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APPROACHES FOR RECOMMENDING P AND K FERTILIZER

After soil samples have been obtained and analyzed, the laboratory or consultant must somehow arrive at fertilizer recommendations for a crop. Part of the challenge is that there's more than one way to recommend fertilization. Most of the information below was adapted from an excellent PPI (IPNI) Better Crops article from a few years ago (Leikam et al., 2003. Better Crops vol. 87, no. 3).

Sufficiency (feed the crop) approach – The goal of this approach is to apply just enough P and/or K to maximize profitability in the year of application, but minimize fertilizer application rate and costs each year. Unless initial soil test levels are high, nutrient applications will be required every year in order to eliminate profit robbing nutrient shortages. Specific application methods, such as the use of band application, may also be needed for maximum nutrient response.

Sufficiency recommendations are typically developed to provide 90 to 95% of maximum yield. Crop response and recommended nutrient application rates are highest at very low soil test levels, and nutrient application rates decrease to zero as the soil test level increases to the 'critical' soil test value. The critical level is the soil test value at which the soil is considered capable of supplying sufficient amounts of P and/or K to achieve 90 to 95% of maximum yield. With this approach soil test values are not viewed as a managed variable and there is little to no consideration of future soil test values.

Build-maintenance (feed the soil) approach – This approach treats P and K soil test levels as controllable variables. At low soil test values, recommendations are made to apply enough P and K to meet both the needs of the immediate crop and to build soil test levels to a non-limiting value, at or above the critical level. The build-up of soil test values occurs over a planned period of time, typically 4 to 8 years. Once the soil test level exceeds the critical value, future nutrient recommendations are made to maintain it in a range at or just above the critical level (medium to high range) where the soil can provide adequate P and K to meet the needs of growing crops. Above the critical level the soil is largely capable of supplying the nutrients needed in a given year; however, below this level yearly nutrient applications are necessary to optimize production. Thus the build and maintain approach ultimately provides greater flexibility to manage both time and cash flow since farmers can choose to apply maintenance fertilizer annually, or to combine applications and only apply the fertilizer every two or three years.

Build-maintenance fertility programs are not intended to provide optimum economic returns in any given year, but to provide high levels of grower flexibility and good economic returns over the long-run by removing P and K as limiting factors. The disadvantage of this approach is the cost of the build phase when initial soil test levels are below the critical value.

Both approaches to P and K recommendations are sound, so we can't really say that one is right and the other wrong. It's really a question of which is more appropriate for a given set of circumstances. Factors such as land tenure and nutrient costs affect which approach is best for the farmer. Nutrient recommendations are not a one size fits all proposition, but should be tailored to fit the circumstances.

—WMS—

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Abbreviations: P = phosphorus, K = potassium.