

## New way to measure nitrous oxide emissions

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(PhysOrg.com) -- An accurate new way to measure a potent greenhouse gas emitted during agricultural production will help countries to better manage their environmental impact, thanks to Queensland University of Technology (QUT) research.

Professor Richard Conant, a Smart Futures Fellow at QUT's Institute for Future Environments, said the new state-of-the-art <u>statistical approach</u> would greatly improve estimates of global <u>nitrous oxide</u> (N2O) emissions by up to 65 per cent.

"Nitrous oxide contributes substantially to total global <u>greenhouse gas</u> emissions and in some countries it's a big part of total emissions," he said.

"We're providing a tool that has significantly improved the accuracy of measuring N2O.

"Our hope is that this information will enable developing countries that lack detailed measurements to keep better track of N2O emissions."

Professor Conant said agriculture was responsible for about 20 per cent of <u>greenhouse gas emissions</u> globally, mostly from nitrous oxide from fertilisers, and methane generated by livestock.

He said, on average, three-quarters of N2O emissions in 2005 came from fertiliser.



"CO2 still has the biggest effect on <u>climate change</u>," he said.

"Nitrous oxide is more potent but there isn't as much of it."

Professor Conant said the researchers, who analysed the proportion of fertilizer lost as nitrous oxide, used ground-breaking data on N2O emissions from fellow QUT Professor Peter Grace.

The analysis was conducted with PhD student Aaron Berdanier, now at Duke University.

The researchers found that the United States, Europe, East Asia and Japan accounted for nearly 50 per cent of global N2O emissions. Africa and the former USSR contributed 13 per cent of global N2O emissions.

However, Professor Conant said it was the <u>efficient use</u> of nitrogen in agriculture that was most important.

Countries such as the US, Europe and Japan, for example, used nitrogen more efficiently and produced more food per unit of N2O than countries in Africa and the former USSR.

Professor Conant said the research would help developing countries become more efficient in agriculture and increase food security.

"This latter group of countries is not using very much nitrogen on their crops, which is affecting their ability to produce food," he said.

However, Professor Conant said that increasing the use of fertiliser in agriculture to meet growing food and feed demands could accelerate N2O emissions faster than previously thought.

"In agriculture, producers generally have been trying to increase yields



and productivity, but we haven't thought as much about externalities in terms of nitrogen pollution and greenhouse gases," he said.

Professor Conant, who was among scientists awarded the Nobel Prize with former US vice-president Al Gore in 2007, said his research would contribute towards an Intergovernmental Panel on Climate Change (IPCC) report, which will set the standard estimate of global emissions for different sectors.

An IPCC report in 2004 found 36 gigatons of CO2 was emitted into the environment a year, compared to three gigatons of nitrous oxide and 4.5 gigatons of methane.

Professor Conant's research paper, Regionally-differentiated estimates of cropland N2O <u>emissions</u> reduce uncertainty in global calculations, <u>was published</u> in the journal *Global Change Biology*.

Provided by Queensland University of Technology

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