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Agricultural & Biological ENGINEERING

Thesis Defense

Speaker: Jeffrey Lai

Title: Data resource and calculation methodology for Indiana poultry manure production

Major Professor(s): Dr. Jiqin Ni

Date: Friday, July 05, 2013

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Location: ABE 212

Abstract:

Poultry manure can be used as fertilizer or other value-added application, such as energy generation using anaerobic digestion or thermo conversion. However, improper management of poultry farm manure can cause environmental problems including air and water pollutions. Correctly calculate and document the quantities of poultry manure production on a farm and in an area is important for effective manure management and utilization, and environmental protection. Calculating manure production requires the numbers of poultry and the manure production rates of the poultry. Inventory data on numbers of poultry in Indiana were available from two major sources: USDA and IDEM. The USDA census provided the most detailed poultry inventory data. The IDEM data have more information coverage over CAFO/CFO. However, these databases do not always match with each other. There are different methods and standards for manure production rates that vary considerably and can introduce errors. In order to examine this issue, different sources of poultry inventory and manure production rates were collected. Experimental data from four Indiana commercial layer houses were also used. These inventory and manure production data were compared and analyzed to select the relatively reliable estimation methods for the manure production calculation. The results from the experimental data were used to calculate the layer hen manure production rates and to compare with other sources from the literature. To enhance the methods, several factors are considered such as the life cycle of each type of poultry, the cleaning periods after the poultry is removed from the farms, and the adjustments of different units used by different sources data were used for comparison analysis with other sources. A set of rates was determined when the calculated manure production had a 10% difference from the reported. Experimental data from four Indiana commercial layer houses provided a range of rates from 0.050 to 0.071 kg/d/bird and they were similar to several rates from different publications.



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