Fact Sheet

FACT SHEET

May 2012

NUTRIENTS AND GREENHOUSE GAS EMISSIONS FROM PIGGERIES

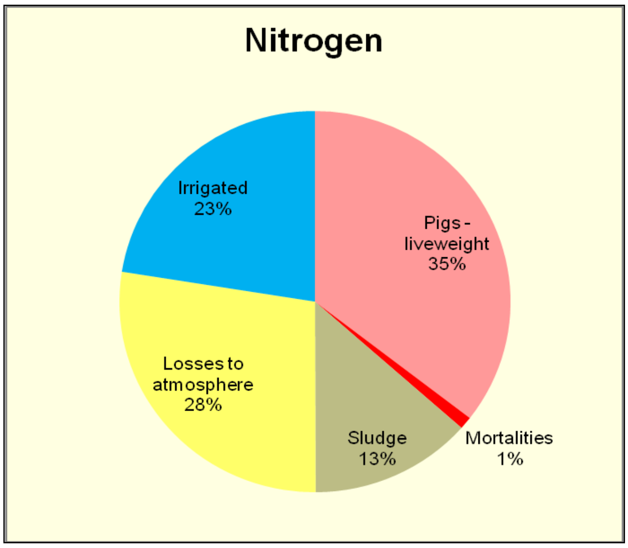
Nutrients and greenhouse gas (GHG) emissions from piggeries are seen as a major priority for the industry. Although only contributing 0.4% to Australia's overall GHG emissions, the pork industry sees mitigation and utilisation as a significant opportunity to reduce resource inputs and minimise its environmental footprint. Emissions arise from a range of sources, including energy use and 'upstream' emissions from feed production. The largest emission source at the piggery is from anaerobic treatment of effluent (for conventional piggeries) and emissions from deep litter management during housing for deep litter systems.

This fact sheet discusses the interaction between nitrogen cycling and GHG emissions at piggeries. Nutrient management is a key issue for piggeries, but the interaction with global warming is less clearly understood.

The Nitrogen Cycle

Nitrogen enters the piggery in feed protein, and a proportion of this is retained in live weight production of the pigs. However, only 35% is actually retained in live weight (see Figure 1).

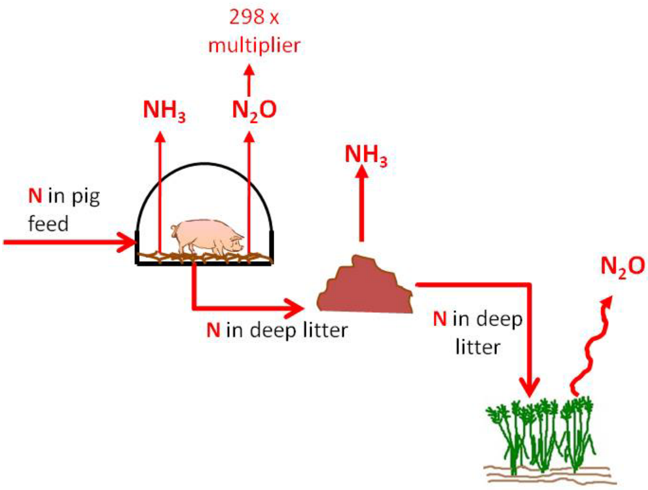
Figure 1 – Partitioning of feed nitrogen entering a conventional effluent flushing piggery



The remaining nitrogen enters the effluent treatment system (conventional piggery) or is captured in deep litter.

A proportion of the nitrogen excreted from the pigs is lost from either the effluent ponds or from the deep litter (during housing or stockpiling).

These losses are in two main forms; ammonia (NH_3) and nitrous oxide (N_2O). Nitrous oxide is a powerful GHG, with 298 times the warming ability of carbon dioxide[1]. Because of the multiplier effect, a small emission of nitrous oxide goes a long way towards global warming.



Ammonia is not a GHG, but it can still contribute to GHG emissions. This is because the ammonia lost from a piggery will be deposited again to land, where it may result in nitrous oxide emissions. The Australian Department of Climate Change and Energy Efficiency suggests that 1% of the nitrogen lost as ammonia is re-emitted as nitrous oxide[2].

For conventional piggeries the emissions from nitrous oxide are not very large, contributing less than 2% of total GHG per kilogram of live weight produced[3]. For a deep litter piggery however, the contribution from nitrous oxide emissions are higher, at approximately 10% of total GHG[3].

Reducing Emissions

Improving nutrient management at piggeries has a number of benefits for the environment and for the piggery.

If gaseous losses can be reduced, this will leave more nutrient available for sustainable utilisation.

The best approach to improve sustainable utilisation of nitrogen will be to reduce the storage time for effluent or deep litter before application. Losses during application can be reduced by incorporating effluent or litter rapidly into the soil, and ensuring a balance between the nutrient requirements of the crop or pasture and the amount of effluent or deep litter applied.

Nitrous oxide emissions from soil are highest during wetting and drying of the soil. Applying nutrients to saturated or waterlogged soils should be avoided. Likewise, application prior to expected heavy rainfall events should also be avoided. This is in line with sound nutrient management practices.

Where effluent and deep litter nutrients can be successfully used as a supplement to reduce synthetic fertiliser use, this can provide another plus for piggeries by providing an indirect GHG offset. Nitrogen fertilisers such as urea are very energy intensive to produce, meaning high levels of GHG are emitted during manufacture. If effluent or deep litter can be used to replace these fertilisers, the piggery will have contributed to lower GHG emissions. For deep litter finishing systems, the nitrogen contained in the deep litter may provide an offset of around 3-5%.

[1] IPCC 2007, Climate Change 2007, The physical science basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor & H.L. Miller (eds), Cambridge University Press, Cambridge and New York.

[2] DCCEE 2010, National Inventory Report 2008, vol 1, Australian National Greenhouse Accounts, Department of Climate Change and Energy Efficiency, Canberra.

[3] Wiedemann, S.G., McGahan, E.J., Grist, S. and Grant, T. 2009. *Environmental Assessment of Two Pork Supply Chains using LCA*. Report prepared for Australian Pork Limited and RIRDC.

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