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Soil Fertility Problems in Cetnral Rechna Doab

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Abstract
The study was conducted to evaluate the fertility status of soil in the central Rechna Doab area. Fertility of the whole Central Rechna Doab area was low, Phosphorus in particular was low in all soils and some soil samples were Potassium deficient while few were low in nitrogen. The situation can be brought to medium fertility level by using proper amount of NPK on the basis of soil test evaluation. However, a high fertility level can only be achieved by all round efforts on scientific basis.

Introduction
Plant growth depends upon soil fertility, the inherent ability of soils to supply nutrient elements to plants. A soil is regarded as unfertile if it does not support the plant growth in which we are interested. Soil fertility is related to the amount of available nutrients, while others measure it by the yield capacity and still others look it to be a function of organic matter or even soil texture. In brief, soil fertility refers to the availability status of essential macro and micro Nutrients in the soil (Tisdale *et al*., 1993).

The assay of soil fertility status is essential for judicious use of fertilizers and assurance of better crop yields. The diagnostic techniques for fertility evaluation include fertilizer trials. soil test and plant analysis. Out of these, soil test provides the most accurate information on the availability of various plant nutrients (Dahnke and Olson, 1990). Welch and Wiere, 1977, Rashid and Mernon, 1996, necessitated that a soil testing programme is beneficial to formulate specific fertilizer recommendations.

In view of above, a study was conducted in Central Rechna Does area which has recently been reclaimed through the efforts of first Salinity Control and Reclamation Project (SCARP-1). The usual method of finding nutrient deficiency is by fertilizer applications in field trials or by deficiency symptoms in crops. The present work employed the soil test method. Fertilizer recommendations using soil test have decided the advantage of being side specific (Soper, 1985).

Materials and Methods
Twenty-three soil samples of the plough layer depth 0-15 cm were obtained during 1998 from agricultural fields (Map; These samples were analyzed in the laboratory of soil seance University of Arid Agriculture Rawalpindi. The Rabi crop wheat had been harvested, fields were either fallow or inplooging stage for sowing the next crop. To some fields barnyard manure had been added while in others animals had been tied for direct manuring, a common practice in timber. In some parts it had rained a week or so, earlier. The method adopted for sampling was by Govinda and Rao (1971). The tools used were spade Kassel and alutpi (rambi). Composite samples were taken and sfornrion sheets were completed about the spots (Fig. 1).

* How much area was represented by one sample.
* Was the sample composite.
* How much was total area covered (Geographical).

In order to study the fertility level of the soil organic matter, N, P, K, Cation Exchange Capacity and pH of the soil samples was determined according to Richard (1954).

Results and Discussion
It is well to remember that plant growth is dependent upon a favorable combination of manifactors: light, mechanical support, air, water and nutrient. It any one of them is out of balanced with others, it can reduce or even entirely prevent the growth of plants. Furthermore, the factor, which is least optimum, will determine the level of crop production. Soil fertility status varies with nature of crop pattern and management practices. Therefore, assay of fertility is essential for judicious fertilization and assurance of better return from food and fiber crops (Yadav and Swammi, 1998).

By looking at the Table 1, it clear that no spot has all the essential factors in the optimum range of plant growth (Baig, 1983). Therefore, all the spots have fertility constraints to plant growth and yield. The results actually represent the soil surface characteristics which allows sensitive detection of changes in soil organic matter dynamics and soil fertility (Cadisch *et al*., 1996).

This area which has been reclaimed did not received amendments such as addition of green manure and fertilizer in proper proportions to compensate the loss of NPK and other nutrients due to leaching and crop removal. The leaching studies conducted in the field showed that phosphorus in sodic soils also moves down alongwith other soluble slats, through peak P concentration lagged behind the other salts (Chhabra *et al*., 1980).

Phosphorus is low in all the spots showing that phosphorus fertilizer is the least used. Next comes K and then N, Therefore, the use of P and K should be popularized along with N. Organic matter was low in two spot while it was medium at all other spots. The situation in this regard is satisfactory, although not good. It seems that slight

