



NewsLetter No: 1 August 2003

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Forward

by Richard Eckard, Project Leader

Welcome to the first quarterly newsletter of the GCCA project. This newsletter is designed to provide short updates on project activities, highlights and notices of key events. The GCCA project officially started in July 2002, through a combination of funding from the Victorian Ecologically Sustainable Initiative, the Victorian Greenhouse Strategy and the GRDC. Apart from the Climate Change module, the CGGA project now forms the core of the Non-CO2 program of the CRC for Greenhouse Accounting as of the 1st July 2003. This non-CO2 program formalises the partnership between the Victorian Dept Primary Industries, Dept Sustainability and Environment, the University of Melbourne and CSIRO Atmospheric Research. Funding for the GCCA project comes principally from the Victorian Greenhouse Strategy, the Victorian governments Ecologically Sustainable Agricultural Initiative and the GRDC, with a scholarship provided by DRDC. The new non-CO2 program now adds a Federal grant through the CRC Program of the Department of Science Education and Training. The GCCA project has just released its new brochure series "Greenhouse & Climate Change in Agriculture: Winning Solutions for Farmers". For copies of these brochures please contact any member of the GCCA team or access them on-line at www.greenhouse.unimelb.edu.au. Feedback on these brochures has been very positive, as illustrated by the following feedback we received from Ian Porter, Head of the Greenhouse Policy Unit.

"Just a quick note to congratulate you on the excellent set of brochures. They showcase the projects extremely well and are a fine mix of easy-to-digest information and detail on the various research modules. I am impressed by the initiative of the project to make the effort to communicate in the early stages and I believe this will prove to be a valuable investment as the work moves into later stages that require further stakeholder engagement. Great production and well written too."



*Carbon Dioxide Analyser
and sonic anemometer
at DPI Kyabram*



Multi-campus communication team: Inaugural workshop

Kate Nichols

On the 26th June 2003 a workshop was convened between the GCCA

project team leaders and local Communications Officers from participating DPI institutes, CSIRO and the CRC for Greenhouse Accounting. The objective of this workshop was to launch a new Multi-Campus model for managing the communications needs of the project.

Recognizing the complexity of running projects that are not only multi-campus, but also multi-institutional, and with Communications Officers at each location having different skills and different understandings of their role, the multi-campus model proposed a structure where we could bring these skills together and work as a team. This model has significantly increased the communications efficiency of the team and has also resulted in a wider exposure of the efforts from individual sites. Good examples of this new model working include:

The Birchip Field days, where Communications staff from Ellinbank, Horsham and SCL were all involved to maximise the communications opportunity.

The launch of the equipment at Kyabram by the Minister for Agriculture, Bob Cameron - here the communications officers from DPI-ISIA and Ellinbank pooled their skills to prepare the Ministerial and Media briefings, through to the practical site organisation of the event. For more information on this event see the article prepared by Sue Keirnan in this newsletter entitled: "Minister launches the latest hi-tech greenhouse research".

Climate Change

Adam Hood

The current phase of the climate change impacts and adaption sub-project is building useful information about cropping in the Mallee and Wimmera and pome fruits in the Goulburn-Broken. The exercise has produced maps of the Mallee and Wimmera showing the suitability of the landscape and the climate for growing wheat in 2000 and how that is likely to shift through 2020 and 2050. The details of the model for pome fruit are still being developed in conjunction with fruit specialists based in DPI Tatura and Kyabram.

Recent drought in Victoria has seriously affected the Northern regions more than other areas in Southern Victoria. The modelling exercise is showing that the average regional suitabilities are likely to vary with some winners and some losers across Northern Victoria. However, there are a number of unknowns about long term climate change, such as short to medium term variability. It is expected that climate change over a long term will have more intense and more frequent inter-seasonal cycles such as those related to el nino-southern oscillation (ENSO) processes.

Further work will consider the ratio of good years to bad in recent times and related productivity for those years. This will enhance our ability to provide farmers with useful information about climate change and impacts of changes in climate variability.



