers, mobile boom, hand watering or drip irrigation) or bottom watering (ebb and flow, flood floors, sand beds and troughs) work best for their business. In many cases, a mixture of both system types will be most effective.

By choosing the best irrigation method and designing a system that meets the constraints of the business, demand for water can be minimised.

Irrigation management tools to ensure more productive and efficient use of water.

Even with a well-functioning irrigation system, there are many considerations for the day-to-day operation of the nursery that are important for efficient water use.

Conducting a water audit is a great place to start. In order to continue to strive for improvement in water management, you need a base-level upon which to conduct measurement. Details on average water use, water costs, pumping costs, maintenance costs, labour costs and throw-out percentage should all be measured and tracked.

It's also important to ensure that staff are brought along the journey. Each staff member should be accountable for their own water usage and play a part in accurate and reliable record keeping.

Other considerations to ensure that the day-to-day running of your nursery is allowing for maximum water efficiency include: using the most appropriate growing media for your irrigation style, irrigating at the correct times of day and reviewing watering schedules aligned to rainfall and other weather events.

Increased reuse of wastewater to minimise the demand of the business on the water resource.

The use of wastewater is increasing in Australian production nurseries and is an invaluable method for reducing top-line water usage in the nursery. However, care must be taken to ensure recycled water is fit for reuse in the nursery production cycle.

Water to be recycled onto nursery stock should be pre-treated to improve quality and remove plant pathogens. Different methods are available to growers including clarification, filtration and storage.

Water should be tested and managed for nutrients like nitrate, phosphate and potassium as well as pH, salinity, turbidity and presence of other chemicals.

Recycled water can also be used for non-production uses such as use in other cropping areas, or for the artificial creation of wetlands to encourage biodiversity.

Effective management of sediment and litter.

To minimise the effect of runoff water on the environment, an erosion, sediment and litter control plan should be prepared for production nurseries. Site-specific plans can

Overhead irrigation in action.

take topographic limitations, climate patterns, soil types, drainage system, and product being grown into account.

There are some simple steps and procedures production nurseries can follow to reduce the environmental impact of their run off, including keeping land clearance to a minimum and revegetate where possible, installing appropriate drainage, minimising fertiliser and chemical inputs and keeping vehicles to roadways and paths. Physical control devices such as traps and fences are also recommended.

Maximising the retention of nutrients to improve efficiency of production and maintain water quality.

The key to minimising nutrient losses in wastewater is reducing leachate through the adoption of practices which result in more efficient use of water and fertilisers.

Ultimately there are five key ways that this can be done. Improvements can be made in the delivery of fertilisers to pots, on the delivery of water to the pots, in the retention of fertilisers in the pots, in the retention of water in the pots and by recycling nutrient-rich wastewater.

The Nursery Industry Water Management Best Practice Guidelines has detailed advice on how each of these management strategies can be executed to improve the efficiency of the water that is used.

Environmentally responsible use of plant protection products to produce quality products

Production nurseries have the potential to cause local pollution through spray drift and water runoff caused by the use of plant protection chemical on-site.

The best way to reduce the environmental impact of chemicals in wastewater is to use less and by prioritising Integrated Pest Management as an alternative to using excess amounts of chemicals.

In addition to simply using less pesticides, nurseries can also investigate ways of impounding and capturing runoff for recycling and reuse, as mentioned above.

Getting more information

The content included in this nursery paper is designed as an overview only. Production nurseries interested in detailed, rigorous advice on how to achieve each of the six outcomes discussed over these pages are sstrongly encouraged to consult the Nursery Industry Water Management Best Practice Guidelines.

The guidelines are also included as part of Nursery Industry Accreditation Scheme (NIASA) manual.

MANAGING WATER FOR THE ENVIRONMENT

With increasing pressure on all agricultural sectors to be responsible environmental custodians, it is more important than ever for production nurseries to consider and consult the EcoHort Guidelines.

