5 Determining Fertilizer Needs

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Man's increasing demand for food and fiber provides the stimulus for modern agriculture to increase production. Furthermore, economic competition in agriculture generally forces the individual farmer to produce agricultural products as efficiently as possible. Both of these factors have led to a continuously increasing demand for fertilizer material to supply plant-available nutrients wherever their natural supply is inadequate. To use these fertilizers efficiently and effectively, the farmer must know or be able to predict which nutrients may be deficient and to what degree. Diagnostic tools have been developed and are constantly being improved to provide this information to farmers.

The yield of any crop plant and the yield increase obtained from fertilizer applications depend upon many different soil, plant, climatic and cultural factors. The level of nutrient availability to the plants is of prime importance in determining crop yields. Because nutrient deficiencies in the soil often cannot be detected by sight and touch, special diagnostic tools to quantitatively evaluate the availability of nutrients are essential. Soil tests and plant analyses are such tools. However, in determining the kind and amount of fertilizer to apply and what practices to follow for efficient crop production, it is still necessary to consider the effects and interactions of all the factors. Special diagnostic tools do not eliminate this need. The quantitative evaluation of the effects of all the different factors requires careful field and laboratory experimentation.

Examples of the problems which need to be solved are interactions between the major plant nutrients at high rates of application; the effect of micronutrients on yields of crops at high fertilizer rates; and the performance of crop varieties under different levels of soil fertility. All of these problems are becoming more intense as yield levels of crops increase.