

REGIONALIZING NUTRIENT RECOMMENDATIONS
INDIANA - OHIO - MICHIGAN

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WHY THE INTEREST IN REGIONALIZE CROP NUTRIENT RECOMMENDATIONS ?

- 1) Wide variations in recommendations made to farmers by who makes them.
 - a) by fertilizer dealers or sellers of product
 - b) by "unbias" consultants
 - c) by soil testing labs
 - d) by Universities
 - e) by other governmental agencies
- 2) Philosophies are different in "What is best for Mr. Farmer"
 - a) Sufficiency Level of Fertilization - "Feed the Crop"
 - b) Build-up & Maintenance - "Feed the Soil"
 - c) Cation Balance Method - "Keep everything in balance"
- 3) Many companies market products and provide recommendations across state lines.
 - a) Co-op's
 - b) Regional or National fertilizer companies
 - c) seed corn companies
 - d) crop protection chemical companies
- 4) Multi-state Industry and Extension training activities
 - a) on-going training activities
 - b) CCA preparation and testing
 - c) extension activities
- 5) Recognizing the differences or similarities between states - that things don't stop at state lines.
 - a) crops are the same
 - b) soils are the same
 - c) farming practices are the same
 - d) there are not big climatic shifts
- 6) Reduced Funding for Applied Research, Extension activities Publications.
- 7) Applied fertility research in some cases is quite is old, was done at lower yields, or data is just lacking.

The three states of Indiana, Ohio, and Michigan started in June of 1992 to critically examine the individual states' recommendations with the charge from the respective Department Chairmen -

"Justify your recommendations based on your research at today's yield levels, or compromise and except research done at other institutions."

Nitrogen Recommendations - Corn

The general N recommendation for corn for an average mineral soil is 110 lbs. N/a for 100 bu/a yield potential PLUS 1.36 lbs. N/a for each bushel greater than 100 bu/a and less than 180 bu/a. For yield potential over 180 bu/a, the rate for 180 bu/a is used. The following chart shows the credits given for carry-over nitrogen following other crops.

Nitrogen Recommendations for Corn

<u>Previous Crop</u>	<u>Yield Potential (bu/a)</u>				
	<u>100</u>	<u>120</u>	<u>140</u>	<u>160</u>	<u>180+</u>
Corn	110	140	160	190	220
Soybeans	80	110	130	160	190
Forage Legume * (60% stand)	50	90	100	130	160
Sod (grass or weeds)	70	100	120	150	180
Annual Legume (cover-crop)	80	110	130	160	190

* 60% stand of forage legume equals 3 plants/sq.ft.

80% stand of forage legume gives 80 lbs. of N credit

100% stand of forage legume gives 100 lbs. of N credit

Nitrogen Recommendations - Wheat

The general N recommendation for wheat is 40 lbs. N/a for 50 bu/a PLUS 1.75 lbs. N/a for each bushel above 40 and less than 90 bu/a. For yield potentials over 90 bu/a, the N recommended is the same as the 90 bu/a recommendation.

<u>Potential Yield, bu/a</u>		
<u>50</u>	<u>70</u>	<u>90+</u>
40	75	110

Phosphorus and Potassium Recommendations

The philosophy behind establishing phosphorus and potassium recommendations is that the producer should add enough to grow the yield that his soil is capable of producing and the recommended fertilizer rate is that which would maintain the fertility of the soil. To accomplish these goals, there are three possible scenarios of soil levels.

- 1) Soil levels are below the minimum soil test level which should produce optimum yields. If additional nutrients are added, a yield response can be expected. This is commonly referred to as the DEFICIENCY RANGE or CROP RESPONSE RANGE for that crop.
- 2) Soil test levels are above the minimum needed for optimum yields but are not excessively high. Growing conditions and variations in sampling and testing make it desirable to establish a range in which there is not likely to be any yield increase to added nutrients above that which is necessary to maintain soil levels. This is commonly referred to as the MAINTENANCE or CROP REMOVAL LEVEL of fertilization.
- 3) When the soil level is above the range and is excessive, it may be high enough to cause imbalance of nutrients and may move in the soil and enter the ground water. In this instance, no extra nutrients should be added until the nutrient is depleted to the optimum or adequate range. This is referred to as the DRAW-DOWN zone.

The following is a graphic representation of these three zones. In the responsive zone, the fertility program should result in an increase in the soil test values. In the adequate or optimum zone, the fertility program should replenish nutrients removed by the crop and the soil value should remain stable. The fertility program for the excessive zone should be less than crop removal and therefore should decrease the soil level with each harvest.

KEY POINTS IN RECOMMENDATIONS:

- 1) All soil references to Phosphorus and Potassium soil levels will be represented in parts per million (PPM).
- 2) Potassium optimum or adequate range will vary by CEC of the soil.
- 3) All calcareous soils (over 7.5 pH) and all organic soils (20% OM or greater) are treated for Potassium as a CEC of 15.
- 3) Standard crop removal figures will be used.
- 4) Optimum Soil Phosphorus levels are established as:

P = 30-60 lbs/a or 15-30 PPM for Corn, Soybeans, etc.

