

PHYSICO-CHEMICAL CHARACTERIZATION AND CORRELATIVE STUDY OF SOIL PARAMETERS OF SELECTED STATES AGRICULTURE LAND

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Abstract:

The macro and micro nutrients of the samples gives the information about the fertility of the soil, and accordingly the crop production are correlated. In this Physico-chemical study, soil samples of four states like Rajasthan, Haryana, Uttar Pradesh and Punjab of north India is collected and tested for number of parameter like available Organic Carbon (OC), pH, Electrical Conductivity (EC), Phosphorus (P_2O_5), Nitrogen (N), Sulphur (S) and Potassium (K_2O). This study builds an understanding about state wise variation of micro nutrients in agricultural land which can be further correlated with the crop production and its economy. The finding of the study reveals that out of four selected states, Haryana takes lead in pH value, Rajasthan takes lead in EC, K and S, and Uttar Pradesh takes lead in OC, P.

Keywords:

Physico-Chemical, agriculture, soil, nutrients, states, north

Introduction:

In India during 1955, 16 soil testing Laboratories were established to give boom in agriculture sector. Government of India focused to increase the capacity of soil testing and analysis through various programs in different plan periods in the country [1]. In this era when population is gradually increasing and the pressure is increasing on agricultural land, the modern and scientific technology can support to reduce this growing pressure. It is essential to understand the soil necessities. Soil gives a medium to absorb essential nutrients which are required by crops. The primarily objective of soil analysis is to have an understanding of exact amount of available nutrients for crop production, and to bring alteration in agriculture practices and strategies. Crop production or crop failure depends number of factors such as soil fertility and biotic components. Macro and micro nutrients play a vital role in soil fertility [2]. The novelty of present study is that it is carried out in Rajasthan, Haryana, Uttar Pradesh and Punjab states of north India followed by comparative analysis of the data collected which has not been studied before.

Materials and Methods:

Location for soil sampling: The locations for soil sample collection are main productive agricultural districts of the states of north India which are stated ahead.

Rajasthan: The soil sample is collected from agricultural land in town Hanumangarh near Ghaghhar river valley in district Hanumangarh which shares border with Sri Ganganagar and areas of Haryana.

Haryana: The soil sample is collected from agricultural land of JCD Vidyapeeth college and university in district Sirsa which is a common and a known district for a rich and high fertile agricultural land in Haryana.

Uttar Pradesh: The soil sample is collected from agricultural land of town Purkji in district Muzaffarnagar which share border with areas of Roorkee, district Haridwar.

Punjab: The soil sample is collected from leaf testing laboratory citrus estate Hoshiarpur district Hoshiarpur.

Soil sampling and analysis: This physico-chemical study of soil is very important for soil parameters like pH, EC, OC, P, K, S. These parameters help us to conclude the quantity of macro and micro nutrients of soil from different states of north Indian agricultural lands. Soil sample collection is an important part in the process of soil analysis because small amount of sample is taken from huge soil mass available in agriculture land and is tested for soil analysis. It is very important step to get a true sample from a large landmass of any agricultural land. Therefore, V-bent shape method with 6 inched digged soil was taken for the sample collection as shown in figure 1.



Fig. 1: V-bent shape hole for soil sample collection

The samples were collected in thick brown paper and analysis was done in the soil and leaf testing laboratory citrus estate Hoshiarpur (Punjab). Out of large portion of collected soil sample, near about 50g was dried in the laboratory by providing certain required temperature [3].

Literature review explores that various “Physico-Chemical Characterization of farm land soil was studies for few states like Gujarat or Maharashtra [4]. But in present study, the research work is given new horizons and done on a vast scale. The parameters on which soil analysis is done are listed in table 1.

Table 1: Description of parameters [5]

Parameter	Description
pH	pH value of soil
EC	Electrical conductivity
OC	Organic carbon %
P	Phosphorous,ppm
K	Potassium,ppm
S	Sulphur, ppm

Data collection and Interpretation:

The values of various testing parameters as received from soil samples of selected are given in table 2.

