



**California Environmental Protection Agency
Regional Water Quality Control Board
Santa Ana Region 8**

Facts about Nutrients and Water Quality: Crop Nutrient Management

Nutrients are essential to all plant and animal life. Agricultural crops generally obtain their nutrients through roots or leaves, from the soil, water, and atmosphere. By fully managing and accounting for all nutrient inputs, farmers and other growers can help ensure nutrients are available to meet crop needs while reducing nutrient movements off fields. Nutrient management also helps to minimize excessive nutrient buildup in soils, preventing or minimizing non point source (NPS) water pollution related to fertilizer use.

The practice of crop nutrient management serves four major functions: (1) It supplies essential nutrients to soils and plants so that yields of food, forage and fiber crops can be maximized. (2) It provides for efficient and effective use of costly nutrient resources so that these resources are not wasted. (3) It minimizes environmental degradation caused by excessive nutrients in the environment, especially in water bodies that receive runoff from fertilized fields and other agricultural lands. (4) It helps maintain or improve the physical, chemical, and biological condition of the soil. Proper nutrient management economizes the natural process of nutrient cycling to optimize crop growth and minimize environmental impacts, and saves money!

Nutrient cycles are “leaky,” however. If nutrients are present in the soil in greater quantities than they are needed, or at times when they cannot be used by crops or soil microbes, they may be lost to the environment through runoff, erosion, leaching, or volatilization. Nutrient availability to crops also depends on the chemical form in which nutrients are present. Nutrients present in an unavailable form (for example, a form not soluble in water) will not be taken up by plants, even though the crop may need the nutrient, and may be “lost” from the cycle. Nitrogen, in particular, undergoes a number of transformations as it is cycled. These transformations occur under different environmental conditions, and understanding when these conditions are likely to occur can improve nutrient management planning.

NUTRIENT IMPACTS ON THE ENVIRONMENT

Negative Impacts

- Excess nutrients cause:
 - water quality concerns
 - agronomic concerns
 - air quality concerns
 - inefficient use of resources



Image provided by US EPA

The objective of agricultural nutrient management is to supply adequate chemical elements to the soil and plants without creating an imbalance in the ecosystem. Nutrient sources, such as the application of fertilizer, irrigation water, and organic materials, are the easiest to control. Agronomic needs assessment tools such as traditional soil tests, the nitrate test, traditional plant tests, organic material analysis, and the irrigation water test will provide information on the status of crops, soils, and soil amendments. Detailed information on these tests can be found at:

<http://www.epa.gov/watertrain/agmodule/right10.htm>.

It is imperative to retain the nutrients where they can be most efficiently used by the plant. This is generally in the soil where roots are or will soon grow. Environmental influences, like rainfall, wind, and gravity tend to move nutrients away from the root zone. The erosive effects of wind and water should be managed to minimize the movement of nutrient-enriched soil particles from field to surface waters. Fertilizers stimulate the growth of algae in lakes, bays, and rivers, leading to loss of beneficial uses of these waters. University of California Cooperative Extension field agents, staff of county Agricultural Commissioner's offices, Resource Conservation Districts, and other agencies, as well as private consultants and field representatives of fertilizer suppliers, can provide valuable assistance in developing appropriate nutrient management plans.