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ALABAMA A & M AND AUBURN UNIVERSITIES

## Fertilizer Management To Protect Water Quality Nitrogen Management Practices For Fertilizer Management

**T**he production and widespread use of commercial N fertilizers has resulted in the development of a very stable and productive agricultural system in the United States and elsewhere. Farm managers routinely achieve levels of productivity that would have seemed improbable a few decades ago. Unfortunately, these gains can incur environmental costs; some nitrogen applied to crops may escape to surface water or groundwater, possibly contaminating drinking water supplies.

Proper management of soils, water, crops, and nitrogen application can ensure that nitrogen is available when it is most needed and least likely to be lost to the environment. Following is a list of recommended practices to reduce water pollution. These practices can help farm managers provide the nitrogen needed by crops in a manner that leaves as little excess as possible to enter the environment.

### Nitrogen Management Practices

- Use a detailed soil and/or tissue testing program. Use soil and or nitrate tests if they are recommended for your area. Soil tests for nitrate have not been recommended in Alabama or most other states in the warm, humid Southeastern U.S. Chlorophyll test meters may be effective in predicting the N needs of an actively growing crop.

- Follow soil test and/or plant analysis recommendations as well as other practices recommended by university labs or other labs to obtain the most profitable yields. Crops make more efficient use of total N when other factors of production are not limited.

- Establish realistic yield goals for crops based on soil potential and management levels. Local Extension Service or Natural Resources Conservation Service offices can help in establishing yield levels. Generally, yields will be no more than 10 percent above the average for the previous years.

- Take into account contributions from all sources when determining amounts of N to apply (fertilizers, manures, legumes, sludges). A laboratory analysis of

the manure will help to determine more accurately the proper rate to apply.

- Classify crops and soils for leaching potential and vary fertilizer application products, timing, rates, and methods to reduce this potential. Shallow-rooted crops with high N requirement have high leaching potential while deep-rooted crops with less N requirement have less leaching potential. Deep sands and shallow sandy soils over fractured geology have high leaching potential while clayey soils have less leaching potential but greater runoff potential.

- Use variable-rate fertilizer application if soils within a field vary in nutrient supplying ability because of topography, erosion, soil type variation, deposition, or other natural or human forces.

- Keep accurate and detailed records of production inputs, climatic data, soil test levels, yields, and other essential information to construct a management system and to plan future improvements.

- Apply preplant N fertilizers as near to planting as possible. Avoid fall applications for spring or summer seeded crops.

- Use split N applications for the following situations: on high N requiring crops such as corn; on shallow-rooted vegetable crops; when soils tend to remain wet for several days following rain; when soils are sandy; or where there are sink holes (areas of karst geology).

- Do not topdress small grain and cool season grasses in the spring until the growing season begins. The longer the interval between application and use, the greater the chance N will be lost to the environment.

- Avoid applying fertilizer and manure to frozen soils or before heavy rains. Runoff and leaching losses could be great.

- Incorporate animal manures, urea, or urea-containing materials where possible to increase N-use efficiency and reduce runoff potential. If materials are injected, slits should be made on the contour.

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- Handle and store fertilizers and manures using properly designed facilities and recommended techniques. Do not leave dry fertilizers and manures exposed to rainfall and stormwater runoff. Clean up spills immediately. Provide adequate containment for liquid storage tanks and lagoons to prevent seepage, leaching, or direct runoff from leaks or ruptures caused by accident or natural events. Do not allow manure lagoons and pits to overflow.

- Maintain and calibrate equipment for spreading fertilizers and manures. Uniform application at recommended rates increases crop yields and N use.

- Use accepted soil conservation practices, both for N management and to sustain high production. Soil loss should be held to near tolerance levels set by USDA/NRCS. Practices include crop rotation, strip-cropping, contouring, terraces, grass waterways, diversions, and conservation tillage. Although there is some evidence that no-till cropping increases the chances of nitrates moving into groundwater, no-till greatly reduces runoff and the amount of N and sediment reaching surface waters. The net effect is in favor of no-till, which greatly improves water quality overall.

- Establish grass filter strips along field edges bordering ditches, streams, and sink holes.

- Use debris basins or ponds in critical areas to temporarily store runoff water and allow sediment to settle.

- Never dump nitrogen-containing materials in streams, wells, or sink holes. Properly seal old or abandoned wells.

- Avoid over-irrigating high N requiring crops, especially on sandy, excessively drained soils. High frequency N application through irrigation water may be the best alternative.

- Avoid over-fertilizing all crops!

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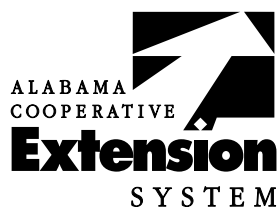
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