



# LEADING EDGE

Leading Edge, supported by the Society for Engineering in Agriculture and the Australian Centre for Precision Agriculture, provides a local and worldwide window on engineering and PA research.

## Rainfall radar coming to a farm near you

By Gary Alcorn

Imagine having an automatic rainfall measurement system giving you maps on a 100 metre grid right across an entire farm with measurements logged and plotted every five minutes on-screen back in the home office.

Agricultural engineer Dr Graeme Cox is convinced the rainfall radar (RR) system originally developed by his firm, DHI Water and Environment, for flood management in urban areas has made a successful transition to the agricultural environment.

After two years of assessment and adjustment on David and Clare Mailler's 'Toenda' property in the Goondiwindi district he

is confident the DHI RR can substantially improve decision making about paddock, crop and machinery management.

"Our system is relatively low-cost (about \$100,000) and can 'see' up to 30 km and map rainfall with a grid resolution as detailed as 100 metres," says Graeme.

It is a smaller version of the units used by the Bureau of Meteorology that cost over \$1 million and have ranges of over 250 km. And the DHI RR has some advantages including measuring rainfall closer to the ground and with a higher resolution.

"The strategy is to set one up in the middle of the farm or in the middle of a district where a grower or group of growers want this vital information. You set it running, it

collects data every five minutes, maps rainfall and collates the results on daily maps which the farm manager can check every morning," says Graeme.

### How does DHI RR work?

"All RR works on the same principle. They send out radio waves at the speed of light that hit raindrops and some of the wave is reflected back to the radar antenna. That reading, called the reflectivity, is collected, fed into a computer and processed to produce an estimate of how much rain is falling.

"We have tested and used the technology for many years in urban applications all over the world. But we trialed the system at 'Toenda' to see how it handles the

*Has agricultural engineering got a future?*

Find out at the SEAg 2007  
National Conference

**"Agriculture and Engineering –  
Challenge Today,  
Technology Tomorrow"**

**September 23-26 in Adelaide**

**VENUE: Chifley on South Terrace**

**REGISTRATION COSTS:**

Members \$475

Non Members \$575

Students & Pensioners \$275

Registrations close on the 7th of September

Additional Expert Training available – Improving  
Irrigation System Performance.

This is a full-day course to be held on the back of  
the 2-day conference at a cost of \$300

**For more information, contact Darren Bartels at  
aba94626@bigpond.net.au**

**More conference information available on  
the SEAg website**

[www.ncea.org.au/seag/seag.htm](http://www.ncea.org.au/seag/seag.htm)

*Both members and non-members welcome*

The conference will link with the Paskeville  
Field Days – see [www.yppfielddays.com.au](http://www.yppfielddays.com.au)

**Australian Society for  
Engineering in Agriculture**

## EARLY ADOPTER SEES HUGE POTENTIAL

Goondiwindi district dryland farmers Michael and David Mailler, Toenda are the first rural landholders to evaluate the DHI rainfall radar system on-farm.

About two years ago they approached DHI to install and develop the RR system to service the special needs of an agricultural environment. Currently the Maillers farm 4000 hectares dryland in a 540 mm annual rainfall zone.

As part of the family which developed the internationally adopted Beeline hands-off tractor guidance system, David is always looking for advanced technologies to make decision-making more reliable.

"Rainfall variability is always a problem for dryland farmers. You can get 25 mm at one end of the paddock and none at the other. Just having rain gauges in a couple of corners of the cultivation is not good enough.

"We wanted technology which would accurately map rainfall right across our farms and then be able to relate those values to crop yield maps. Using this data we could then identify our limits to yield based on real inputs," he said.

He saw another reason for wanting accurate rainfall recording and mapping — potentially better management for the irrigation industry.

The DHIRR system could assist both runoff and irrigation management by identifying water behaviour and location, he said.

"This system has got huge potential which is only limited by your imagination. By knowing very accurately where rain falls and how much, we can model runoff and fine-tune our inputs by eliminating variables such as rainfall.

"If you know your paddock is 80 per cent wet then you can calculate your planting threshold and adjust your entire sowing, weed control and fertiliser programs to suit," he said.

higher intensity rainfall and tougher conditions we get here in Australia and we are finding positive results.

“It’s ready to go,” he said.

