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How efficient is your business water management?

In 1999, a national survey of nurseries that had attended a WaterWork workshop in any year since 1995 was conducted. The survey revealed that none of the participating nurseries knew or were willing to supply details on average water use, water costs, pumping costs, maintenance costs or hand watering labour costs relating to their business.

As an industry, our continued access to water is dependent upon the industry's ability to demonstrate it is a responsible and efficient water user capable of meeting changing public expectations. With water users increasingly being held accountable for their management of this diminishing resource, knowing what is involved in a water audit is also becoming an increasingly important issue for businesses.

This *Nursery Paper* will introduce some of the topics a detailed water audit may include.

A detailed water audit should include a full evaluation of your current irrigation system and irrigation management practices.

Water sources

- Water quantity – detail the availability of water from each source, noting limitations, costs, reliability of backup supplies, etcetera.
- Storages – demonstrate how the sizing of the storages relates to the irrigation demand.
- Bores – what is the sustainable long term pumping rate? What is the seasonal variability of the standing water level, noting depth, aquifers casing size, screens, etcetera?
- Drainage water – is it collected or disposed? What are the limiting factors in recycling or reusing this water?

Water quality

- Determine the quality of your irrigation and drainage water sources.
- Have irrigation water samples tested in a laboratory for pH, Electrical Conductivity (EC), Alkalinity, Chloride, Hardness, Nitrates, CaC03 saturated index, Sodium Absorption Ration (SAR), Calcium, Magnesium, Sodium, Potassium, Aluminium, Arsenic, Boron, Copper, Iron, Manganese, Molybdenum, Sulphur and Zinc and any other tests, such as turbidity for Ultra Violet disinfestation.
- Have these tests analysed for the suitability of this water to grow your range of plants, irrigation equipment clogging hazard and disinfestation limitations.

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In this month's *Nursery Paper*, creator of the WaterWork training course and renowned industry 'water guru' Chris Rolfe examines some of the topics a detailed water audit should assess. This auditing process will highlight the limitations and opportunities for optimising efficient water utilisation in your business.

• Your Levy at Work •

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Production requirements

Note any limiting factors from your nursery's irrigation that could affect optimum production. These could include:

- Irrigation operating times – match these to your production schedules
- Irrigation times – minimise wind effects on sprinklers
- Plant disease susceptibility with excessive wet foliage
- Staff working schedules (i.e. dispatch and spraying)
- Off peak power or water periods
- Excessive use of water
- Excessive leaching of nutrients
- Uneven plant growth
- Slow plant growth
- Leaf drop, giving a less attractive product
- Poor inter-node spacing and plant shape
- Excessive drainage
- Elevated or contaminated watertable.

Have you completed the National Water Survey yet?

A nation-wide survey is being conducted to collect data from retail and production nurseries.

The industry is coming under increasing pressure to demonstrate it is a professional, responsible and efficient water user. Your information will help us to demonstrate how serious we are about water stewardship.

This is also an excellent opportunity to audit your own water use. Remember: Knowing what you use is the key to making good water management decisions!

Please complete this important survey online at
www.rmcg.com.au/nursery.htm.

It should only take a few minutes of your time.

Alternatively a paper copy of the survey can be sent directly to you by contacting Clare Kelliher on ph: 03 5441 4821 or via email: clarek@rmcg.com.au.

Irrigation system

A full evaluation of the current irrigation system and irrigation management practices should be undertaken. This may require the services of a qualified irrigation specialist for some of the analysis. You and your staff can do much of the legwork by collecting data on the sprinkler performance and operating pressures of blocks and pumps.

Determine the quality of your irrigation and drainage water sources – is this water suitable to grow your range of plants?

Pumps

- Details of each pump should be taken, noting the operating pressure at each irrigation station or block. Your local irrigation equipment supplier should be able to provide you with a pump curve for each pump. The irrigation specialist will advise on the suitability of each pump for the range of duties required and can measure/ calculate the flow to each station.
- Shut off pressures should be recorded on all rotodynamic pumps and compared to pump curves to check impeller wear.
- Suction losses should be measured and calculated to check the efficiency of the pumping system.
- Detail the maintenance schedule for your pumping units.

Filters

- Note the type and size of filter units. An irrigation specialist can comment on the type and capacity of the unit and its suitability for your requirements.
- Record the backflushing frequency and any maintenance you carry out on the unit.

Sprinkler/dripper performances

- With a series of 'catch cans', which

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are available from the Irrigation Association of Australia (see www.irrigation.org.au/catchcans.htm), measure and calculate the mean application rate (MAR), coefficient of uniformity (CU%) and scheduling coefficient (SC) for each irrigation block.. Note the operating pressure, types of sprinklers or drippers and spacing using the WaterWork Calculator and procedures outlined in the National WaterWork training course.

- Draw up your current irrigation schedule for each block (including the block area) and input your daily irrigation timings with whatever seasonal variations you normally adopt.
- Record the mechanism and process you use to decide how long to water each block.
- Outline your maintenance schedule and how you monitor the system performance, for example, pressure and output.

