Answers to climate change

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In relation to broadacre cropping, there are three key questions about climate change that need answering: what impact it might have on future productivity, what is the role of agriculture in reducing greenhouse gas emissions and what systems adaptations are required to remain sustainable under climate change?

Unsurprisingly, there are not three simple answers. So the GRDC, together with the Australian Government, state governments, universities and other Rural Development Corporations, is supporting projects to help provide the answers. In addition, demonstration, extension and communication activities are being supported to help ensure growers are kept abreast of new developments and practices aimed at helping them manage in a changing environment.

If one thing is certain about climate change it is that carbon dioxide (CO_2) levels are rising. Researchers at Horsham, Victoria, are examining the effects of elevated CO_2 on crop productivity (see page 6). Future temperature and rainfall patterns are less clear, but projections suggest slightly warmer and drier conditions for much of the southern Australian wheatbelt. How farmers adapt to climate change is essentially a question of attitude to business risk (see page 7).

Improved climate forecasts would assist growers greatly in managing business risk in a changing and variable climate. Part of this investment is the collaborative program Managing Climate Variability, which has been helping Australian farmers to manage climate risk 'on the ground' for more than a decade.

Managing Climate Variability invests in research that helps increase forecasting accuracy, builds the predictability of attributes such as soil moisture, and translates forecasts and attributes into decision-support tools for primary industries.

An important element of Managing Climate Variability's research is shifting the basis of Australia's weather forecasting from historical statistical models to dynamic models that forecast based on the current interactions of oceans and the atmosphere, with continuous information feeds from around the world (see pages 10, 11 and 13).

Incorporating improved weather predictions into management decisions is an important part of adapting to climate change. The Bureau of Meteorology's website, especially the Water and the Land section (www.bom.gov.au/watl), provides a valuable and evolving source of climate and weather information for growers.

Predicting what might happen in a season is important, but having varieties that are able to cope with climate change is another vital part of systems adaptation. Varieties that can tolerate extremes of heat or cold, drought or modified pest and disease threats due to increased levels of carbon dioxide are all being explored (see page 8).

While there is a concern that climate change could limit agricultural production, there is an equal concern that increased agricultural production through the use of nitrogen fertiliser is part of the problem. Nitrous oxide, a potent greenhouse gas, is released into the atmosphere when nitrogen fertiliser breaks down. This represents the largest single greenhouse gas emission from grain production. The Nitrous Oxide Research Program is investigating how the use of legumes, different tillage systems, liming and nitrification inhibitors can assist in reducing emissions (see page 4).

Crop production may also be part of the answer in reducing greenhouse gas emissions by sequestering carbon in the soil. A national program is measuring for the first time the capacity of different environments and agricultural practices to sequester carbon in soils (see page 3).

Adapting to climate change and mitigating greenhouse gas emissions in broadacre cropping is complex. Often it is the grower who is in the best position to integrate the wide range of decisions that need to be made to remain profitable into the future. That is why the GRDC is making use of grower 'champions' who can communicate to other growers how they are managing their farms in the face of change (see page 15).

Enjoy and make use of this *Ground Cover* supplement.

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