

Role for modelling in cropping decisions

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Bas^Basing crop management decisions on a combination of modelling, soil moisture probes and experience-based 'gut feel' is likely to give the best outcomes, according to Harm van Rees, principal of Cropfacts Pty Ltd and acting CEO of the Birchip Cropping Group.

Experienced farmers may be very successful with only 'gut feel', he told the recent GRDC Update in Adelaide, but appropriately calibrated moisture probes linked with good current rainfall data can provide actual information about soil moisture and a well-validated cropping model can give high-quality insights to support strategic and tactical cropping decisions.

"We use computer models to fly aeroplanes; why can't we use a model to make crop management decisions?" he asked.

The Yield Prophet crop production model, which is based on the Agricultural Production Systems Simulator (APSIM), simulates soil water levels and daily crop water and nitrogen use and provides a probability-based assessment of the likelihood of achieving a target yield.

It can also be used to explore management



ABOVE: HARM VAN REES CHECKING THE DEVELOPMENT OF A HEALTHY WHEAT CROP.



PREPARING TO INSTALL A LINKED SERIES OF MOISTURE PROBES [LEFT] IN A TRIAL SITUATION.

options and interactions between risk factors such as frost, sowing time and moisture.

Dr van Rees sees moisture probes, which show where water is in the soil and where crops are obtaining their moisture, primarily as an education tool, although data from well-calibrated probes over several seasons can be used to calculate the drained upper limit and crop lower limits of soils; benchmarks that are needed to achieve the greatest value from models such as Yield Prophet.

Soil moisture data from a probe can also provide insights to how deep crop roots are in the soil and can be used in calculations of daily crop water use.

To provide the greatest benefit probes need to be accurately calibrated in the soil



THIS MOISTURE PROBE INSTALLATION INCLUDES A RAIN GAUGE AND TELEMTRY THAT TRANSFERS THE MOISTURE DATA DIRECT TO A COMPUTER.

in which they are installed so the moisture content data can be 'read' as millimetres of water, he said. And there should ideally be a rainfall gauge in close proximity to each probe so the soil moisture data can be related to the moisture going into the system.

Soil moisture data from a probe can also provide insights to how deep crop roots are in the soil and can be used in calculations of daily crop water use.

Just as probes need to be calibrated, accurate soil characterisation is critical to achieving good outcomes from crop production models such as Yield Prophet, he said.

Models can produce very accurate and reliable outcomes provided they are well set up with accurate inputs including good soil characterisations, which are critical because so many cropping decisions depend on reactions between conditions in the soil and the crop.

Experienced growers with a very clear idea of the soil characteristics in each of their paddocks can use this understanding to provide the soil-related information needed by the model or to improve modelling outcomes by fine-tuning formal broader-based soil characterisations.

Growers without this level of knowledge about their soils may be able to obtain formal classifications from historic soil surveys.

Many of Australia's cropping soils were characterised in government surveys

several decades ago and the results of those surveys are still valid and still available, he said.

Those soil characterisations and other soil data resources can be accessed through SoilMapp, an iPad 'app' developed by CSIRO to provide direct access to national soil data and information from the Australian Soil Resource Information System (ASRIS) and ApSoil, the database behind APSIM.

Growers could also choose to have their soils formally characterised, but this could be costly.



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