

Confined Animal Production and Manure Nutrients

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Introduction

Livestock and poultry manure can provide valuable organic material and nutrients for crop and pasture growth. Careful nutrient management, including the use of manure, can reduce and, in some cases, eliminate the use of commercial fertilizers. The opportunity to jointly manage animal waste and plant nutrients within a single operation has decreased as animal production units grow fewer, larger, and more specialized (Govindasamy *et al.*, 1994; Trachtenberg and Ogg, 1994). For farms with livestock and scarce cropland, some producers may apply manure at rates that lower disposal costs rather than optimize the nutrient contribution to the crop. This can cause residual nutrients to be transported to the environment through runoff and leaching, where they degrade water quality and impose costs on water users.

Manure and its associated nutrients are a concern at several stages: from accumulation in open and unpaved feedlots; from storage in holding ponds, lagoons, and uncovered stockpiles; and from excess manure and wastewater applied to land. Reducing runoff and spills from storage and treatment structures often can be accomplished with engineering-based solutions. Depending on farm size, these structures may be regulated as point sources under the Clean Water Act. But reducing the flows of excess nutrients from the application of animal waste to cropland has become a growing challenge. Policymakers are considering mechanisms to link livestock operations with available cropland to increase the nutrient contributions of the manure to crop yield while reducing damages from residual nutrients.

U.S. animal production provided \$98.8 billion in sales in 1997, over half (51 percent) of all farm sales (USDA, 1999a). Sales from animals usually produced

in confinement (feedlot beef, dairy, swine, and poultry) accounted for over \$75.4 billion. Policy changes that affect costs of manure management could have significant economic effects on the livestock sector. Federal policies that directly impact manure management include the Clean Water Act (CWA), Coastal Zone Act Reauthorization Amendments (CZARA), and the Environmental Quality Incentives Program (authorized by the Federal Agriculture Improvement and Reform Act of 1996). We look specifically at those farms that may require permits under the CWA as point-source discharge sites, as well as those farms eligible for assistance under the Environmental Quality Incentives Program (EQIP) of the 1996 Farm Bill.

A growing number of States and local governments are implementing laws directed at specific confined livestock and poultry operations (U.S. EPA, 1999b). These efforts are often less comprehensive and more restrictive for some animal types than are Federal regulations.

This report—using data from the last four censuses of agriculture conducted in 1982, 1987, 1992, and 1997—estimates the amount of manure nutrients produced in the United States and the cropland and pasture available to receive it. The quantity of manure nutrients produced is compared, first, to the amount reasonably applied to land controlled by the confined animal operation, and second, to all crop and pasture land in the county. In short, if a livestock operation applied its manure to the available crop and pasture land under its control at a rate that met the nutrient needs of the plants, how much excess onfarm nutrient production would require disposal?¹

¹ We assume that manure and commercial fertilizers are optimally managed relative to crop needs on the operator's available land.

This is a narrowly focused but critical question that helps frame part of the policy debate.² If the livestock operator has adequate land for manure application, policy efforts can be directed to farm-level solutions. Since manure nutrients can also be applied to land owned by other operators, policies may need to

² We do not consider potential nutrient losses directly from the animal holding facility.

address timing of transfer and applications, liability for improper application, and transportation costs. Finally, if better onfarm management is inadequate to reduce the potential for manure-based water quality problems, we differentiate those areas that need mechanisms to encourage alternatives to land application, such as commercial uses (fertilizer manufacturing or energy production) or central facilities for treatment or processing.