EcoHort supports production nurseries in the implementation of good sustainable practices to help position themselves and the broader industry as being committed to sound environmental and natural resource stewards. Water management is a major focus for the EcoHort Guidelines.

As separate from the NIASA manual, the EcoHort Guidelines focus wholly on environmental outcomes.

Wastewater management

There is growing community concern about environmental impact of human activity on waterways including increasing frequency of algal blooms, increasing nutrient loads, pollution and reduced flow rates of our rivers and creeks,

The nursery industry is at risk of contributing negatively to environmental impacts due to nutrients, chemicals, sediment and litter in water discharged from nurseries into stormwater outlets. The close proximity of many nurseries to populated areas and sensitive water catchments sharpens community concern about nursery wastewater.

Responsibility for ensuring healthy waterways and protecting water quality in catchments is shared between the community and all levels of government. The specifics vary from state to state, but in most cases the local council, community and state water authorities have developed a series of values relating to parameters like aquatic ecosystems, visual amenity, chemical levels and irrigation water supply aligned to the waterways in the state.

Under EcoHort, the objective for wastewater management is to maintain these environmental values of local and downstream waterways and aquatic habitats as developed by the community.

Therefore, nurseries that do not collect all wastewater have an obligation (which varies depending on State legislation) to protect waterways, by ensuring they are not contaminated with nutrients and chemicals.

This can be done through physical barriers, IPM strategies and the regular testing of runoff for dangerous levels of chemicals, pH and nutrients.

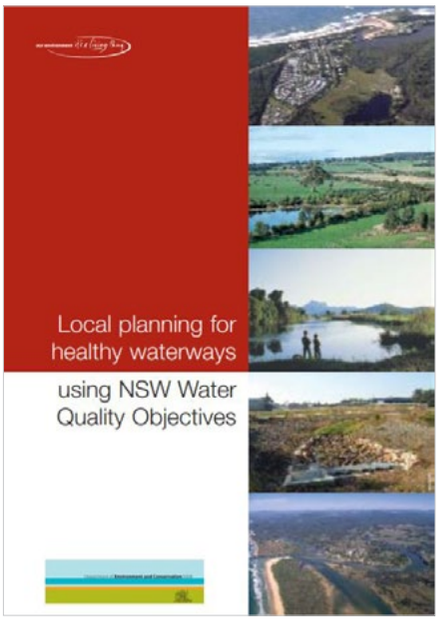
Growers should consult local councils and state water authorities on more specific information on waterway objectives and guidelines.

Water use efficiency

Australia is a dry continent and water is one of our most precious resources. Excess water use depletes surface and underground supplies and makes our rivers and streams vulnerable to degradation. Water efficiency is a major focus within the EcoHort guidelines.

In addition to collecting wastewater and runoff, nurseries can minimise their use of water by prioritising bottom-water systems which are typically much more efficient than top-watering systems.

However, if using top-watering systems, drip irrigation is likely to be the most efficient with less over-watering. Mobile boom systems are also fairly efficient. Other top watering systems like hand watering and fixed overhead sprinklers can be efficient with the right management practices in place.



New South Wales Water Quality objectives.

LINKS TO RESOURCES

Growers are strongly urged to consult the available resources on best practice water management practices.

Nursery Industry Water Management Best Practice Guidelines:
https://www.greenlifeindustry.com.au/Section?Action=View&Section_id=556

EcoHort guidelines: ***https://www.greenlifeindustry.com.au/Category?Action=View&Category_id=126***

More detailed information on irrigation techniques is available in this past nursery paper:
https://www.greenlifeindustry.com.au/Attachment?Action=Download&Attachment_id=2148

PAST EDITIONS OF NURSERY PAPERS ARE AVAILABLE ONLINE on the Greenlife Industry Australia website:
https://www.greenlifeindustry.com.au/Section?Action=View&Section_id=46