System hydraulics

- An irrigation specialist can determine the hydraulics of your system and comment on the adequacy of the pumps, piping and valves as well as suggest any changes required to optimise performance.
- Do you flush and disinfect your pipelines? How do you do this and how often?

Best practice performance for irrigation systems

The new 'Water Management' section of the *Nursery Industry Accreditation Scheme Australia (NIASA) Best Management Practice Guidelines* identifies best practice performance for irrigation systems as:

MAR – less than 25mm/hr

SC – less than 1.5

CU% – greater than 85%.

With water users increasingly being held accountable for their management of this diminishing resource, it is important that businesses know what is involved in a water audit.

Drainage/recycling and management

An evaluation of the current drainage and recycling system and current drainage management practices is every bit as important as the irrigation system.

Existing drainage system

- Describe in general terms the drainage system, detailing the types of drains used. Comment on their adequacy in heavy rainfall.
- Show how you manage drainage to minimise downstream pollution. Detail any sections of the current system which need attention, such as erosion and ponded water.
- Does your drainage system match the slope, soils and rainfall intensity as detailed in the national WaterWork training course?
- Does the system meet all necessary state and local regulations?
- What are your recycling and water re-use options? How are they managed?

Drainage storage

Show how you manage your drainage storages to optimise water retention and minimise return of any pollutants in the water to surface and groundwater systems.

Demonstrate storages are located on suitable sites to minimise losses through seepage.

So what do you do with all this information?

This auditing process will highlight the limitations and opportunities for optimising efficient water utilisation within your nursery. The changes will fall into two categories:

1. Management, and
2. Technological.

When you have assessed how much water you apply to each irrigation block every day and match this to the actual water requirements of these blocks, you may need to reorganise your irrigation schedule. Maintenance of the irrigation equipment and drainage system may also need to be upgraded.

Technological changes

If your irrigation and/or drainage system needs significant upgrading, write a list of the requirements for modification or replacement. This list can serve as a brief to your designer.

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Draw up a plan of action

Prepare a timetable for implementing the development/upgrade with a summary of costs and returns anticipated.

- Describe any new scheduling system you may now prefer to use.
- Outline how you will monitor the irrigation system for performance, for example noting pressure and output.
- Outline how you will manage drainage to maximise re-use and minimise downstream pollution.
- Outline how you will manage drainage storages to optimise water retention and minimise the return of pollutants to surface and groundwater systems.
- Give each change a priority in terms of water use efficiency benefit and cost or regulatory requirements and briefly explain why you have assigned each item its particular priority.

Once these changes have been fully costed, this information can form the basis of a business plan for your friendly financial institution to finance the upgrade.

Bottom line

This process demonstrates to catchment authorities or environmental regulators the responsible approach your business has taken to improve water utilisation and minimise the impact your business will have on the local environment.

It will also reduce downtimes, better meet the water requirements of your plants and improve your productivity and profitability.

Learn more about the efficiency of your irrigation system by collecting data on the sprinkler performance and operating pressures of blocks and pumps.

The new and improved National WaterWork training course is just around the corner!

As part of a general review of all industry workshops, the very popular WaterWork training course is being revamped. While the guiding principles of water management in production nurseries have been preserved, the course has been expanded to incorporate the latest technology and standards. It also includes several new modules.

The WaterWork review is being undertaken by Chris Rolfe, original creator of the WaterWork training course and author of this *Nursery Paper*, and Bill Yiasoumi of the NSW Department of Primary Industries.

The new and improved WaterWork training course is being trialled in New South Wales this month and will soon be available nation-wide. If you are interested in updating your knowledge and attending the new WaterWork training course, contact your State or Territory Nursery & Garden Industry Association.

Acknowledgements

Chris Rolfe needs little introduction to the nursery and garden industry. Chris is the major author of the book *Managing Water in Plant Nurseries*, now in its second edition, and for many years wrote a regular column in the *Australian Nursery Manager.* Specialising in nursery water management issues, Chris' contributions include developing and running specially targeted one-day workshops for both production and retail nurseries as well as over 70 WaterWork workshops throughout Australia.

This *Nursery Paper* was compiled and edited by Inga Ting, NGIA Publications and Web Coordinator.

References

Nursery Industry Water Management Best Practice Guidelines (updated 2005)
A practical guide that nursery operators and the relevant authorities can use in partnerships to achieve the five goals of sustainable water use. Available to download from the NGI website at http://www.ngia.com.au/publication_resources/overview.asp#wm.

Managing Water in Plant Nurseries (2nd edition)
A guide to irrigation, drainage and water recycling in containerised plant nurseries. Available to purchase from Nursery and Garden Industry Australia (NGIA). Visit http://www.ngia.com.au/publication_resources/available_to_purchase.asp for more details.

Nursery Industry Accreditation Scheme Australia (NIASA) Best Management Practice Guidelines – 3rd Edition (updated 2005)
Recently republished, the reviewed NIASA guidelines incorporate new information on water management and inground production with the updated version of the Water Management Best Practice Guidelines. Available to purchase from NGIA. Visit http://www.ngia.com.au/publication_resources/available_to_purchase.asp for more details.

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