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Citation of Papers

These papers were presented at the sixth Greenhouse Gas and Animal Agriculture Conference (GGAA2016) held at The Pullman Albert Park, Melbourne, Australia (14–18 February 2016). Invited reviews and research articles are published in a joint issue of Volume 56 of *Animal Production Science*.

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GGAA2016
Melbourne Australia

Foreword: GGAA2016 Special Edition

Introduction

Agriculture is already being affected by climate change, with extreme weather events, droughts and increasing climate variability impacting on production and rural livelihoods globally. In addition to the physical impacts, agriculture will also increasingly be affected by policies aiming to reduce emissions from the land sector. Alongside resource degradation, rising competition for agricultural land and water, and declining investments in agricultural research and development, climate change is providing an additional challenge for farmers and industries to manage. Agriculture must meet these challenges while significantly increasing productivity. The United Nations Food and Agriculture Organization predicts that world food production must increase by at least 70% by 2050 in order to meet the demands of a projected global population of nine billion people (Godfray *et al.* 2010).

Climate change and COP21

Livestock greenhouse gas emissions are likely to become of greater significance in global mitigation efforts into the future. The 21st Council of the Parties (COP21) meeting in Paris in December 2015 pledged to limit global warming to well below 2°C, and to pursue efforts to limit the temperature increase to 1.5°C (UNFCCC 2015). Notably, of the 160 country-specific Intended Nationally Determined Contributions submitted before the COP21 meeting, 80% included specific mitigation targets for their agricultural sector (Hedger *et al.* 2015).

Given that emissions already in the atmosphere will raise global temperature above the 1.5°C threshold, there is likely to be increasing focus on options to draw down atmospheric carbon dioxide as well as reduce emissions of short-lived climate pollutants (SLCP). Methane is a SLCP with a global warming potential of 86 times that of carbon dioxide for the 12 years it lasts in the atmosphere (Myhre *et al.* 2013). Reducing methane emissions will have an immediate impact on reducing the effects of climate change and will be an essential component of a comprehensive strategy to limit warming to 1.5°C.

Significant advances have been made over the past few decades in measuring, managing and reducing livestock emissions but much remains to be done, particularly as a changing climate and the need to vastly increase food production affects agricultural systems worldwide. Globally there will need to be a significant increase in the research effort to provide agriculture with profitable adaptation and mitigation options, thus improving both sustainability and food security.

GGAA history, purpose, aims and audience

The Greenhouse Gas and Animal Agriculture Conference (GGAA) is the premier international conference summarising the collective state of scientific knowledge on greenhouse gas abatement strategies for the livestock sector. The gathering features leading scientists and policymakers reviewing the current state of knowledge and presenting significant new developments in policy, measurement, modelling and mitigation efforts associated with greenhouse gases from animal agriculture.

The first conference, GGAA2003, was held in Japan with 200 delegates from 20 countries. Five subsequent GGAA conferences have been convened (GGAA2005, Switzerland; GGAA2007, New Zealand; GGAA2010, Canada) with the biggest (Ireland, GGAA2013) attracting 460 delegates from 41 countries.

GGAA2016

At the GGAA2016 conference, held in Melbourne, Australia, more than 300 delegates from 36 countries gathered to participate in a program featuring 15 invited keynote speakers, 50 offered presentations and 220 poster presentations. The conference was organised into nine themes covering: global perspectives and policy; measurement of methane and nitrous oxide; the biology and biochemistry of livestock emissions; mitigation of ruminant emissions; mitigation of emissions from excreta and manure management; mitigation in practice; whole farm modelling of mitigation options; process level modelling of livestock greenhouse gases; and adaptation and mitigation.

All delegates were offered the opportunity to publish their research in this peer-reviewed Special Edition of *Animal Production Science*, with all abstracts published in a conference proceedings. Volume One of the GGAA2016 Special Edition includes 60 peer-reviewed papers; a 'virtual' Volume Two will be available within the first quarter of 2016. Taken together, these special editions provide the latest summary of the current state of knowledge on policy developments, measurement, modelling and mitigation of greenhouse gasses from animal agriculture.

Richard Eckard, Chair
On behalf of the GGAA2016 Local Organising Committee and International Scientific Committee

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