Addressing the Non-traditional Nutrient Management Education Needs of Mississippi Poultry Producers: History, Action, and Future

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Abstract

Poultry production, the largest grossing agricultural enterprise in Mississippi, is concentrated in the south central region of the state. The industry cluster increases concerns about nonpoint source pollution and water resource quality in the region. Site specific nutrient management plans are required by the Mississippi Department of Environmental Quality for poultry farms that have changed production levels since 1994, or are classified as Concentrated Animal Feeding Operations (CAFO's) according to Environmental Protection Agency regulations. In recent years, Mississippi State University Extension Service (MSU-ES) and Experiment Station personnel have worked closely with all segments of the industry and other agencies to expand the research base and to provide training in nutrient management. Reorganization of MSU-ES in 2002 addressed the need for more non-traditional education programs in environmental issues in general, and nutrient management in particular. Mississippi based research and outreach programs were reviewed at a symposium in December, 2003. Facilitated discussion among symposium attendees focused the perceived strengths and weaknesses of the effort, and offered suggestions for improvement. The Environment/Nutrient Management Program Priority Group was organized to plan and implement programming efforts using multiple disciplines and university units. An Extension area agent specialty was defined, advertised, hired, and placed in the poultry region to provide educational programs and serve as a resource. Recent changes in state CAFO permit requirements (2004) further increased the educational needs of poultry producers in nutrient management, record keeping, and other management skills.

Introduction

Poultry is integral to Mississippi agriculture, both by meat production and providing soil amendments to support cattle production. Mississippi State University (MSU) has worked in numerous capacities to support the best interests of the people of the state with respect to poultry production management, avian health, environmental issues, economics, and human nutrition. Interest in agricultural environmental issues in recent decades has increased as the population has urbanized and agricultural production models have become more centralized. This paper examines how MSU addressed growing concerns about nutrients in the landscape in south central Mississippi.

History

Poultry is the largest farm gate contributor to the Mississippi agricultural economy; it is the fourth largest broiler producing state in the nation and has significant fresh egg production. The largest segment, broilers or chickens grown for meat production, are grown by individual farmers under contract to integrated poultry production companies. Chicks are hatched in a central location and delivered to the farms for growing. For economies of scale and transportation, most production for a particular company is situated about a one hour drive around centralized processing plants. This hub and spoke setup is called a complex. Over time, several complexes have located primarily in the south central region of Mississippi; broiler production contributed approximately $100,000,000 to agricultural income in 2000 in seven counties. Other counties also had significant broiler income (Morgan and Murray, 2002)

Litter from periodical cleanout of growing houses is commonly applied to pastures and forages on the producing farm. The Mississippi Department of Environmental Quality requires growers who have 'significantly changed' their operation since 1994 to have an environmental operating permit that includes a Nutrient Management Plan (NMP). These plans are usually developed for the poultry growers by local field staff of the United States Department of Agriculture Natural Resource Conservation Service (NRCS) using the published practice standards and formats of the Field Office Technical Guide (FOTG) of the agency. Mississippi NRCS bases the specific guidelines on Experiment Station research and Extension information generated by the Mississippi State University and other institutions, including the Agriculture Research Service of the United States Department of Agriculture.

When NRCS Practice Standards were revised in the mid-1990's, a phosphorus-based (P-based) Nutrient Management Plan was included in the Animal Waste Management standard of the Mississippi FOTG. In the same era, some integrators required all growers to develop and follow NMP's, irregardless of regulation. Various agricultural stakeholder groups realized that P-based plans required large land areas for successful implementation. Furthermore, tne MSU Extension Service Soil Testing Laboratory recommended no P fertilizer application, whether organic or inorganic, on soils with more than 144 pounds $acre^{-1}$ soil test P (STP) as determined by the Mississippi Soil Test procedure (Crouse, 2001). Many fields with poultry litter application histories have elevated STP because the litter has more available P than crops can assimilate in a relatively short time span (Read et al., 2005). This situation involving the growers, agencies, companies, and academia became untenable.

Action

After interaction with several concerned stakeholders, Mississippi State University developed a 'Water Quality and Nutrient Management Task Force' (Task Force) to focus research and outreach services required by the industry segments: growers, poultry companies, government agencies, and non-government organizations. The multi-discipline Task Force involved the agricultural units of MSU, units of the Agricultural Research Service, and non-agricultural units of MSU. The Task Force allowed better communication among the diverse academic units, and simplified the university entry point for stakeholders with poultry-related issues. Several projects were initiated and combined.