He claims this system will show growers the precipitation variation across their farm or even individual paddocks. The grower can then ask questions like:

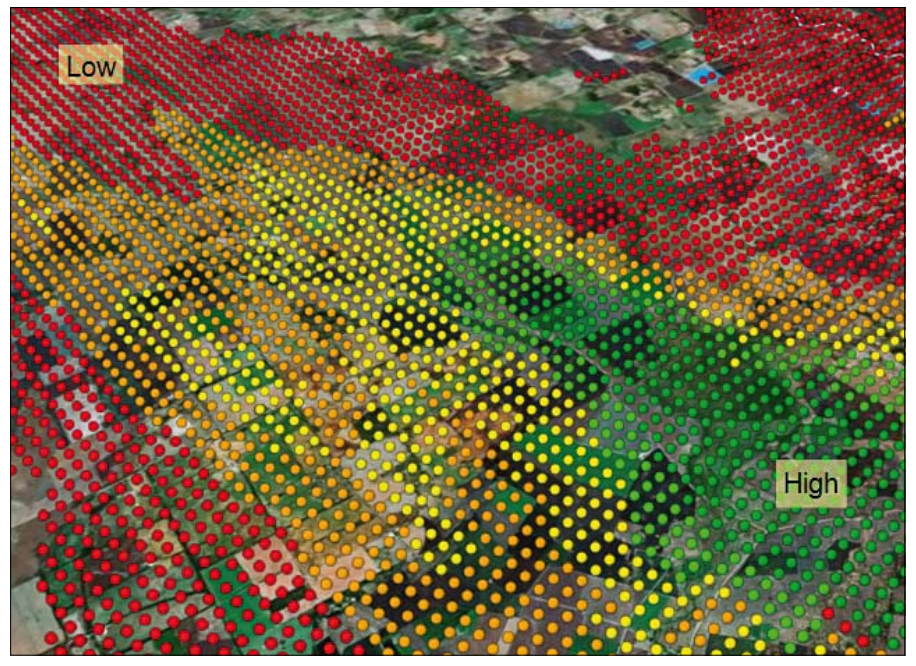
- Which paddock can I get on to cultivate?
- Which paddocks should be planted first? and,
- Should I target my spraying to this corner of the field?

“Our aim is to augment the humble rain gauge at the farm house with a rainfall mapping system that enhances farm management through better decision making.”

Graeme Cox says the current cost and 30 km range of the RR is geared to the needs of the larger farms, or group ownership. But his 30 year vision is for a RR on every farm.

He uses the marine navigational radar analogy. “Initially only the largest ships could afford a nav radar. But over time, the systems have got smaller and cheaper — now most boats worth over \$300,000 have them as standard equipment.”

Graeme sees more exciting developments in the future through integration of RR with other technologies.



Typical output of the rainfall radar overlaid on an aerial photograph (high rainfall are green points and low rainfall are red points).

“We are working on linking our RR technology with soil maps to produce soil moisture maps. We have a research proposal submitted to feed the rainfall data into DHI’s soil moisture-modelling software.”

“Imagine being able to see the variation

in soil moisture levels across your farm on a daily basis. This information will help you target seed and chemical rates to achieve optimum yields and reduce input costs,” he said.

“We are interested in getting some USQ ag engineering students to do research in this area. Hopefully some papers will come from this project and they will be presented at future SEAg conferences.”

DHI is about to launch a website to demonstrate its rainfall radar for farms. Subscribers will be able to log on and view detailed rainfall data for their farms.

For more information contact Graeme at [gjc@dhigroup.com](mailto:gjc@dhigroup.com) or (07) 55640916.



Rainfall radar installation at ‘Toenda’.

### Enjoy a cool holiday this year, and at a great rate

Barcoo is a superbly appointed lodge at Dinner Plain in the heart of Victoria’s high country. This year round playground offers trout fishing, magnificent scenery, great restaurants, peace & quiet and other cool activities.



- 4 bedrooms (all with queen size beds)
- 3 bathrooms • Spa pool
- Sleeps up to 16
- Fully equipped with All mod cons

**GREAT VALUE FOR LARGE OR FAMILY GROUPS**

Further details phone 1800 670 019 or [www.dinnerplain.com](http://www.dinnerplain.com)