Table 2: Analysis of soil samples collected from selected states of north India

Parameters	Rajasthan	Haryana	Uttar Pradesh	Punjab
PH	8.7	9	8.5	8.40
EC (mmhos/cm)	0.2	0.1	0.08	0.05
OC (%)	0.05	0.33	0.72	0.37
P (ppm)	5.73	5.94	10.67	7.11
K (ppm)	72.13	59.08	39.85	58.85
S (ppm)	48.47	19.12	11.35	5.55

Result and Discussion:

The variation in pH, OC, EC, K, S and P in the soil samples collected from Rajasthan, Haryana, Uttar Pradesh and Punjab is shown through graphical presentation in figures 2, 3, 4, 5, 6 and 7 respectively.

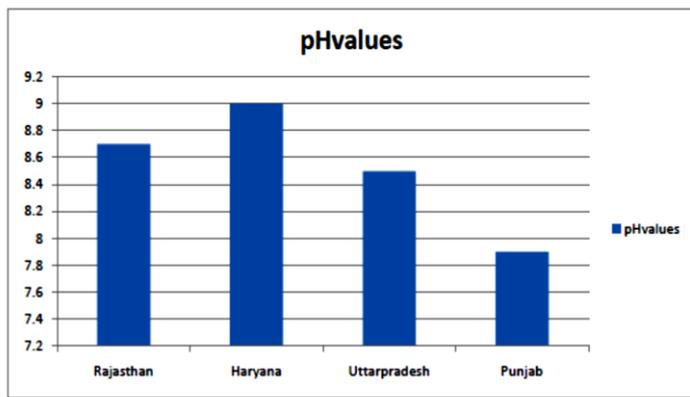


Fig. 2: Variation in pH values in collected soil samples

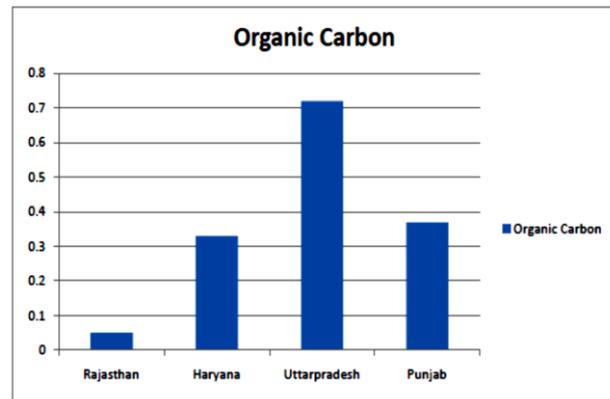


Fig. 3: Variation in values of Organic content (OC) in collected soil samples Fig. 1:

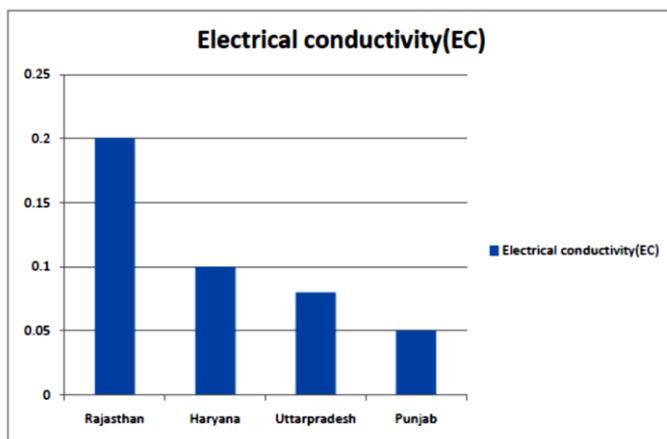


Fig. 4: Variation in Electrical Conductivity (EC) values in collected soil samples