Map of changes pasture suitability in Victoria



Dr Daniel Rodriguez discusses the Background Study and the Grains Greenhouse

Australia-wide focus on greenhouse gas emissions: A new grains module for GCCA

Daniel Rodriguez, Roger Armstrong, Fiona Barker-Reid

A new grains research module has recently been consolidated and added to the existing suite of research covered by GCCA. Linking researchers from every state in

Accounting Framework with a local producer at the Birchip Field days.

Australia, this module follows on from the GRDC funded project - "Background Study into Greenhouse Gas Emissions from the Grains Industry (DAV 478) and incorporates the on-going GRDC project "Reducing Loss of Nitrous Oxide from Grain-Based Production Systems for Greenhouse and Production Benefits - Testing Assumptions (DAV00007)".

DAV 478 highlighted a lack of greenhouse gas emission measurements for Australian farming systems and the unsuitability of existing overseas measurements to be extrapolated to Australian conditions. The new module- "Managing Greenhouse Gas Emissions from Australian Cropping Systems" – will address this uncertainty about N₂O, and will develop farm systems and agricultural practices to improve production efficiency while minimising greenhouse gas emissions.

Under the new national non-CO₂ program of the CRC for Greenhouse Accounting, this research module of the GCCA project aims to:

- * Conduct nationally-coordinated field experiments in northern, western and southern grain regions to quantify nitrous oxide emissions and provide nitrogen fertiliser emission factors from a range of Australian cropping systems, including a range of tillage and nitrogen fertiliser managements;
- * Develop and validate farming systems models that allow us to widely apply the data from the measurement sites to a range of Australian agroclimatic zones and cropping systems, and
- * Develop Best Management Practices that will reduce greenhouse gas emissions, while improving the efficiency of nitrogen fertiliser use in cropping systems.

New automatic Chambers at DPI Rutherglen:
Greenhouse gas collection chambers have been established on a long-term site at the Department of Primary Industries (DPI), Rutherglen. This site was selected for its history of both "conventional" and "no till" management practices. For the 2003-2004 season, chambers have been installed on plots sown to wheat.

Other sites where N₂O emissions are being monitored include a flood irrigated Maize site at Griffith and a Cotton/Grain rotation site at Narrabri. These sites will be highlighted in a subsequent newsletter.

Getting Out There:

On 10 July 2003, Grains Research team members attended the Birchip Grains Research Expo. A special Greenhouse area was provided, displaying information about projects in progress, as well as general information regarding greenhouse issues. Information sessions were held concurrently with the poster displays, and the morning began with presentations and discussion on "Greenhouse and Farming – Implications for Future Management". Representatives of the Australian Greenhouse Office, the Victorian Government Greenhouse Policy Unit, and DPI spoke on various issues relevant to farmers. The discussion that followed reflected the interest within the community regarding this important issue.

Nitrous oxide emissions from dairy pastures

Kevin Kelly, Rob Baigent, DPI Kyabram

On the 14th August the Minister for Agriculture, Bob Cameron, officially launched the new equipment installation at DPI-Kyabram. This equipment, worth around \$450K, was purchased under the state government's Growing Victoria - Scientific Equipment Acquisition Strategy.

The highly specialised equipment is designed to measure nitrous oxide losses at a number of scales. Firstly, there are small automatic chambers that sample gasses that are emitted from the soil. These chambers feed air samples back to one of the laboratories trailers, where a Fourier Transform Infra-Red Spectrometer continuously analyses the gas for nitrous oxide, carbon dioxide, methane and water vapour content.



Automatic chambers at the Kyabram site

Secondly, there is the Micro-meteorological towers linked to a Tunable Diode laser for measuring real-time nitrous oxide losses from large areas (an entire irrigation bay at a time). This system also includes the Bowen Ratio towers (for measuring evapotranspiration), the carbon dioxide analyser, and Eddy Correlation towers.

The site at Kyabram is one of only a few of its kind in the world, with the capacity to measure the losses of these gasses on a continuous basis.

The objective of this research is to understand the processes governing these losses and develop best management practices that will further improve the efficiency of our production systems, while reducing the environmental impact.



