

## Filling the Research Gap Program



## National Agricultural Manure Management Program

### Anaerobic Treatment for Emissions Reduction from Solid Manure Residues

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#### Background

This project aims to develop an alternative handling and anaerobic processing technology for solid phase manures from the pork (spent litter) and chicken egg industry (conveyer belt manure).

Solid manure will be processed into clean power and fertilisers to reduce greenhouse gas emissions at a sufficiently low cost and low level of technical complexity to enable farmers to readily take it up at farm-scale. When compared with alternative technologies such as composting, the anaerobic treatment technology provides incentives for adoption with the production of bioenergy (biogas) and fertiliser outputs, providing new farm income streams.

#### Objectives

- Quantify methane and nitrous oxide emissions from solid manures from the chicken layer and pork industries and develop a national baseline for emissions from stockpiled solid manure residue.
- Model nutrient cycling and emissions from stockpiled manures to provide a fundamental understanding of the biological and chemical processes that cause greenhouse gas emissions.
- Develop and assess a leachbed anaerobic processing and leachate nutrient recovery technology for chicken layer manure and spent piggery litter manure.
- Define clear pathways for on-farm adoption of the new technologies considering the drivers and economic, environmental and technical limitations.
- Define the greenhouse gas abatement potential of the developed leachbed and leachate processing technologies.

#### Key activities

- Sample and biochemically analyse chicken layer and piggery spent litter manure stockpiles.
- Model mass balances to quantify baseline manure storage/stockpiling nutrients and greenhouse gas emissions.
- Trial new leachbed technology to anaerobically digest solid manures, creating biogas for energy recovery.
- Process leachate from the leachbed reactors to recover mineral fertiliser products.



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- Assess on-farm adoption of these new technologies and potential to cost effectively mitigate greenhouse gas emissions.

#### Outcomes

Through this work the following outcomes will be achieved:

- A better prediction of baseline emissions from stockpiled solid manure residues;
- Viable technology options for the processing of solid manure into clean biogas energy and renewable fertiliser.
- New knowledge on emissions profiles for solid manure handling and a better knowledge of abatement options.
- Abatement of emissions, through the use of renewable biomethane energy and renewable crop fertiliser products produced from processing of the solid manure residues.

#### Implications

This project aims to develop leachbed technology that processes solid manure residues into clean energy and renewable fertiliser products with potential sale value.

The use of renewable biomethane energy reduces dependency on fossil-fuel derived energy. The recovery of leachate nutrients from the manure waste for transport offsite will prevent over-application of nitrogen and reduce the potential for nitrous oxide emissions from land.

The information collected in this project will enable producer participation in the Emissions Reduction Fund (ERF) through supporting development of an ERF Methodology.

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