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People's Choice presenter on the importance of observation and lifelong learning

Irrigation Australia journal recently spoke with Richard Stirzaker, winner of the People's Choice award for best presentation at Irrigation Australia Conference 2016.

Richard has worked at CSIRO in Canberra for more than 25 years, starting on the physiology of root water uptake from soils but quickly broadening his interests to irrigation, salinity and agroforestry. When he started work into irrigation in the 1980s, researchers only had a neutron probe and tensiometers to help them. Despite there now being plenty of tools available, all claiming to be easy to use, Richard isn't sure we are improving irrigation management as quickly as we need to. This was the subject of his presentation.

Anyone who knows Richard would be aware of his fascination with looking at old problems in new and simpler ways, and with his passion for learning and observing relationships between soil, plants and water. He was involved in developing the FullStop Wetting Front Detector, which gives a visual impression of how deep irrigation water is penetrating into the root zone. The detector captures a soil water sample from which salt and nutrients levels are monitored.

Recently he has been involved in developing a Chameleon soil water sensor that shows whether the soil is wet, moist or dry at three depths using blue, green and red coloured lights. The Chameleon data produces 'colour patterns' that capture the unique story of each crop and which can be viewed on a mobile phone.

IA. How do you feel about winning the "people's choice" award for best presentation?

To be honest, I was not even going to attend the conference. Since 2010 the funding for the type of work I do has pretty much dried up in Australia. Almost all my work over the last six years has been in Africa, working mostly with small-scale farmers. We have developed an on-line Virtual Irrigation Academy https://via.farm/ which focusses on 'bottom-up' learning about water, nutrients and salt. We recognise that every farm is different and that each soil, crop and irrigation combination has its own unique constraints and opportunities. We don't believe that any tool delivers the solution, but we can use simple tools to structure the way we learn and make step-by-step improvements.

I was not sure how the audience would respond to the simplicity of both our tools and approach, but apparently they liked it. Farming is not engineering – there are few turn-key solutions. Our job is to become very good observers of the complex interrelationships between water, soil, plants and weather, and learn to steer the system in the direction we want. Although our work has focussed on small scale farmers, I think the Virtual Irrigation Academy would suit the biggest irrigators too.

Richard Stirzaker, winner of the People's Choice award for best presentation at Irrigation Australia Conference, discusses trends in soil monitoring.

IA. How important do you think some sort of soil moisture intelligence is to efficient irrigation or is there something more important to measure, such as salt?

Obviously it's important for an irrigator to keep track of soil moisture, but a few measurement sites are not enough. Anyone who has done experiments, and can afford to put lots of sensors close together, knows that soil moisture can vary a lot over small distances. It is better to have a reasonable idea of soil moisture spatially across a paddock than a few so-called accurate measurements at one spot i.e. more measurements that are simpler to interpret.

Over the years I've been amazed at how monitoring salt or nutrients can change irrigation management. I worked for a long time with wine grape growers near the mouth of the Murray, and measuring salt was far more important than measuring water. These growers were under-irrigating on purpose, and it was the build-up of salt in the root zone, not the water deficit, that was stressing the crops.

Monitoring soil nitrate can be a revelation. Most of the available soil nitrogen is in the nitrate form, and nitrate moves with the water. Many times I've watched how over-irrigation at the start of the season washes most of the nitrate out of the soil, while the expensive soil water monitoring equipment gives the impression that everything is OK.

IA. One of the key messages in your paper was that use of soil moisture technology by farmers has decreased since around 2009 except for calendar scheduling and "other". Based on your work with irrigators what's the best explanation you can come up with for this?

Every five years or so, all irrigators are surveyed as to how they decide when to irrigate and how much water to apply. From the 1990s to the mid-2000s, the number of farmers measuring soil moisture steadily increased, as we would expect with the development of new equipment. However, the survey shows that adoption of soil moisture monitoring flat-lined to 2008 and has been declining since.

I can only speculate on the reasons for this. Some say that the equipment bought years back has reached the end of its life and irrigators have learned some lessons and do not see the need to re-invest. Others think the end of the government sponsored programs around water management is the cause. There

have been welcome new developments in remotely sensed data which may be filling some gaps, but if the statistics are true, less monitoring of water, salt and nutrients is a worrying trend.

IA. Based on your work over the years with scheduling and tools, what are your reflections about possible trends in the future as far as the manufacturing and service sectors are concerned and irrigators?

Over the last two decades, research and industry have come a long way in improving the measurement, data handling and display of soil water information. There is still a way to go. I am convinced that measuring water alone is not sufficient – we have found that there is just as much or more information buried in the salt and nitrate signals that we monitor.

I also think we need simpler data, with better spatial coverage that can be accessed on your phone and interpreted at a glance. We need to move away from seeing technology as a solution and to viewing irrigation farming as a lifelong journey of learning.

We would love you to look at our Virtual Irrigation Academy and gives us your ideas on how we can get better at turning water into food.

You can go to the Irrigation Academy at https://via.farm/

WHAT DO YOU THINK?

We are interested in your views about the decline in use of soil moisture technology since 2008, as described by Richard.

Have you got an explanation?

IAL is offering a $100 Bunnings voucher to the best answer, as judged by Richard and IAL.

Email your response to Anne Currey anne@naturallyresourceful.com.au by 9 December.