National Agricultural Manure Management Program

Co-ordination of the National Agricultural Manure Management Program
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This project managed, directed and coordinated the NAMMP research projects to deliver greenhouse gas mitigation options across the intensive livestock industries that will support the Emissions Reduction Fund (ERF) by delivering research outcomes that contribute to the development of new ERF methodologies for Australian agricultural industries.

Background

The National Agricultural Manure Management Program (NAMMP) was developed to coordinate national research to estimate the agricultural greenhouse gas (GHG) emissions abatement potential for various manure management systems across the manure supply chain for Australian intensive livestock industries.

NAMMP is funded by the Department of Agriculture and is managed by Australian Pork Limited. The program consists of 6 research projects. Four research projects commenced in July 2012 and were completed on 1 June 2015. Two additional projects commenced in July 2013 and will run until June 2016.

The six NAMMP research projects have been led by key researchers from the University of Western Australia, the Department of Agriculture and Fisheries Queensland, Feedlot Services Australia Pty Ltd, the University of Queensland and the Queensland University of Technology.

NAMMP has been supported by funding from the Australian Government, Australian Pork Limited, Meat and Livestock Australia, Australian Egg Corporation Limited, Chicken Meat Program of Rural Industries Research and Development Corporation and, Dairy Australia. Further support to the six projects has been provided by the Department of Agriculture and Food Western Australia, University of Western Australia, Department of Agriculture and Fisheries Queensland, University of Queensland, Feedlot Services Australia Pty Ltd, the University of Wollongong, the University of Queensland, CRC for High Integrity Australian Pork, Quantum Power Limited, the Queensland University of Technology, JBS Australia, The Organic Force, Department of Primary Industries Victoria, Horticulture Australia Limited, and Organic Nutrients Pty Ltd.

The completed and active projects are summarised on this fact sheet. A separate more detailed fact sheet is available for each project and further details can be found on the APL web-site for the National Agricultural Manure Management Program.

http://australianpork.com.au/industry-focus/environment/national-agricultural-manure-management-program/

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The livestock industries in **NAMMP** make up a combined account of 84% of manure management emissions. The projects in **NAMMP** have demonstrated that changes in design and management can significantly reduce emissions from manure over a relatively short time frame.

Objectives

NAMMP is focused on the successful delivery of GHG mitigation opportunities across the manure supply chain in the intensive livestock industries. Data generated from the program will underpin the development of Emissions Reduction Fund (ERF) methods and contribute to industry models and National Accounts Inventory.

Activities

The project lead for NAMMP is Australian Pork Limited (APL). APL has four key functions as project lead:

- To provide scientific leadership and co-ordinate research activities across the NAMMP network;

- To co-ordinate communication and data sharing within the NAMMP network and across the other programs under the Filling the Research Gap program, including through the conduct of technology workshops;

- To collate, review and synthesize findings of projects under the NAMMP to report on progress and outcomes at the program level to the Australian Government Department of Agriculture; and

- To coordinate and facilitate milestones and associated non government funding sources.

Outcome

The NAMMP cross-sectoral consortium has enabled the development of emission mitigation options as well as provided data to underpin the possible development of ERF methodologies. This collaborative research and development has also generated emission factors which can be used to validate emission factors in the National Accounts Inventory and industry models, identify risks and benefits for industry, develop new management practices and incorporation in studies such as Life cycle assessments (LCA).

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Projects under the National Agricultural Manure Management Program (NAMMP)

Program Co-ordination

- ***Coordination of the NAMMP*** – Australian Pork Limited
  This project has managed, directed and coordinated the NAMMP Program. A significant number of research outcomes have been achieved which add to the basic understanding and quantification of Australian GHG emissions from Australian intensive livestock manure management and land application practices. This information will assist in verifying and updating factors in Australian National Greenhouse Accounts, update industry models, potentially change industry practices and provide baseline data for the possible development of a range of new Emissions Reduction Fund Methods.

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Research Projects Completed

- ***Mitigating the Greenhouse Gas Potential of Australian Soils Amended with Livestock Manure*** – The University of Western Australia (UWA)
  This project evaluated the effectiveness of different mitigation strategies in reducing greenhouse gas emissions following the application of piggery, poultry or feedlot manure, in various forms, to land by measuring carbon dioxide, nitrous oxide and methane fluxes from soils following amendment using laboratory and field studies. Results showed that lower application rates of manure has the potential to reduce GHG emissions by 60%, with manure appearing to contribute to significant grain yield increases, irrespective of the type of manure. Dry seeding and the incorporation of manures into the soils showed 25% and 75% GHG emission reductions respectively whilst composting and pelletising also showed significant reductions of GHG emissions of 70% and 80% respectively

- ***Advancing Livestock Waste as Low Emission — High Efficiency Fertilisers*** – Queensland Department of Agriculture, Fisheries and Forestry (QLD DAFF)
  This project examined the reduction of greenhouse emissions through quantifying chemical and microbial gaseous emissions and identifying innovative managements for land applied manures (egg, chicken meat, pork, and beef) and fertiliser formulations (manure+smart-sorber technologies). Results found that sorbers decrease GHG emissions (N_2O and NH_3) substantially by up to 60% whilst potentially reducing the need for conventional fertiliser. Sorbers were also found to improve agronomics (20%) and boost carbon retention in the soil by approximately 50%.

- ***Pork Greenhouse Gas Mitigation*** – Feedlot Services Australia Pty Ltd
  Pig farmers have two attractive options to reduce greenhouse gas from conventional piggeries where pond covering is not feasible: i) change to deep litter housing; or ii) change to short hydraulic retention time effluent treatment. This project quantified the differences in greenhouse gas emissions from each system and compared these to emissions with conventional flushed housing and anaerobic ponds with long hydraulic retention time. Results showed that converting from the commonly used long hydraulic retention time ponds to a short hydraulic retention time system reduced GHG emissions by 87%. Converting to a deep litter system or a deep litter system with stockpiling also offered significant GHG mitigation of 85% and 65% respectively.

- ***Poultry Greenhouse Gas Mitigation*** – Feedlot Services Australia Pty Ltd
  This project addressed knowledge gaps in greenhouse gas estimation based on changed feeding or manure management in the chicken meat and/or layer hen industries. The project investigated the effects of bedding depth and dietary crude protein on greenhouse gas emissions in the chicken meat industry and the effects covering manure stockpiles in the layer industry. Results found that the poultry industry in general have very low GHG emissions with findings 8 times lower than Australian accounts data. The Meat chicken industry had very modest potential for reductions from both mitigation options of varied litter depth and crude protein reduction. The layer industry on the other hand has the potential to significantly reduce its GHG emission by approximately 88% by covering their manure stockpiles

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