

EXTENSION AND ADULT EDUCATION PROCESSES TO PROMOTE ADOPTION OF WATER USE EFFICIENCY IN AVOCADO INDUSTRY

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Introduction

The Rural Water Use Efficiency Initiative (RWUEI) is a partnership program between industry and government to improve the use and management of available water, thereby improving the competitiveness, profitability and environmental sustainability of Queensland's rural industries. The Queensland Government is spending \$41 million over a four-year period to achieve:

- adoption to improve water use efficiency on farms
- reduce water losses from storage on farms
- provide financial incentives to achieve best irrigation management practice and
- to reduce run-off and deep percolation of irrigation water.

Queensland Fruit & Vegetable Growers Limited is running the RWUEI program for the Queensland Horticulture Industry. Since 1999, field trial and demonstration sites were established on commercial avocado properties in Far North Queensland to develop extension and communication strategies to facilitate grower's adoption of best irrigation management practices and become water wise on farm.

Best irrigation management methodology to promote adoption

Two methods are being employed, to identify and benchmark best irrigation management practices. These are, on farm investigations and an industry survey.

Investigation sites were established on growers' properties in November 1999. To monitor soil moisture at these properties, capacitance probes systems namely C- Probe, Buddy and Gopher are being used. Other systems such as EnvoroScan could be used. The selected sites represented the best, as well as a range in expertise, technology and growing conditions that exist within the avocado industry. This variation can then be used to determine the degree of improvement as well as the benefits that could be expected from full adoption of industry best practices. It would also indicate the nature of inputs and skills that growers will need to develop in order to achieve best irrigation practice, in their irrigation management.

In order to establish the relationship between monitoring sites and the irrigation practices that exist within the avocado industry, two

intensive surveys will be carried out, the first one at mid-term period of the program and the second one just before the final conclusion of program.

These trial sites encourage the adoption of best irrigation management practices by:

- initiation of on-ground action that reflects best management objectives
- facilitating the exchange and transfer of new knowledge that has been generated to improve water use efficiency
- reflecting on the on-going feedback and evaluation on the effectiveness of a demonstration site
- increasing the involvement of growers to the processes of benchmarking
- setting processes in place whereby, a grower evaluates his/her own water use efficiency and the performance of others in pursuit of continuous improvement

The industry survey on best irrigation management practice would also promote adoption by:

- face to face communication, which in turn determines the level of understanding a grower has and what training needs has to be put in place to promote adoption of best irrigation management practice
- establishing a comparative water use efficiency of the whole industry
- giving feedback on the effectiveness of the program
- directing changes that may be necessary to build into the running of the program to facilitate change.

The mid-term industry survey is due shortly and will be soon carried out.

Extension and adult learning processes to promote adoption

The RWUEI program as a whole is basically an extension program with emphasis on adoption of “Best Irrigation Management Practice” by 40% or more of horticultural growers by June 2003. This is being achieved by developing sequential and continuous adult learning programs, which are simple enough for all stakeholders / growers to follow through effective participation irrespective of their age or learning ability.

All extension and communication activities of this program have a strong focus on sequential adult learning curve. This learning curve is a phase process, which interconnects one phase to the next.

Phase I. Information and awareness:

The growers were subjected to the exposure of new and innovative technologies, which influenced their decision supporting strategies to schedule irrigation as per to crop water demand and tree phenology. Workshops sessions were conducted to kick-start this information and awareness phase and covered areas such as:

- Project introduction
- Soil moisture monitoring in irrigation management
- Gopher and C Probe in irrigation management
- Dissolved gypsum in irrigation management
- Design, operation & maintenance of under tree sprinkler
- Hortfarm Software for mapping, paddock record, irrigation record keeping and packing shed management
- Horticulture export management

A registration desk that was operated at the point of entry which showed that these workshop sessions attracted a large per cent of the industry, and were a huge success as growers turn up was in big numbers.

