

Survey of Availability, Application, and Economic Values of Poultry Manure for Cropland in Indiana

Executive Summary

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This project was conducted to study the production, availability, geographical distribution, transportation, application, and economics of poultry manure in the state of Indiana. Data and information were collected from various databases and sources; and via phone interviews, face-to-face discussions, and an on-line survey. Year 2007 was selected as the primary year of data analysis because of the availability of the most comprehensive data sets. Data in other periods from 2002 to 2012 were also used to study the development of the Indiana poultry industry and the production of poultry manure within the state.

There were 4,545 Indiana farms that raised poultry of various species in 2007. The number increased by 53.5% from 2,961 farms in 2002. The sizes of layer farms varied considerably. The majority of the farms was below the CFO threshold, raised small numbers of poultry, and were scattered all over Indiana. About 98% of the layer hens were raised in only 2% of the layer farms in 2007. Poultry CFOs and CAFOs constituted only 11.7% and 6.9% of the total number of poultry farms in 2002 and 2007, respectively. The changes in the Indiana poultry industry demonstrated that while the total number of Indiana poultry farms increased, the number of CFO/CAFO decreased.

Because of the continuous development of the poultry industry in Indiana, poultry manure production has been increasing. Indiana produced 1.885 million tons of total “as-excreted” poultry manure in 2007, a 26.7% increase as compared with 2002. Layer manure (0.840 million tons) consisted of 44.6% of all manure produced, followed by turkey manure (0.534 million tons or 28.3%), and pullets (0.177 million tons or 9.4%). Among the five major poultry species, the manure produced by ducks (0.101 million tons) had the smallest proportion of 5.4%. The manure produced by three poultry species (layers, pullets, and turkeys) increased by 31% between 2002 and 2011. The rates of increase were largest for turkeys (84%) and smallest for layers (4%).

As the number of CFO/CAFO poultry farms decreased and their sizes increased, poultry manure production has become more concentrated geographically. Indiana poultry manure distributions vary greatly among different counties. In general, there was more poultry manure available in northern and southern Indiana. Among the 92 counties, Dubois County in southern Indiana had the highest manure production of approximately 268,400 tons in 2007. Benton County had the least available poultry manure of only about two (2) tons.

The equivalent amounts of plant nutrients available in as-excreted poultry manure produced in Indiana were 30,370 tons of nitrogen and 9,433 tons of phosphorus in 2007. When divided by the total “land in farms”, there were averages of 4.11 lbs of nitrogen and 1.28 lbs of phosphorus per acre of land in 2007 in Indiana. Compared with the 3.24 lbs of nitrogen and 1.01 lbs of phosphorus per acre of land in 2002, the increases were 26.7% and 26.2% for nitrogen and phosphorus in poultry manure, respectively, during the five-year period.

The recoverable poultry manure nitrogen and phosphorus (the amount available for land application) in Indiana in 2007 were 13,667 tons and 3,585 tons, respectively. The recoverable poultry nutrients per acre of Indiana farm land were 1.85 lb/acre of nitrogen and 0.49 lb/acre of phosphorus in 2007.

There were manure brokers or contract manure haulers in Indiana providing various services, including manure transportation and land application; but only a small number worked with poultry manure. The average transportation radius of solid poultry manure was about 25 to 30 miles. The maximum transportation distance was 100 miles. Some manure brokers’ service areas were at a radius of about 200 miles (not the manure transportation distance).

Poultry manure prices differed based on geographical areas and times but had a general increasing trend over the years. The actual manure-only costs obtained in the survey ranged from \$9.5 to \$60/ton of solid manure. Rising inorganic fertilizer prices in the past decade were the driving force behind the increasing economic value of poultry manure.

The surveyed willingness-to-pay costs for solid-manure-only ranged from \$0 to \$50/ton and averaged \$17/ton. Those costs for manure, transportation, and application ranged from \$0 to \$100/ton and averaged \$26/ton. For liquid poultry manure including transportation and application, the willingness-to-pay costs ranged from 1 to 30¢/gallon and averaged 5¢/gallon. The cost was lower for liquid-manure-only without transportation and application. It ranged from 0 to 20¢/gallon and averaged 3¢/gallon.

About 25% of the surveyed croplands applied poultry manure as organic fertilizer. More than two thirds of the surveyed poultry manure users had applied poultry manure to fields for at least 2 years. The longest history of using poultry manure was 75 years. The users were well aware of the benefits of using poultry manure. All of them planned to continue applying it to their croplands.

For crop producers who had not applied poultry manure, the top reason was its unavailability. Difficulty of poultry manure application was the second reason, followed by lack of experience or familiarity (never used poultry manure). About a quarter of the survey respondents had concerns about its economics (more expensive than inorganic fertilizers). Negative environmental effects were also among the concerns, which included potential nutrient runoff, odor nuisance, and groundwater contamination.

Recommendations for future work are to develop and distribute educational materials for poultry manure applications; update the Indiana poultry manure production and availability in 2014 when the new USDA Census data are published; study value-added utilizations of poultry manure; survey manure production and application from the swine and dairy industries; and conduct scientific research to develop more reliable production rates for calculations of poultry manure nutrient productions.

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