RURAL WATER USE EFFICIENCY
IRRIGATION FUTURES
Improving irrigation management for a profitable and sustainable future

Queensland Government

Supported by the Qld Government
Department of Natural Resources and Mines

The Pipeline

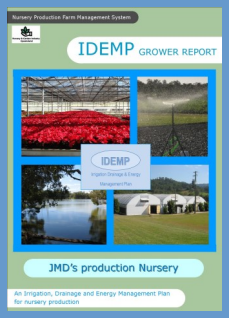
An electronic update on Nursery Production RWUE-IF project activities

Volume 3 Issue 6 Newsletter Date 22.12.2016

Nursery Production Rural Water Use Efficiency—Irrigation Futures (NGIQ RWUE-IF)

Irrigation, Drainage & Energy Management Plans (IDEMP) describe the infrastructure and management practices in operation at a production nursery and outline plans, designs, suggestions and opportunities for on-farm system and equipment improvements and upgrades.

IDEMPs support growers in nursery production to address both economic and environmental issues relating to water access, recycling, storage and use to ensure the business remains profitable and sustainable into the future.



IDEMP
Irrigation Drainage & Energy Management Plan

Nursery & Garden Industry Queensland

IN THIS PIPELINE

Reviewing Water Quality and Availability

Conducting an Irrigation System Audit

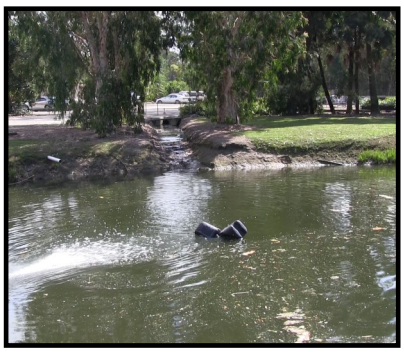
Video

See the latest video on calibrating pH and EC meters at — https://youtu.be/DYjFVODA2mE

Reviewing Water Quality and Availability

Recent visits to nurseries participating in the nursery production Rural Water Use Efficiency – Irrigation Futures, RWUE-IF, initiative has shown positive business growth across the sector with investments in on-site upgrades and expansions to meet the current product demand. Water availability and quality has been a topic for discussion from the south-east corner to the top of Queensland.

Water quality and quantity are of vital importance to nursery production. The decision on a suitable location for a production nursery depends on many considerations, but topmost must be the sustainable supply of good quality water.



Nursery water use average figures of 22.5 Megalitres per hectare of production, provide a basic guide around which to ensure adequate water resources are available and to design irrigation systems. Operating an irrigation system to industry Best Management Practice, BMP, along with catching and recycling wastewater and rainwater, can reduce the quantity of additional water required to be brought into the system. It should also be noted that production in full sun in north Queensland may require greater volumes of water application.

It is a practical exercise for existing production nurseries to review the issue of sustainable water supply at various stages of nursery development or expansion to ensure water resources are still available at the quality and quantity around which the original design and decisions were prepared.

Many factors can impact on the available water quality and quantity, for example;

- Bores can deliver less output over time due to climatic influences, competition from other bores, clogging of the intake screen or the aquifer. These changes to available volumes and water levels in the aquifer can also lead to changes in water quality.
- Dams can silt up over time without silt and sediment traps to remove these particles, thereby reducing the storage capacity. Dam seepage and evaporation can reduce the available water volumes. Water quality is directly affected by lower levels in dam storages when pump intakes remove water from the poorer quality areas of the dam. Water quality is directly affected by increased silt loads often containing organic material and nutrients.
- Drains can become eroded, adding to sediment levels and diverting wastewater away from storage facilities. Poorly maintained drains, including those without reed plantings and sediment and silt traps, can affect water quality.

IDEMP Video and Technical Information

For an introduction to IDEMPs go to the following link to see a video explaining more— http://youtu.be/1YQXpO6IBYQ . For technical information visit the NGIQ Technical Information Library at https://www.ngiq.asn.au/resources/technical-information/

- Reticulated town supply is often considered an expensive, but a safe and reliable supply of irrigation water. However town supply can often be restricted during times of drought. Town water quality in some regional areas can also vary greatly throughout the year.