Table 1: Fertility status of samples

Organic matter (%)	N (%)	P (ppm)	K (Meq/1)	CEC (Meq/100 g)	pH
0.37	0.16	0.07	0.02	7.84	8.78
0.93	0.16	0.21	0.10	8.90	8.62
0.47	0.06	0.27	0.35	13.26	8.70
1.11	0.02	2.00	0.15	14.08	9.00
1.84	0.04	0.27	0.20	17.06	8.00
0.87	0.07	2.5	0.10	12.53	8.40
1.22	0.07	0.27	0.15	7.80	8.41
1.38	0.01	2.0	0.40	15.09	8.90
1.28	0.06	0.27	0.20	7.50	8.00
1.01	0.02	2.0	0.35	7.00	8.20
0.93	0.20	4.0	0.25	5.50	8.30
2.17	0.04	3.0	0.30	15.02	8.04
1.84	0.04	0.17	14.40	22.59	10.24
2.48	0.07	0.32	0.40	7.27	8.16
1.76	0.08	3.5	0.15	15.55	8.10
1.13	0.06	3.2	0.35	15.06	8.11
1.18	0.06	2.0	0.20	17.04	7.99
1.34	0.09	3.0	0.10	27.61	8.30
0.93	0.07	0.4	0.50	13.54	8.37
1.38	0.07	0.3	0.30	17.58	8.30
0.78	0.05	4.0	0.45	14.54	8.40
1.45	0.10	0.37	0.15	20.77	8.27
1.30	0.09	4.68	4.80	16.05	8.59

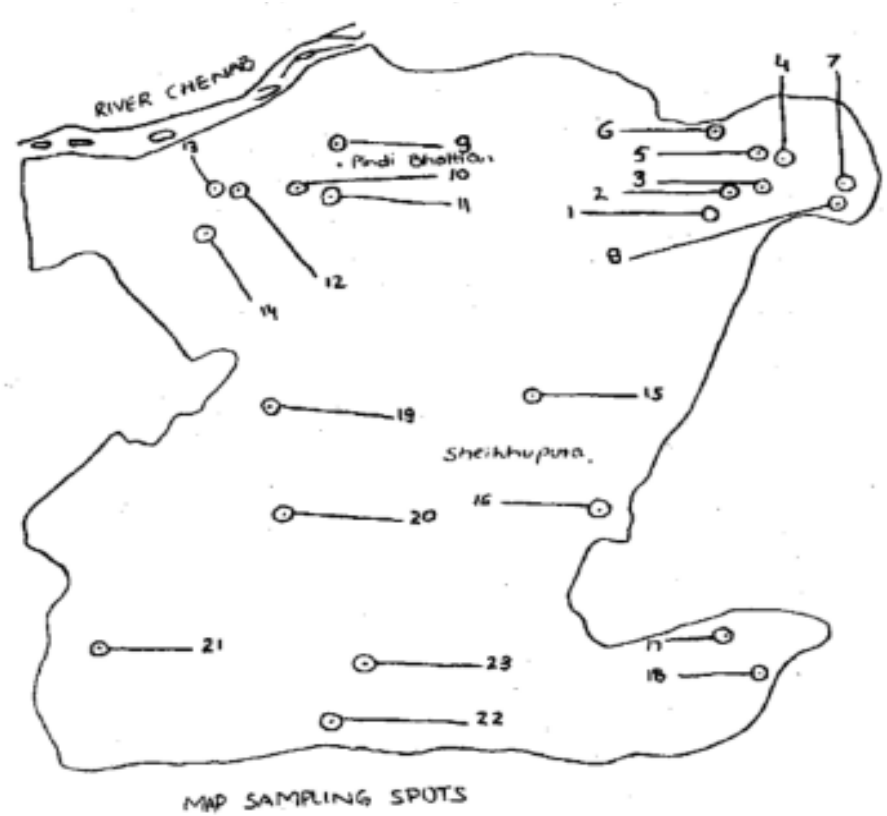

Fig. 1: Map sampling spots

variation in topographi of the area has resulted in less accumulation of organic matter in these spots (Biere, 1996). The pH range is very low in spots 43, which is waterlogged and un-reclaimed, all the rest of the spots have pH in moderate to high range. Summarizing the situation of the whole area, if NPK fertilizer is applied in appropriate quantity 75 percent of the area will attain moderate level of fertility. One spot, that is 4 percent would been drainage and leaching with amendments and then the application of NPK fertilizer in proportionate amounts. Five spots (21%) can attain moderate fertility with the addition of green manure and NPK fertilizers.

It is quite evident that all lands are being used far below their potential. Khaioon *et al*. (1975) have concluded that in the Indian Punjab 77 percent of the increased production came from fertilizers and the remainder could be attributed to a number of factors such as irrigation, improved seeds, soil and crop management. The present study supports the view that production of most crops can be quadrupled with higher level of inputs and modern management (Mian, 1985).

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