



A METHODOICAL STUDY OF PHYSICO-CHEMICAL CHARACTERIZATION OF FARMLAND SOIL OF MARKAND VILLAGE LOCATED IN NANDED DISTRICT IN MAHARASHTRA, INDIA

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ABSTRACT

In the current study we examined the physicochemical properties of farmland soil of Markand village located in Nanded district. The soil parameters like pH, Electrical conductivity (EC), Total organic carbon, Available nitrogen (N), Available phosphorus (P), Available Potassium (K) and Calcium carbonate CaCO₃ content were analyzed. It was found that there was a minor variation in nutrients and parameters of soil sample of farmers field. The results of the present study also show suitable levels of Nitrogen, Phosphorous and Potassium in the farm soil and excess use of fertilizer may diminish yield of the crops .

I. INTRODUCTION

Soil fertility is vital to a productive soil. Soil fertility is determined by the soil's chemical, physical and biological properties. Soil testing is one of several diagnostic tools used to evaluate soil quality, pH, and soil nutrient and organic matter levels . There are some of the possible benefits of utilizing chemical analysis of soil sample such as gathering baseline data on nutrient levels in new fields can help in making decisions on the use fertilizers, amendments, and cover crops to improve soil quality. Some of the basic soil chemical tests such as pH and organic matter, in combination with soil texture analysis, can indicate which crops will grow best on that soil. If concerns arise about nutrient deficiency symptoms or low yields while crops are growing, chemical soil tests can add pieces to the puzzle of trying to improve soil quality so

crops will thrive. Organic content often have physico- chemical parameters that can serve as indicators of a change in soil quality under particular agro heavy reliance on compost or manure. Understanding nutrient cycling within these systems is important to avoid nutrient overloads and potential pollution. Chemical soil tests become a monitoring tool to avoid excessive additions of nutrients to your farm system. In the present study we have also examined the principal physical climatic conditions.

II. MATERIALS AND METHODS

The study area is located in the province of Dist. Nanded , between Latitude 022°43N, Longitudes 077°00 E. Representative soil sampling involves procedures of drying, grinding, sieving, mixing, partitioning, weighing and storing. In laboratory this sample was analyzed for different chemical parameters following standard methods. All the chemicals and reagents used for analysis are AR grade. Analysis of physicochemical parameters of the soil samples were suspended in distilled water and allowed to settle down the particles. The pH of the suspension was determined using pH meter. Electrical conductivity of the soil was determined in the filtrate of the water extract using Conductivity meter. % Organic carbon content was determined by adopting chromic acid wet digestion method as standard procedure of Walkley and Black method using diphenylamine indicator, available nitrogen was estimated by alkaline permanganate method, available phosphorus determined by volumetric method [1-8]. Available potassium content in

the soil was determined by using turbidimetric methods, calcium can be determined by titration with standard KMnO_4 solution. Carbonate in soil was determined by rapid titration method using bromothymol blue indicator. All apparatus are Systronic make.

III. RESULTS AND DISCUSSION

Experiments were performed for the determination of chemical constituents of soil and some of its physical properties for the assessment of type and quality of soil. Soil texture, soil temperature, bulk density, pH, Electrical conductivity (EC), Total organic carbon, Available nitrogen (N), Available phosphorus (P), Available Potassium (K) and Calcium carbonate (CaCO_3) in soil were determined experimentally. Investigation demonstrate that black colour soil was found in the study region. Soil texture in the different soil is differing according to soil diversity. Soil texture also affects the nutrient supply of the soil [9]. Soil texture is one of the most important soil properties governing most of the physical, chemical and hydrological properties of soils. Variability in soil texture may contribute to the variation in nutrient storage and availability, water retention and transport and binding and stability of soil aggregates. It can directly or indirectly influence many other soil functions and soil threats such as soil erosion. The soil water holding capacity is essential to the evaluation of regional soil water balance. The bulk density of soil sample was found 1.07 kg/lit. indicating that soil has a better water holding capacity. The analysis of

chemical properties indicates that the black soils in the study area was slightly acidic. The range of pH of soil is 6.62. Soil pH is an important consideration for farmers and gardeners for several reasons, including the fact that many plants and soil life forms prefer either alkaline or acidic conditions or the pH can affect the availability of nutrients in the soil. Electrical Conductivity (EC) estimates the concentration of soluble salts in the soil. The electrical conductance of soil by EC meter was found 0.28 dS m^{-1} . Generally it is believed that higher the concentration of ions in the soil solution more is its electrical conductance. Organic carbon content decreases with depth of profile. It may be due to its mineralization under existing climatic conditions on the surface or may be due to low leaching from surface layers or may be due to low leaching from surface layers or absorption by clay particles. The moderate percentage of organic carbon content was found 0.567%. The percentage of free calcium carbonate present in soil sample was found to be 7.5%. The available nitrogen present in soil sample was found to be 222.02 kg/ha. Available P in the present investigation was found to be 104.29 kg/ha. Application of phosphorus (P) is necessary for maintaining a balance between the other plant nutrients and ensuring the normal growth of the crop. Available potassium present in soil sample was found to be 73.92 kg/ha. Results of all the parameters of a soil sample are given as follows. The soil physical and chemical data are presented in Table 1.

Table 1 : some physical and chemical properties of soil

Parameters	Observed Value	Inference	Reference range
Color	Black soil	-	-
pH	6.62	slightly acidic	6.0 - 6.5
Bulk density	1.07 kg lit	indicating better water holding capacity	-
EC (dS m^{-1})	0.28 dS m^{-1}	good quality soil	lower than 1
Organic carbon (%)	0.567 %	carbon content is moderate	0.41- 0.60%
Calcium carbonate (%)	7.5 %	calcareous	5-10%
Available nitrogen (kg ha^{-1})	222.02 kg/ha	N in required range	170-225 kg/ha
Available phosphorus (kg ha^{-1})	104.29 kg/ha	P in required range	60-150 kg/ha
Available potassium (kg ha^{-1})	73.92 kg/ha	K in required range	250-350 kg/ha

IV. CONCLUSION

After studying all the parameters it is concluded that, the soil sample collected from farmland is rich with the entire nutrient, slightly acidic i.e. it is good for all type of agricultural crops. Electrical conductivity (EC) indicates the good quality soil. From the study of CaCO_3 it is indicated that soil is calcareous and from the percentage of calcium carbonate it is concluded that the CaCO_3 is present in less amount which is good for soil. If it is present in excess it may affect the crop. Organic carbon determination shows the carbon content is moderate. It is beneficial for supplying water to plants and also by providing good physical condition to the soil. Farmers are requested to use the suitable fertilizer to increase the fertility of soil. From NPK study i.e. Nitrogen, Phosphorous, Potassium it is observed that all the parameters are in required range which indicates that the soil is in good health. From all the parameters it is concluded that this soil is good for Jowar, Soyabean, Chickpea and Pigeon Pea cultivation. Farmers are suggested not to use much fertilizer because farm is rich with all the

nutrients and excess use of fertilizer may decrease the crop yield.

V. REFERENCES

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