The Task Force worked in tandem with the Southwest Mississippi Resource and Conservation and Development Council in administering an Environmental Protection Agency 319 grant through the Mississippi Department of Environmental Quality that addressed development of alternate nutrient management options for poultry litter. The objectives of the work were:

1) Economic analysis of alternative poultry litter use;
2) Assess quality and quantity of poultry litter produced in Mississippi;
3) Provide demonstrations that would increase poultry litter demand; and
4) Determine and develop options for alternative poultry litter use.

Several initiatives by 23 faculty and professional staff addressed these concerns through research and demonstration projects, and Extension publications and programs (Vizzier-Thaxton, 2002).

Concomitantly, the MSU Extension Service was reviewing its organization and delivery mechanisms for non-traditional education opportunities that enhance the Mississippi quality of life. In this process, environmental issues and nutrient management were recognized as vital to Agriculture and Natural Resource programming, and as such, a Program Priority Group was developed in the Extension Service reorganization implemented in July, 2002. Many activities previously coordinated through the Task Force were subsumed by the Environment/Nutrient Management Program Priority Group (E/NM PPG).

The second group adopted a mission "to expand the focus on extension, education, and research on environmental issues related to the natural resource base that sustains and improves the landscape, integrating the importance of water quality, soil quality, and air quality in food and fiber production, human capital, and asset stewardship". Reporting areas in the E/NM PPG are animal waste management, water quality, soil management, and environmental stewardship. An area agent position for E/NM was allocated by the reorganization plan. A first task for the E/NM PPG was defining, searching, and interviewing for that position which was filled in November, 2003.

During the transition period between the two systems, internal support to two current authors through the William White Fund of the MSU Division of Agriculture, Forestry, and Veterinary Medicine supported a review process of the poultry litter efforts by the university and partners. The Nutrient Management Symposium in December, 2003 involved stakeholders from industry, producers, agricultural organizations, and academia. Following four presentations describing 41 different recently completed or ongoing projects related to poultry litter utilization, participants were engaged in facilitated discussion regarding the MSU effort.

Strengths and opportunities for improvement in the Mississippi effort as identified by the stakeholders are listed in Table 1 as presented by the participants of the facilitated discussion.

Future

The Environmental Protection Agency promulgated new rules for Animal Feeding Operations and Concentrated Animal Feeding Operations in 2003. Legal action is refining the applicable scope of the rules in 2005, however the Mississippi Department of Environmental Quality promulgated state rules under the EPA guidelines in January, 2004. One requirement in the Mississippi version not mandated at the national level is required annual continuing education for animal waste permit holders. However, prior to this commitment, the Extension Service, in cooperation with integrators and agencies, is providing programming on the new rules, how they will be administered in the state, national nonpoint discharge elimination permitting requirements, CAFO definitions, and producer rights.

Other programming targeted to the poultry communities includes principles of nutrient management, environmental issues, soil sampling and testing, soil management, soil amendment application timing, P environmental flux risk assessment, and calibration of application equipment.

In response to concerns listed in Table 1, Excel-based record keeping programs have been developed that can used on computers or printed for hand calculations. Several instructional methods are being used or planned to transfer the record keeping programs because of the diverse computer skills, interests, and learning styles of the producers. These include individual sessions, a mobile teaching lab for small groups in remote locations, and cooperation with community college computer teaching laboratories.

In addition to the poultry-centric program described, the Extension Service, with Mississippi-based agency and advocacy group partners, is developing a watershed-based agricultural-environmental stewardship educational program named Medallion Producer (Holder and Oldham, 2005). This program will include a poultry producer track that will include water quality issues, laws, and regulations, agricultural air and soil quality issues, Integrated Pest Management, nutrient management, structural soil management measures, the roles and duties of Conservation Districts, the Natural Resource Conservation Service, and other agencies, Best Management Practices, and relevant cost-share programs.

Summary

Poultry is a major component of the Mississippi economy. Mississippi State University has supported the industry, the producers, and the general public over the past few years through research, Extension, resident education, and agency interaction.. Some MSU programming was reactive due to the circumstances, but over time potentially controversial issues were addressed through focusing the assets and talents available. Now MSU, through Extension and research teamwork, is implementing planned, proactive programming.

References

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Table 1. Perceived strengths and needed improvements in Mississippi-based poultry litter research and Extension as determined by facilitated discussion with industry and academic stakeholders.

Strengths: • Involves many stakeholders • Demonstrated ability to bring research to producers and agencies (opened the gate on cooperation) • Good interagency relationships • Having personnel for support structure • Extension Service is offering more to poultry producers • Mississippi "Medallion" will be a good opportunity for farmers to participate in a positive program • Good to have personnel to facilitate transfer of research • Involvement through a multi-disciplinary approach
Opportunities for improvement: • Determine a 'best' mechanism to implement a package of the research • Continue outreach through Field Days, local, and regional meetings • More outreach and research on various aspects • More outreach concerning record keeping programs