Dairy cow at Ellinbank fitted with methane collar

Methane Research

Bruce Knee, DPI Hamilton & Martin Auld, DPI Ellinbank

The methane team have completed several bench-top studies to help define the optimum procedure for collection and sampling of methane and SF₆ (Sulphur hexafluoride- a tracer gas) samples from the PVC collection canisters that fit around the cows neck. Analytical procedures for SF₆ (by gas chromatography) have been established and the first batch of permeation capsules (that release this tracer gas in the rumen) have been constructed. These capsules were previously sourced from either the CSIRO methane vaccine team in Western Australia or from New Zealand.

In order to test equipment and laboratory techniques a practice field collection was conducted at Hamilton recently. This involved collecting methane samples from twelve dairy heifers on each of five days. As a result of what was learnt from this practice run, modifications will be made to the equipment. For example, the trial was conducted during very wet weather and moisture became a problem in our flow restrictors and particle traps. Consequently we are now testing some 'off the shelf' filters to more effectively eliminate moisture from the collection lines. The laboratory analysis of the samples went extremely well with expected levels of SF₆ and methane successfully measured.

With this practice run behind us we are now confident of starting our first seasonal measurements in September (Hamilton) and November (Ellinbank). The construction of the new Cow Calorimeters has begun at Ellinbank and should be nearing completion by the end of the year.

Minister Launches the Latest Hi-Tech Greenhouse Research

by Sue Keirnan, Communications Officer DPI Ellinbank, has been reprinted from DPI News (25 August 2003)

Most of you have heard of global warming, climate change and greenhouse gas emissions. Changing weather patterns and a greater incidence of extreme climatic events – for example the current heat wave across Europe – will have a profound impact on agriculture in the future.

It is increasingly recognised that climate change could have a significant influence on the long term viability of our food and agriculture sector – so vital to the economic viability of many parts of regional Victoria.

Our agricultural industries are likely to be among the first to be affected by a changing climate – either positively or negatively in the future. This means it could be the deciding factor on whether or not a specific type of farming within a given region can remain viable; or it could mean new opportunities for different types of farming within that region.

Last week, amidst a surreal landscape of mobile laboratories, strange looking towers and metal boxes laid across a dairy paddock, the Minister for Agriculture, Bob Cameron, visited DPI Kyabram to launch the very latest in hi-tech gas measuring devices. Through Growing Victoria's Science, Innovation & Education initiative, \$1.1 million was allocated to the Victorian Greenhouse & Climate Change in Agriculture (GCCA) research program for new greenhouse research equipment – some of that equipment was on display at DPI Kyabram (see picture). The balance of that funding is being used to build 'cow calorimeters' (sealed rooms for measuring methane emissions from cattle) at DPI Ellinbank.

The GCCA program forms part of Victoria's response for reducing greenhouse emissions. It is also a collaborative scientific research and communications partnership between DPI's Research & Development Division, the University of Melbourne, CSIRO Atmospheric Division and the CRC for Greenhouse Accounting. The research is focused on finding best practice management solutions to reduce methane and nitrous oxide emissions from intensive grazing and cropping systems; as well as climate change modelling to assist in the planning of future farming operations for Victoria's agricultural industries.

Through the Victorian Greenhouse Strategy, a \$100 million package of incentives to cut emissions and improve energy efficiencies across Victoria has been implemented. The day at DPI Kyabram was a perfect opportunity to show the Minister, stakeholders and media an 'agricultural example' of the Government's commitment to international efforts for reducing Greenhouse emissions whilst gaining an up-to-the-minute research report from scientists working on the GCCA project.



(L to R): Program Leader, Dr Richard Eckard (Melbourne University/DPI Ellinbank), Ian Galbally (CSIRO Aspendale), Malcolm Campbell (DPI Tatura/Kyabram), Adam Hood (SCL Werribee), Agriculture Minister, Bob Cameron, Sue Keirnan (DPI Ellinbank), and Kevin Kelly (DPI Kyabram).