P = 50-80 lbs/a or 25-40 PPM for Forage Legumes and Small Grains

P₂O₅ required to raise P soil levels is 10:1 spread over 4 years. (2.5 lbs/a/yr or 1.25 PPM/a/yr)

0 P recommendations are obtained after 20 lbs or 10 PPM over the upper end of the optimum range.

- 5) Optimum Soil Potassium Levels are:

K in lbs. = ((150 + (5*CEC)) or K in PPM = ((75 + (2.5*CEC)) to 75 lbs. or 37.5 PPM above the critical level.

lbs. K₂O required to raise K soil levels is

10 CEC = 4 lbs. or 2 PPM per unit of soil test K

20 CEC = 6 lbs. or 3 PPM per unit of soil test K

30 CEC = 8 lbs. or 4 PPM per unit of soil test K

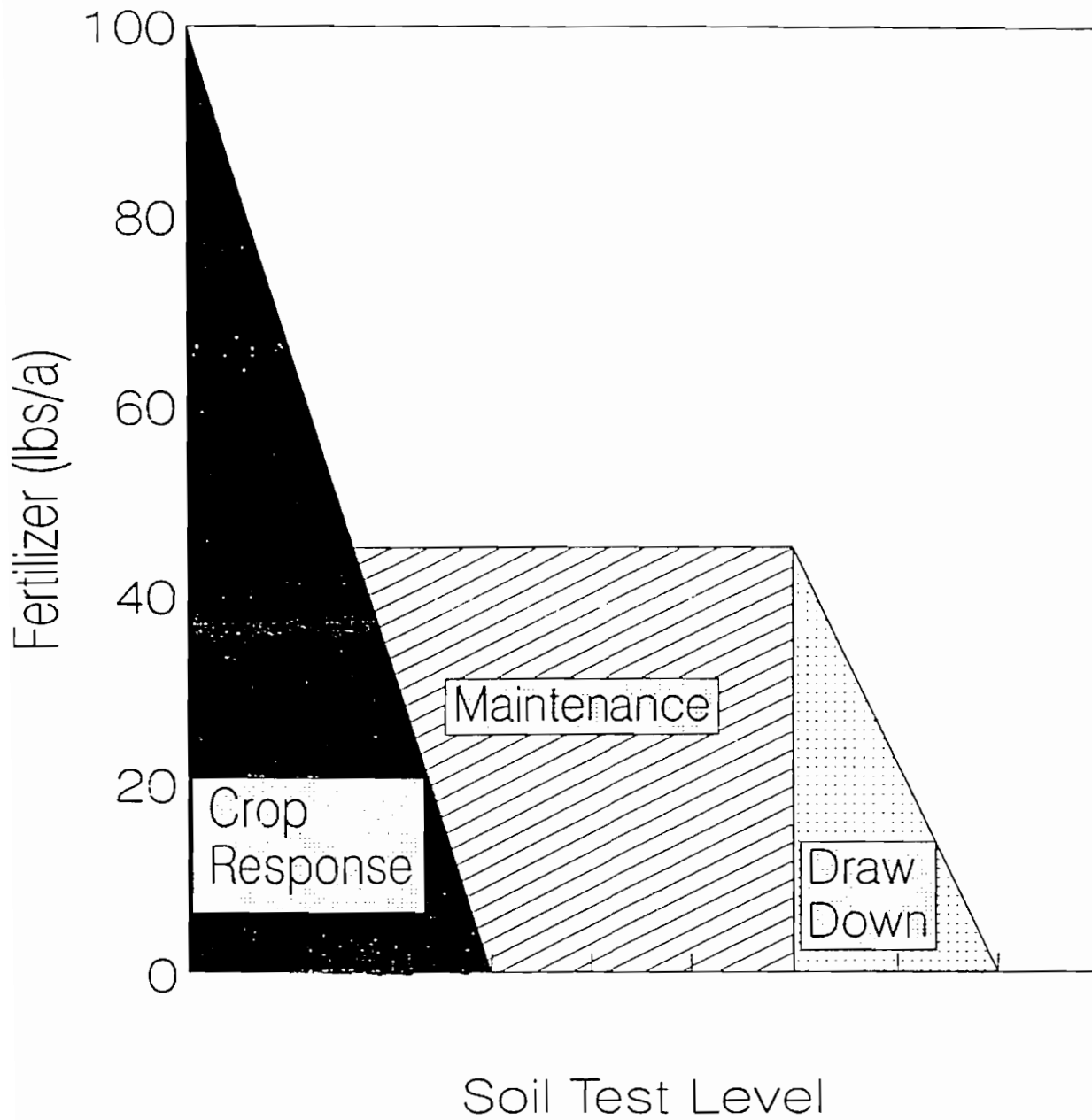
0 (zero) K recommendations are made for 50 lbs or 25 PPM over the upper end of the optimum range.

A cap on the maximum Potash per application to apply.

WHERE DO WE GO FROM HERE OR WHAT NEEDS TO BE DONE YET?

- 1) Mechanisms are being developed to allow for state differences in climate, crops grown, yields, etc.
- 2) Other nutrients such as Calcium, Magnesium, Lime requirements, Sulfur, and Micronutrients are to be addressed.
- 3) Plans are being developed for publishing the nutrient recommendations into a regional publication to be used by all three states.

NUTRIENT RECOMMENDATIONS PHILOSOPHY



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