

Climate change no laughing matter

From monitoring burping sheep to decreasing the amount of laughing gas in the soil, The University of Western Australia (UWA) strongly contributes to the international investigation of climate change.

UWA's Institute of Agriculture (IOA) is the only institution in Australia to receive funding from the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) as part of the Climate Change Research Program for research into all three greenhouse gas areas – methane, nitrous oxide and carbon dioxide.

UWA IOA researchers will share in the national funding scheme launched earlier in 2009 to help adapt agriculture to climate change, in the Australian Government's initiative for primary industries known as Australia's Farming Future.

Over the next four years, \$26.8 million will support 18 projects to investigate ways to decrease greenhouse gas emissions from livestock and research teams investigating soil carbon and nitrous oxide emissions will receive almost \$32 million.

Funding for this highly collaborative program comes from a variety of sources across Australia, including universities, industry groups and state departments.

One of these projects, based at UWA, is looking at how to minimise the methane output from grazing livestock. The methane mitigation from livestock program is coordinated by Meat and Livestock Australia.

An individual sheep burps out about 20 litres of methane a day and cattle up to 280 litres.

Professor Philip Vercoe, Deputy Leader of the Animal Production Systems Program at UWA, says if grazing livestock

could be bred or fed to produce less methane there would be less greenhouse gas in the atmosphere and the efficiency of meat and wool production could be improved.

"The sheep breeding project aims to reveal how much of the methane production in sheep is related to the genetics.

"Developing a simple, quick on-farm method, such as breath testing, will allow us to measure methane from large numbers of sheep in the field in a short time," Philip said.

Nitrogen loss from soils

Limiting the amount of nitrous oxide, commonly known as laughing gas, coming out of soils, is also a concern at UWA.

Associate Professor Louise Barton, UWA School of Earth and Environment, is researching ways to decrease the amount of nitrogen coming off cropping soils in South West WA.

She hopes this will lead to more efficient use of fertilisers: "The advantage of this work for farmers is that we may come up with approaches that will decrease the greenhouse gas footprint of their product, making them more competitive in the future."

The project, funded by the Grains Research and Development Corporation (GRDC) in partnership with DAFF, will also determine if on-farm carbon dioxide emissions from urea can be decreased by substituting urea with grain-legume fixed nitrogen.

Nitrous oxide emissions will be measured on a sub-daily basis from lupin-wheat rotations, using soil chambers connected to a fully automated system.

The equipment, purchased for the project by the Department of Food and

Agriculture WA (DAFWA), enables simultaneous determination of greenhouse gases.

The third UWA research project, also with GRDC funding, investigates sustainable soil management by identifying current and future potential for soil carbon sequestration.

The upper limit of soil carbon storage will be determined using computer models and mapped against measured levels of soil carbon.

Deputy Leader, Integrated Land and Water Management, IOA, UWA, Associate Professor Daniel Murphy, says the project identifies a commitment to better soil management.

"Sustainable management of soil, in particular soil carbon, is essential for the continued viability of the Australian agricultural industry," he said.

The project includes the WA component of the GRDC's commitment to soil carbon research and forms a collaborative activity between UWA, DAFWA and the UWA-based Grower Group Alliance.

IOA Director, Winthrop Professor Kadambot Siddique, is proud of the Institute's contributions to the global issue of greenhouse gas emissions and climate change.

"UWA and the Institute is in the business of knowledge generation and these three projects confirm our role as leaders in the agricultural research field and our commitment to understanding hot topics such as climate change," he said.

The project is part of the \$46.2 million being invested by the Australian Government to take research from the laboratory to the paddock to help farmers to be profitable, sustainable and resilient in a changing climate – for Australia's Farming Future. ■



UWA Research Associate Dr Andrew Wherrett collecting plant samples at DAFWA's Wongan Hills Field Research Station, with a chamber used for measuring *in-situ* nitrous oxide emissions in the foreground.



UWA Research Assistant Debra Donovan installing chambers for measuring *in-situ* nitrous oxide emissions following seeding at DAFWA's Wongan Hills Field Research Station.