

Soil Moisture Monitoring Demonstration Project

NVIRP, in partnership with DPI, are currently implementing a project to demonstrate the use of Soil Moisture Monitoring (SMM) equipment for scheduling irrigations.

Demonstration sites have been established at 12 locations throughout the Goulburn Murray Irrigation District. This document provides an update on progress.

Achievements for April/May

- The SMM probe at the Katamatite site has been moved to another paddock that will be more intensively irrigated next season. This will ensure the equipment is fully utilised and additional data provided to the grower, building on the knowledge he has gained to date.
- Project evaluation presentations have been provided to NVIRP Modernisation Co-ordinating Committees and Technical Advisory Group (Torrumbarry April 6th, Murray Valley April 7th, Central Goulburn April 12th, Rochester April 12th, Pyramid/Boort May 6th, TAG April 15th).
- Re-sowing of annual pasture at the annual based demonstration sites has been completed with good establishment and representation of the paddock.
- Abstract for the project was accepted at the 2010 Irrigation Australia Limited conference. A poster will be presented at the conference on June 8th -10th 2010.
- Project selected to be one of the Better Services to Farmers (BSTF) Evaluation Stories. Survey completed to produce a series of Longitudinal Performance Stories (Case Studies).
- Presentation to DPI Grains Team on Soil Moisture Monitoring and the benefits the project is demonstrating. Field visit to the site at Kerang.
- Project promoted at the Water Technology Cluster Irrigation Expo at Echuca on 19th and 20th May.
- Reports collected from most of the supply companies that summarises the services provided during the growing season and the results and benefits from using their equipment. A summary of comments from these are listed on the next page.
- Presented a Soil Moisture Monitoring section at the DPI Dairy Team coordinated course — Irrigation and Risk Management at Numurkah. Participants rated the information provided as "highly useful".

- Assisting irrigator enquiries with the scheduling component of the Federal Government's Farm Water Program.
- Some capacitance probe site sensor depths have been modified. At the Kerang site the 1 metre sensor has been shifted up to the 10cm zone. This will be more representative of rooting depth and give a better indication of the effects of small rainfall events. No change in moisture was recorded at the 1 metre depth last season.

Activities planned for the coming months:

- Complete the Annual Project Report.
- Continue to collect on farm paddock records from sites.
- Present the project poster at the IAL conference.
- Plan two regional meetings with irrigators involved in the project to share information learnt through the demonstrations and methods to maximise the benefits of SMM equipment.

Points of interest:

The soil moisture sensors are providing valuable information to irrigators on the soil moisture levels under lucerne pastures in mid to late autumn. Farmers are using this information to make decisions on whether late irrigations are required to continue growing dry matter in the mild conditions.

Irrigator observations

"I just grazed that paddock of lucerne (14th May) and if I didn't irrigate the paddock (on 29th April) that growth would not have been there. I was using the sensor information to inform my decision making relating to the last irrigation for the season. The soil moisture was at the reference point level where I had been irrigating throughout the season. The short term weather predictions were for mild to warm conditions with no rain."

"At the start of spring I hope to look back and say look at the growth compared to what didn't get watered. This moisture will carry through the winter, not only has it provided late autumn feed but it will produce benefits in the spring with early growth."

"After the first irrigation, I could see the value in the data being collected. As more data was received during the season (after irrigation and rainfall) I could analyse the data and schedule irrigations to maximise production."

The end of the irrigation season saw this monthly update become a bi-monthly publication until spring.

Farmer benefits from Soil Moisture Monitoring

What have been the benefits for the irrigators involved in the soil moisture monitoring project and what have they learnt?

Below is a summary of the major benefits as detailed in company annual reports provided to the project team:

- Extracting more moisture out of the root zone extending the irrigation interval.
- Reduced water logging.
- Increased confidence in technology.
- Depicted different water use according to the season, different amounts of moisture depending on growth stage of the plant.
- Improved irrigator understanding of plant water use.
- Demonstrated the effect of rainfall on soil moisture.
- Ease in which soil moisture data can be accessed.
- Being able to visually see full and refill points.
- Taking data observations and ground truthing this to make practical adjustments to irrigation practices.
- Provided more soil profile information than could be physically observed previously, eg shovel.
- Helped determine how often to irrigate and the length of time to irrigate (sub-surface drip site).
- Helped with critical crop stages – when the plants start to use water and the demand of water in the lead up to harvest.
- Allowed more effective staff organisation and better management of field operations ie, in-crop cultivation on dry beds (tomatoes).
- Greater refinement of scheduling as the trust in technology improves over time.
- Able to forward plan irrigation events.
- Evaluating crop water use by checking data on the computer and comparing soil moisture status to the points identified.
- Check live data with forecasted weather conditions to determine if and when irrigation would be scheduled.
- Effectiveness (depth of moisture penetration) of irrigation and rainfall.
- Measured the slow down in crop water use and applied additional water when required to ensure no crop water stress.
- Reduce the chances of water logging by using weather forecasting to either irrigate early or to delay irrigating after determining the effectiveness of rainfall.
- Maintain optimum soil moisture during the critical growing period to facilitate maximum yield and quality.
- Understanding the effects of water logging after an irrigation event.
- Understanding rooting depths.
- Understanding infiltration according to soil type.
- Understanding rainfall effectiveness.
- Recorded history of irrigation management for the crop (pasture). Areas of improvements can be identified by looking back at the historical data.
- Observation of the crop and soil moisture after different irrigation regimes (sub-surface drip) and then calculating the best management practice for the soil type to maximise yield.

All comments were generally focused at maximising yield and not aimed at water savings, however improvements in water use efficiency demonstrates growing more from less water. If the irrigator can maximise the period the crop grows in the optimum moisture range then yields should be higher. Water use efficiency will be high providing the agronomy and inputs match the yield potential driven by applied water. A demonstrated higher WUE will provide an improvement in on farm efficiency to match the off farm irrigation delivery upgrades being implemented by NVIRP.

For more information on the project please contact:
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