

- I. Project Title and NPB project identification number:** Implementing Mass Nutrient Balance Procedures on Swine Production Facilities, NPB Award 05-129
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Scientific Abstract:

Whole Farm Nutrient Balance (WFNB) approaches have been used to provide a measure of environmental performance (Aarts et al., 1992; Lanyon and Beegle, 1993; Klausner, 1995). Whole farm balance concepts are used as part of the Netherlands Mineral Accounting System public policy that includes compulsory mineral input and output reports from livestock farms and levies for excess imbalances (Jongbloed and Lenis, 1998). Procedures for measuring WFNB will be followed in measurements made on commercial swine facilities for 2006 and 2007. The conclusions developed based upon data from 13 for 2006 include:

- On average, the participating swine producers import 1.5 units of N and P through all farm sources for every unit of N and P that is exported in managed products. This level of efficiency is significantly better than commonly reported values for commercial animal feeding operations (primarily dairies) reported in the literature. Several farms produced P balances very near an ideal 1 to 1 ratio.
- Feed is the dominant source of N and P arriving on farm representing 79 and 88% of all imports, respectively. Fertilizer represents approximately 10% or less of total nutrient imports suggesting that these farms have little opportunity to further improve their nutrient efficiency through nutrient planning (use of manure to replace fertilizer).
- The WFNB for facilities with storage only (deep pits and exterior storage) are substantially better than those observed for farms with anaerobic lagoons.
- No relationship was observed for N or P WFNB versus size of farm as measured by animal numbers. However, it was observed that as the concentration of pigs per unit of land area increased, so did the whole farm nutrient imbalance (ratio of inputs to managed outputs).
- Increasing dietary phosphorus was found to be correlated to increasing in whole farm phosphorus imbalances, suggesting the impact of diet management on environmental risk. However, no relationship was observed between dietary crude protein and whole farm nitrogen imbalance.

In addition, a finishing house nutrient balance (FHNB) using mass balance procedures for N and P will be implemented on the same farms in 2007. The FHNB will be completed for 2 turns of pigs. In addition, a WFNB will be repeated for 2007.

These research results were submitted in fulfillment of checkoff funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer reviewed

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