Grains & Cropping

Satellites to track soil moisture

Hunter trials pave way for technology

By PENNY ZELL

TECHNOLOGY that could allow farmers to log onto the computer and check the soil moisture content of their paddocks from satellites is being tested on eight farms around Victoria.

The trial is being done in preparation for the launch of so-called satellites in 2009 and 2010, which will monitor the amount of moisture in the top two metres of soil world-wide to improve weather forecasting internationally.

But the data will not only be used for agronomic applications – it will also be manipulated by leading Australian and international scientists to provide practical, real-time data for farmers, such as soil moisture content to a depth of one metre or so.

By combining this information with data already available (like long-term weather forecasts), farmers may be able to plan their crop rotations and agronomy up to three months ahead of time, says project leader, Dr Jeffrey Walker from the University of Melbourne.

"Knowing the amount of moisture content in the root zone of their paddocks and its distribution across their farm could greatly improve farming operations," Dr Walker says.

Soil moisture measurements could also help farmers dealing with insect and disease management, by improving the timeliness of herbicide and pesticide applications.

Dr Walker is working with a group of 30 Australian and international scientists to develop a method to validate data from aircraft versions of the satellites that will be launched from near the ISRO facility in 2007 and NASA in 2010.

The instrumentation used to measure soil moisture is attached to two light planes which pass over the Upper Hunter Valley properties for up to five hours a day at heights of 150 to 3650 metres (500 to 12,000 feet).

Using passive microwave sensors, the satellite instruments measure the natural emissions from the earth's surface to give a soil moisture reading for the top five centimetres.

This provides "footprints" of the soil moisture every 50 to 100km. Meanwhile, scientists on the ground measure the soil moisture on each property using portable HydraProbes to validate the aircraft measurements.

Each of the properties involved in the trial also have permanent soil moisture monitoring sites from five-centimetres to one metre deep to validate the root-zone soil moisture estimates.

The technological limitations of the satellites, which will be used from 2007, means they will only be able to measure soil moisture in single footprints of 2500 square kilometres.

So by taking higher resolution measurements now from a closer distance to the earth, Dr Walker and his team say they will be able to validate and improve the algorithms they use in combination with other data to convert the data onto a smaller scale.

"We are still collecting an enormous amount of data; where and how that data will be applied is yet to be determined," he said.

"But we hope to develop the technology to produce a high-resolution root zone soil moisture map one to two metres deep.

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NOWING how much moisture is stored in their paddocks would be helpful in estimating vegetative growth rates for their property's grazing fodder, say Merriwa farmers, Martin and Lesley Nixon, who are among the eight farmers participating in the remote soil sensing trial.

By knowing how much feed growth they could expect on his property, "Merriwa Park", Mr Nixon said he would be able to adjust his stocking rates well in advance.

"With cattle, picking the market is crucial to making a profit. This technology will allow us to make an informed decision on whether to keep or sell stock," he said.

The Nixons runs a commercial herd of 350 Angus breeders and their property, in addition to growing about 150 hectares of wheat and canola.

The Nixons, and the other Merriwa farmers involved in the trial, are ideally located for the measuring experiments.

Dr Greg Hancock, of the University of Newcastle, said the district was chosen as a site for the trial largely because it is far enough away from the coast, but close enough to Newcastle, to have a good mixture of cropping and grazing, and it is part of an enclosed catchment.

Mr Nixon is pictured for right with Dr Hancock, Dr Jeffrey Walker, of the University of Melbourne; Cristian Martinez, University of Newcastle, and Dr Patrick Wursterman of the European Space Agency, checking soil moisture on "Merriwa Park" with their HydraProbes.

Data would decide Merriwa stock rates

Making News

Tamworth no-till conference

A CONFERENCE aimed at facilitating the adoption of no-till and conservation farming practices in the north will be held at the Tamworth Agricultural Institute's Sustainable Farming Training Centre on March 29 and 30.

Organised by the NSW Department of Primary Industries, University of New England, Grain Research and Development Corporation and the Australian Centre for International Agricultural Research, the conference will look at the constraints preventing broader adoption of no-till in the northern grains region.

Topics will include the social, economic and legal interactions affecting farm management and technical advances in conservation farming practices.

Registration will cost $250 with an early-bird fee of $220 for registrations received before January 31.

For further details, visit www.agric.nsw.gov.au/reader/cowalspotlight/no-tillage-conference.htm