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

Queensland Government
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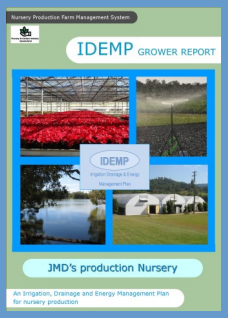
Department of Natural Resources and Mines

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

The Pipeline

An electronic update on Nursery Production RWUE-IF project activities

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

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Evapotranspiration

DATE CLAIMERS
Spring Green Expo. 2-3 August 2016.
Gold Coast Convention Centre

Irrigation Australia Conference Report

The Irrigation Australia International Conference and Exhibition is the major event for irrigators and the irrigation industry in Australia. The conference was held in May this year at the Melbourne Convention Centre, with over one hundred and forty exhibitors, and one hundred speakers. Project officers Steve Hart and Lex McMullin attended the Irrigation Australia Conference along with a record number of delegates. The conference speaker program provided information, insights and techniques on a broad and diverse range of irrigation subjects from planning, design, supply and distribution through to control, automation, efficiency and monitoring. The exhibition provided a great opportunity to view the latest innovations, technologies and products available within the irrigation industry.

A number of recent enquires to project officers, Steve Hart and Lex McMullin, from growers engaged in the RWUE-IF initiative, were focused on monitoring equipment, including access to on-farm weather data that could be utilised in making irrigation scheduling decisions. On display at the irrigation conference were a range of monitoring platforms that have the capacity to integrate various sensors capable of delivering just such information to the grower.

'Observant' was typical of the monitoring platforms available. The 'Observant C3' is a flexible, solar powered monitoring platform that can be connected to a 'Davis Weather Station', to provide a full range of weather data to the grower; rainfall, temperature, humidity, air pressure, wind speed and direction, solar radiation, as well as evapotranspiration calculations (ET). The system allows the grower to monitor current weather data, log and graph historical data, and access the information on a smart phone or computer, anywhere at anytime. Like most available platforms, a range of other sensors can be connected to provide additional information, eg. tank & bore monitoring, moisture probes, camera, etc.

Weather data can be extremely useful for growers in managing their irrigation. ET data provides an indication of water lost from the crop in the previous twenty-four hour period, allowing changes to the daily irrigation scheduling. Information on wind speed and direction can alert growers to the possibility of any exposed production pads requiring extra attention. Rainfall data is useful in decisions to temporarily suspend irrigation, and logging of historical data provides useful information on local weather trends. Access to the information on a smart phone allows for real time, remote management decisions.

A weather station can assist growers to better understand just what is going on, and to make smarter, more informed irrigation decisions.

IDEMP Video and Technical Information
For an introduction to IDEMPs go to the following link to see a video explaining more—http://www.ngiq.asn.au/technical-information/?did=252. For technical information visit the NGIQ Technical Information Library at www.ngiq.asn.au/technical-information or click on the centre icon on the home page.

Evapotranspiration

The term evapotranspiration is simply the sum of evaporation and transpiration. It is the water lost to the atmosphere from the ground surface by evaporation and from the plant by transpiration.

Evaporation from the soil/growing media is the process of converting water into water vapour and moving it away from that surface. During the evaporation process, water vapour is lost from the soil/growing media, and the surrounding air becomes saturated, with the process potentially slowing down unless the wet air is transferred to the atmosphere away from the evaporating surface by wind forces and the process can continue. The evaporation process is dependent on a number of climatic parameters (solar radiation, air temperature, air humidity and wind speed), the amount of shading (from the crop or a structure) and the available moisture levels in the soil/ growing media.

Transpiration is essentially the evaporation of water from a plant, mainly from the leaves. Plant roots draw water up into the plant where this water is transpired into the atmosphere. Almost all water taken up by a plant is transpired with only a small amount being used within the plant. The rate of transpiration changes in relation to weather conditions (temperature, humidity, sunlight hours, sunlight intensity, wind and precipitation) and ground conditions (soil/growing media type and moisture levels). Transpiration rates also vary from plant to plant with those from arid regions transpiring far less than those from rainforest areas.

Transpiration increases:

- as the temperature rises and the plant stomata open and release water vapour to the atmosphere.
- as the relative humidity in the air around a plant decreases.
- with greater movement of air around the plant.
- with greater soil/growing media moisture levels.

The water loss balance between evaporation and transpiration changes over time. At the time of planting a small cutting or seedling the evapotranspiration will come almost completely from the evaporation of water from the soil/growing media. At maturity with a full canopy the evapotranspiration will derive mainly from transpiration of the plant eg. as a crop develops and the canopy increases, the amount of solar radiation reaching the soil/growing media surface reduces, the canopy buffers the wind, which in turn increases the relative humidity and therefore reduces evaporation. With the developing canopy the plant surface area becomes greater with a corresponding increase in plant transpiration.

Evapotranspiration (ET) is commonly computed from weather data using the 'Penman-Monteith' equation (the agreed standard method) using well watered and well maintained turf grass as the reference crop. This is sometimes known as the reference evapotranspiration (ETo). Particular crop or plant coefficients can be used in this calculation to provide more specific evapotranspiration (ET) information. Disappointingly, the nursery industry does not have a range of crop/plant factors or coefficients at present that could be included in the calculation.

The evapotranspiration (ET) data is expressed in mm and can be a useful aid in determining the irrigation scheduling requirements for nursery crops or nursery blocks/zones of plants. The quantity of water that is needed to replace the evapotranspiration (ET) loss is defined as the crop water requirement. Traditional irrigation practices involve the scheduling of irrigation based on a seasonal time program but irrigation can be scheduled incorporating the evapotranspiration (ET) data from the previous 24 hours providing a more efficient application of irrigation. This information can be used to either schedule the irrigation directly or used to adjust the irrigation by a percentage of the standard application.

In the Pipeline for July/August 2016

- Burnett/ Wide Bay, Sunshine Coast, Brisbane, Gold Coast and Lockyer Valley - IDEMP development.
- Spring Green Expo. 2-3 August 2016. Gold Coast Convention Centre.