

Agricultural Nutrient Management and Environmental Quality Position of the Soil Science Society of America¹

The degradation of water, air, and soil quality by nutrients originating from agriculture is an international environmental issue. In the U.S., public concerns about ground and surface water contamination by nutrients, particularly nitrogen and phosphorus, have intensified as evidence linking agricultural practices to nonpoint source pollution of our streams, rivers, lakes, oceans, and estuaries has emerged. Some key areas of recent concern in the U.S. have included confined animal agriculture, where the geographic concentration of animal production in some regions has resulted in serious questions about the ability of the nearby agricultural land base to assimilate animal manure nutrients; and the impact of fertilizer and manure nutrients on hypoxia in the Gulf of Mexico. In response to these concerns, state and federal agencies have proposed, or implemented, stricter regulations for the use of fertilizers and animal manures in agricultural crop production.

The Soil Science Society of America (SSSA) has long recognized the importance of managing agricultural nutrients in a manner that both sustains agricultural profitability and protects the quality of our environment. We also recognize that it is virtually impossible to produce food and other agricultural products economically without some nutrient losses to our ground and surface waters and atmosphere. Our members have conducted scientific investigations on the fate and transport of nutrients in U.S. agroecosystems for decades. This research has resulted in agricultural best management practices (BMPs) that, if effectively implemented, can, within the limits of current science and technology, optimize crop productivity and minimize nonpoint source pollution of our environment by nutrients. *The SSSA strongly endorses a national policy of agricultural nutrient management that fully integrates environmental protection with the national goal of increasing agricultural productivity. We propose the following guiding principles for this policy:*

¹Prepared by Dr. Tom Sims, Department of Plant and Soil Sciences, University of Delaware, Newark, DE 19717-1303. jtsims@udel.edu, Karl Glasener, and Tom Hall, ASA/SSSA/CSSA. Revision date: February 1, 2000 *About the Soil Science Society of America (SSSA)*: The Soil Science Society of America (SSSA) is the professional home for over 6,000 professionals throughout the world dedicated to the advancement of soil science. The primary purpose of the Society is to advance the discipline and practice of soil science by acquiring and disseminating information about soils in relation to crop production, environmental quality, ecosystem sustainability, bioremediation, waste management and recycling, and wise land use.

- # Environmental pollution (water, air, and soil) is caused by both point and nonpoint sources. Great strides have been made in the U.S. in the past 30 years in reducing point source pollution. However, it has become apparent that controlling nonpoint source pollution will be a much more complex challenge. Nonpoint source pollution originates from many sources in a watershed and all sources must be addressed to improve environmental quality. *Agriculture is one of those sources and efforts to further reduce agricultural nutrient losses are needed to protect and improve the quality of America's environment.*
- # Agriculture's contribution to nonpoint source pollution varies widely as a complex function of land use, cropping system, soil type, climate, topography, hydrology, animal density, and nutrient management techniques. Despite this complexity, research-based nutrient management practices that are effective at reducing nonpoint source pollution are available throughout the U.S. Wider implementation of currently recommended nutrient management BMPs by agriculture is essential if we are to effect significant improvements in environmental quality. *SSSA strongly endorses site-specific, nutrient management planning as the means to guide the implementation of agricultural nutrient management practices that will be profitable and protective of the environment.*
- # U.S. environmental policy has always emphasized integrating the best and most advanced science into practical solutions. Modern agricultural sciences are advancing at a remarkable pace, allowing for innovations that will increase not only the efficiency of production, but also the efficiency of nutrient use. Three examples are: (i) advances in plant and animal biology that can increase plant nutrient recovery and nutrient retention by animals; (ii) more sophisticated techniques to study and model the fate and transport of nutrients in soils, such as site specific technologies and updated soil analysis methods. Using these tools we can identify critical source areas in the landscape where nutrient losses are most significant and prioritize efforts to reduce these losses; (iii) use of mitigation and bioremediation strategies such as wetlands, riparian buffers, and filter strips to minimize nutrient losses. To put these technologies in place on the land will require that professional soil scientists and agronomists work in partnership with all agricultural nutrient users, their advisors, and the public sector. *SSSA calls for a national commitment to basic and applied research and expanded education programs on nutrient management that equally incorporate environmental protection with agricultural productivity.*
- # The adoption of more efficient nutrient management practices by agriculture will continue to be limited by factors affecting the profitability and politics of crop and animal production. Farmers, animal producers, and other nutrient users are often willing to implement more intensive practices but cannot afford the expense, time and labor required. At the same time social and political pressures to prevent nutrient losses are accelerating. Large scale, confined animal agriculture in particular is increasingly viewed with concern and alarm by many. *SSSA strongly recommends greater national and state-level efforts to bring the agricultural community together with scientists and with the citizens, organizations, and agencies that are pressing for greater efforts to reduce agricultural nonpoint source pollution. A national consensus is needed on the goals of agricultural nutrient management and on the means to document progress towards these goals. Soil scientists that are members of the agricultural and scientific communities can contribute to this national effort.*

To summarize, SSSA firmly believes many science-based, economically viable solutions that can reduce agricultural nutrient losses are available today and should be implemented more widely. Research by soil scientists and their colleagues in other disciplines indicates that improvements in environmental quality can be expected as agricultural nutrient losses are reduced. We also believe that we can do better. Increased support of the basic and applied research that underlies nutrient management is of paramount importance to nutrient use by agriculture and to improve the quality of America's environment. *SSSA calls for and will actively participate in a national dialogue to establish concrete goals and measures of success for agricultural nutrient management practices that protect and restore environmental quality.*