- Water licensing from managed schemes can be reduced in times of drought, and also at times when an individual catchment comes under review. It is vital to be aware of all the details and issues contained in a water license. The quality of water in many managed schemes, particularly those from channel schemes can vary greatly throughout the season.

It is important to monitor and record nursery water quality and use regularly. Water quality can have an impact on water disinfestation systems or directly on plant growth. Water quantity monitoring can identify excessive use that may originate form a leak or broken pipe. Historic records may be invaluable in discussing and negotiating future water entitlements with regulatory authorities.

Conducting an Irrigation System Audit

A survey of production nurseries that participated in WaterWork workshops found that information on average water use, water cost, pumping cost, maintenance cost, and hand watering labour cost was not known. A similar lack of data has also been found during the course of the RWUE-IF project. The benefit of a system audit for production nurseries is that it identifies maintenance items that will reduce system downtime, and will help to improve productivity and profitability. Conducting a system analysis demonstrates to regulatory authorities that a responsible approach is being taken to water management, and impacts to the environment are being minimised. As an industry, it is imperative that information gained from irrigation system audits is readily available, so that nurseries have continued access to water.

A full evaluation of the current irrigation system and irrigation management may require a qualified irrigation specialist, but much of the data on system performance can be collected by staff e.g. information on sprinkler performance.

When conducting an irrigation system audit, water supply is the first area to be investigated. Information on total availability, quality and quantity limitations, costs and backup supplies needs to be recorded. If bores are used as a water source, information on the sustainable long term pumping rate, seasonal variability in standing water level, depth of aquifers, casing size and screens used is required to determine the available water and pumping efficiency. The amount of drainage water and what collection and recycling options are available, along with the limiting factors for recycling or reusing water demonstrates the feasibility of water recycling. Water quality needs to be determined by a full laboratory analysis and, in addition to the full nutrient analysis, tests such as turbidity need to be done if ultra-violet disinfestation is being used. Full nutrient tests will determine if there is a clogging hazard, and what disinfestation limitations are imposed by water quality.

Information is then gathered on irrigation scheduling covering areas such as how scheduling is managed to minimise wind effects, reduce excessively wet foliage, minimise interference with staff working schedules, and to take advantage of off-peak power or water periods. A benefit of reviewing this information is that it can help to reduce excessive water use and nutrient leaching, which will improve uneven and/or slow plant growth, leaf drop, poor internode spacing and plant shape. This also provides information on how to reduce excessive drainage and minimise the impact on elevating and/or contaminating water tables. A record should be made of the current irrigation schedule for each block, the process used to determine irrigation run times, and any seasonal variations in scheduling.

Details of pumps, particularly pump curves, can be obtained from an irrigation specialist and the performance of the pump compared to the duties required. Recording shut off pressures and comparing these to pump curves indicates the amount of impellor wear and, from this, in conjunction with measuring suction losses, the efficiency of the pumping system can be calculated. An assessment of system hydraulics can then be made to enable comments to be made on the adequacy of pumps, pipes and valves, and changes that need to be made to optimise performance. Finally, a maintenance schedule for the pumping units can be developed.

Other areas that are included in a system audit are the type and size of filter units and suitability for the application, along with records of back-flushing frequency and maintenance done on the unit. Catch can tests can be done to determine Mean Application Rate (MAR), Coefficient of Uniformity (CU), and Scheduling Coefficient (SC) and a record of operating pressures, types of sprinklers and spacing made. An outline of a system maintenance schedule and how the system is monitored can then be done e.g. pressure and output monitoring.

Finally, the drainage system is described detailing the types of drains used, and how well they cope with water in heavy rainfall, and demonstrate how drainage is managed to minimise downstream pollution. Information on how well the drainage system matches the slope, soils and rainfall intensity and if the system meets all regulations should also be recorded. In this assessment, it should be shown how the storage of water optimises water retention and minimises pollution in surface and groundwater systems, and that losses through seepage are minimised.

Auditing highlights the limitations and opportunities that are available for optimising water use efficiency through management and technological improvements. At the end of the process a prioritised action plan can be drawn up, and this then allows improvements to be costed and planned for.

For further information on conducting an irrigation system audit refer to The Nursery Papers May 2006 Issue no. 4.

In the Pipeline for January/February 2017

- Burnett/ Wide Bay, Sunshine Coast, Brisbane, Gold Coast and Lockyer Valley - IDEMP development.