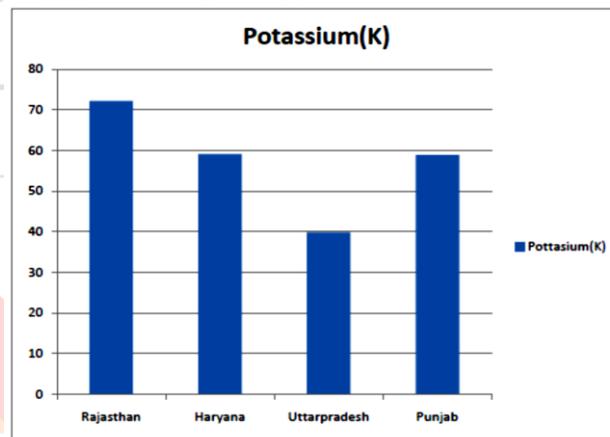


Fig. 5: Variation in Potassium (K) values in collected soil samples

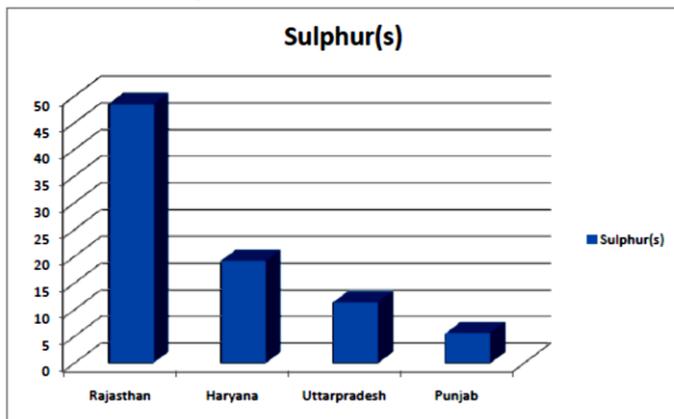


Fig. 6: Variation in Sulphur (S) values in collected soil samples

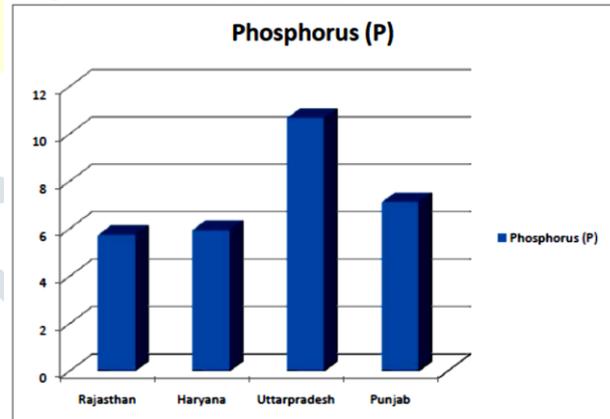


Fig. 7: Variation in Phosphorous (P) values in collected soil samples

The comparative analysis of all the parameters of study for selected states are shown through graphical presentation in figure 8.

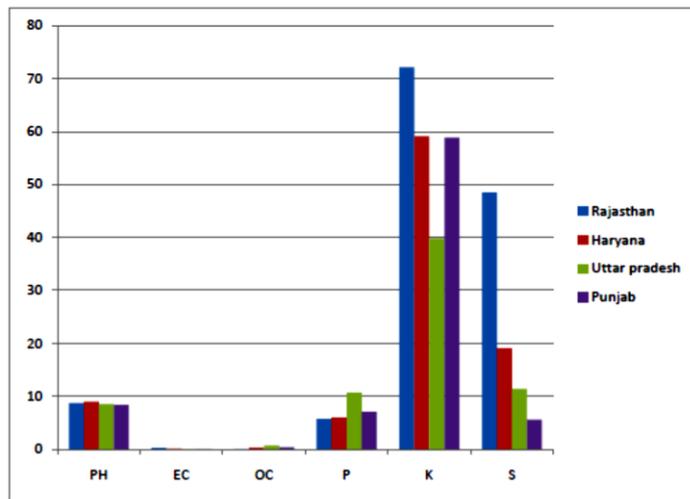


Fig. 8: Comparative analysis for pH, OC, EC, P, K, S for collected samples of selected states

Conclusion:

The comparative study shows that Haryana leads in pH followed by Rajasthan, Uttar Pradesh and Punjab. The comparative study shows that Uttar Pradesh leads in Organic Content followed by Punjab, Haryana and Rajasthan. The comparative study shows that Rajasthan leads in Electrical Conductivity followed by Haryana, Uttar Pradesh and Punjab. The comparative study shows that Rajasthan leads in Potassium content followed by Haryana, Uttar Pradesh and Punjab. The comparative study shows that Rajasthan leads in Sulphur content followed by Haryana, Uttar Pradesh and Punjab. The comparative study shows that Uttar Pradesh leads in Phosphorous Content followed by Punjab, Haryana and Rajasthan. This study gives new findings that the available EC, pH, OC N, P, K, deficient soils of Rajasthan is recommended rich fertilizer and soils of Punjab and Haryana are good stable and rich in farming.

Acknowledgement:

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