Phase II. Information gasping and increasing knowledge:

The workshop sessions at phases I, generated enough interest and understanding among growers on how to improve water use efficiency on farm. The growers now slipped into the phase II, where they showed signs of hunger for more information. They started reading handouts and other information sheets given to them in Phase I. The information started to filter through their minds, which lead to increase in knowledge. This increase in knowledge facilitated each grower to look of opportunities and ways in which they could improve water use efficiency to match crop water demand, in order to either increase yields or to improve fruit quality. Growers were now ready to progress further into Phase III

Phase III. Practical application - Hands-On:

This phase consisted of a series training sessions presented to grower's in-groups on field days. Field days were conducted in a commercial paddock situation at growers properties, generally at sites where on-farm investigations on benchmarking best irrigation management practices were being carried out. It had a total hands-on approach, where each grower was given the opportunity to use different capacitance probe systems to measure soil moisture. They were then able to determine which system they were comfortable with and the processes required to understand the equipment and to use them properly.

The format of the field day activities is outlined below:

Activity 1. Soil Moisture Monitoring devices as tools to schedule irrigation and improve water use efficiency on farm.

- Inspect and operate Gopher, Micro – Gopher, Buddy, C-Probe and EnviroSCAN.
- Installation of access tube using different methods
- Practice on recording soil moisture, judge the level of moisture depletion to turn-on the next irrigation, determine the active root zone depth and plant water use
- Questions on operating the systems, ascertaining which system is best for their situation, how much each of these systems cost and how you could use the “Financial Assistance” that is available under the RWUEI to improve water use efficiency on farm

Activity 2. Viewing of current work in progress

- Network of sites in operation in North Queensland Region
- See and discuss on screen display of work in progress and results to date. Provide your ideas and interact with other growers

There was an excellent representation from growers on the day, accounting to more than 50 growers participating in the activities. Growers appreciated the method of practical application that was coined into these activities and they were able to relate their irrigation practices to these activities. Hence, from here on the growers moved into the next phase.

Phase IV. Acting, responding and bringing change:

This phase was coined in the activity 2 of the field day, which was viewing of current on-farm investigation results from different trial sites. Results were presentations by growers who were involved in the field trials to other growers attending the field day. This provided a platform of opportunities for all growers to interact freely among themselves.

The positive out come of phase IV were:

- Growers presenting research findings to growers
- Growers showing how they used soil moisture monitoring to schedule irrigation and improve water use efficiency
- On-farm trial sites became powerful tool for growers to discuss, proof and exhibit a change in irrigation practice is necessary to improve water use efficiency
- On-farm trial sites showed the functionality of being a demonstration site as a proof of “seeing is believing”

Hence, those growers participating in the on-farm investigations have acted on the information collected from soil moisture equipment and responded to this information by bringing a change in their irrigation practice. These growers have shown that if they

were over watering, then by changing irrigation practice in avocado, water use efficiency can be increased by 40%.

Phase V. Use of financial incentives:

Growers were now ready to utilise financial subsidies that are available to them through the “Financial Incentive Scheme” of the RWUEI program. A large number of growers are using this subsidy to buy soil moisture monitoring equipment.

The “Financial Incentive Scheme” of the RWUEI program is giving the push and motivation for growers to use the subsidy. It is also facilitating adoption and is helping achieve program’s goals, which is to increase and improve water use efficiency on farm through adoption of best irrigation management practices.

Conclusion

The extension and adult learning processes that has been put in place in an informal style, without terming them as training programs and courses seems to work well. This method has definitely worked in attract growers attention on the issue of being water wise on farm. The methodology emphasis on matching crop water demand rather than savings in water also seems to be working. The soil moisture monitoring devices as decision support and irrigation management tool has improved water use efficiency in avocado. The savings in water can be 40% or more, depending upon the level of over watering a grower may do. Use of capacitance systems have enable growers to keep up their watering as per to crop demand, therefore, avoiding under or over watering. This resulted in an increase in water use efficiency in avocados. There was an improvement in yield and quality of fruits. These investigations also resulted in less percolation and downward movement of water beyond the root zone, thereby, attributing to a more profitable and environmental sustainability of the production system, with less leaching of nutrients, pesticides and salts into the water ways, streams and ground water table. By reducing the hours of pumping there was a saving of energy and electricity cost by 40%.

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