LECTURE 16

SOIL TESTING AND CORRELATION

The composite samples obtained from fields are used in pot-culture plant studies to assess the crop responses (in terms of dry matter) to added fertilizers. Calibration of the responses to soil - test values was obtained by using different methods. Fixation studies are conducted to ascertain the capacity of soil to fix nutrient to be applied, finally, the results are interpreted to confirm nutrient deficiencies, index soil fertility, and establish "critical level" for each nutrient. The results are verified in the next stage, in field experiments.

Fertility group/ Index

The International soil fertility evaluation and improvement programme (Waugh and Fitts, 1965) advocated grouping of soils into low-medium-high categories.

The method:

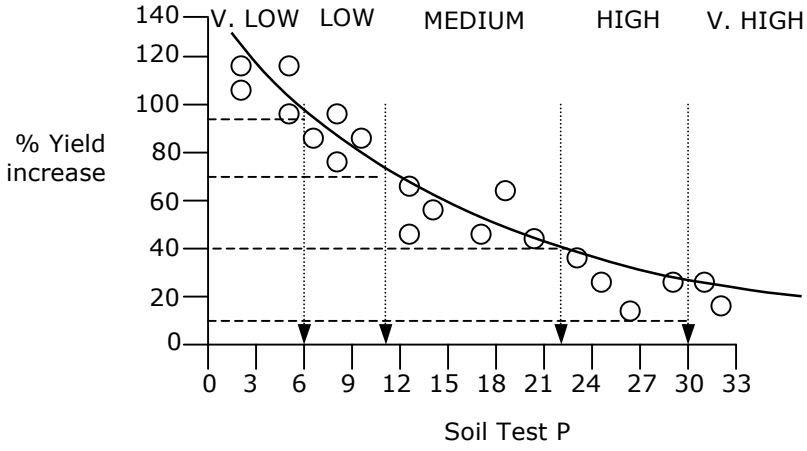
- Collection of representative soil samples and analysis by using different extractants for the 'available' nutrient
- Conducting of potted-plant studies with graded doses of added nutrient supplying all other nutrients to meet the crop requirement

- Computing of the percentage yield responses
- Plotting of the soil-test data obtained with different methods and the percent yield response; and to find the scatter distribution for the best correlating soils test methods. The scatter diagram will be generally curvilinear. The response is less, as the soil test value increases.
- The general groups are low, medium and high

The fertility groups followed in Tamil Nadu

Fertility group	Available nutrients (kg/ ha)		
	$KMnO_4$-N	$NaHCO_3$-P	NH_4OAc-K
Low	<280	< 11	< 118
Medium	280-450	11- 22	118-280
High	>450	> 22	>280

This classification indicates that low classes of soils would markedly respond to added fertilizers and high status of soils does not respond to them. In the medium range, nothing could be predicted. In addition, by this grouping, it was not possible to indicate how much fertilizer was to be added to get economic yields. Thus, this grouping is qualitative. Arbitrarily, the recommended dose of fertilizer for a crop is increased by 25% in low status and reduced by 25 % in high status.



Fertility index

Fertility index expresses the **relative sufficiency as a percentage of soil nutrient amount adequate for optimum yields**. The probability of a response to fertilizer application increases with decreasing soil test level.

More than 85% of soils testing very low may give greater response and profit. About 60-85% of soils, having medium soil test value may give little profit. Around 15% soils with very high soil test may have little response.

In general, the very low to very high classification is easily understood by the grower. However, separate group classification need to be done accounting for greater variability associated with crops and soils.

Soil Test Rating	Probability of Crop Response (% Yield increase)	Fertility Index
Very low	95–100	0-10
Low	70-95	10-25
Medium	40-70	25-50
High	10-40	50-100
Very High	0-10	100+