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Assessment of Nature of Farming Soil and its Management for Nutrients from Some Villages of Chandrapur District (MS), India

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Abstract

The physicochemical analysis of farming soil is important because it gives information about presence of macro and micro nutrients in soil. It determines suitability of farming plot for different crops production. It will help farmers problems associated with selection of crops for their farming plot, soil nutrients, amount and types of fertilizers to be applied to increase the yield of crops. In the present study, eight farming samples were collected from different villages of Chandrapur District (MS), India. The nutrients and certain physicochemical parameters of the soil like colour, pH, electrical conductivity, organic carbon, organic matter, nitrogen, phosphorous and potassium, manganese, copper, iron and zinc were evaluated. It was found that there was a marked variation in available soil nutrients in farmer's field. The results reveals that some nutrients in farming plot are in inadequate and few are adequate and therefore there is need of proper management of nutrients in farming plot. So on the basis of nutrient availability, treat farming plot with organic manure and or chemical fertilisers before planting.

Keyword: Farming soil, Soil parameters, Crop yield, physicochemical analysis

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1. INTRODUCTION

The fertile soil is uppermost thin layer of earth's crust and offers a natural source for the growth of plants. It is considered as good sources of essential nutrients for growth of plants[1-4]. Now a days chemical fertilizers and pesticides has been widely applied to farming land to increase agriculture productivity. Such ill practises changed soil properties day by day and finally soil becomes infertile. Further tendency to grow cash crops is increases among farmers. Therefore farmers use different pattern for soil cultivation that again declines soil fertility[5-11]. The soil analysis is one of the scientific technique to assess farming soil fertility. Soil fertility play important role in growth of plant and consequently crop yield. It is depends on the concentration macro as well as micronutrients like organic carbon, available N, P, K, Fe, Mn, Mg, Zn and Cu. In general, lack of theses nutrient inputs a major factor in degradation of soil fertility and has become major constraint to sustainability of soils for farming and production of crops. In the view of importance of soil nutrients in farming soil, we have decided to analysed different soil parameters, interprets result and recommends to farmers to manage the soil nutrients in desirable limit for good crop yield.

2. MATERIALS AND METHODS

Study Area: The soil samples were collected from Chargaon, Khutala, Kosara, Nagpur (Chota), Morwa, Ghodpeth, Khapni, and Nandori village of Chandrapur District in summer season. This area is surrounded by various industries. Soyabean and cotton in rainy season and wheat crops in winter season is taken up by farmers in their field.

Soil sampling: The samples were collected at 0 to 20 cm depths from the surface of soil of farming plot. Then they were dried and grinded using mortar and passed through 2 mm sieved to get uniform particle size. The sieved samples were packed in clean polythene bag, labelled as P_1, P_2, P_3, P_4, P_5 , P_6, P_7 and P_8 plot samples of farming land at Chargaon, Khutala, Kosara, Nagpur (Chota), Morwa, Ghodpeth, Khapni, and Nandori village respectively. It is then analysed for determination of physicochemical parameters of plot samples. The SD fine chemicals of AR Grade were used during analysis. The standard methods[12-17] was used for determination of different physicochemical parameters of plot soil samples which is described in table 1

Table 1 Methods use for estimation of soil parameters	
Colour	By viewing
pH	pH Meter
EC	Conductometry
Organic carbon	Wet oxidation
Organic Matter	% Soil organic matter = % organic carbon x 1.72
Nitrogen	Kjeldhal Method
Potassium	Flame photometry
Phosphorous	Colorimetry
Cu	DTPA (Lindsay and Norvell, 1978)
Mn	DTPA (Lindsay and Norvell, 1978)
Fe	DTPA (Lindsay and Norvell, 1978)
Zn	DTPA (Lindsay and Norvell, 1978)

3. RESULTS AND DISCUSSION

The data of physicochemical analysis of farming soil is presented in table 2. The farming soil at P_1, P_2, P_3, P_5 and P_8 plot were black in the colour whereas rest farming samples were brownish in colour. The pH value determines acidic, basic and neutral behaviour of farming soil. Its value affects absorption of minerals and microbial activity present in the soil[18]. The pH value of all plant samples were found close to neutral pH (Table 2) and lie in the range prescribed by standard agency. The conductivity value is indicator of ionic content in the soil. The EC of P_1, P_2, P_3, P_4, P_5, P_6 and P_7 plot samples lies in the prescribed range (Table 2). These values indicated significant presence of ionisable materials in the soil. The EC of P_8 plot sample shows high conductance value indicates that they have low calcareous matter. It is advised to lower the conductivity by making small water plot in field and allow to absorb salty content deep inside the soil or scratch out salty layer before planting. The major sources of OC and OM in the farming soil are crop residue and organic manure. They offers essential nutrients, hold water and provide physical strength to plant[19]. The OC and OM content at P_1, P_2, P_5, P_6 and P_7 plot site was insufficient. Therefore it is advised to treat farming plot with organic manure before planting. The plot at P_3, P_4 and P_8 indicated sufficient range of OC and OM. The occurrence of nitrogen is crucial nutrient for plant growth. It plays key role in photosynthesis, helps in seed formation and increases crop production[20]. The nitrogen content at P_1, P_5, P_6 and P_7 farming site was found insufficient. It is advised to use organic manure or chemical fertilizer in requisite proportion on or before one to two week of planting (Table 2). The plot sample at P_2, P_3, P_4 and P_8 has average nitrogen content. The phosphorous is necessary for seed germination and essential for flowering and fruits development[21]. The potassium is very essential macro nutrients for plant growth. In potassium deficient farming soil, plant growth gets altered and the productivity of crop yield is decreases[22]. In present study, soil at all plot sites found to have sufficient phosphorous and potassium level. The copper and iron present at all plot soil was available in adequate amount. The sufficient amount of manganese was found to present in plot at P_3, P_4, P_5, P_6 and P_7 whereas plot at P_1, P_2 and P_8 had insufficient manganese. The sufficient amount of zinc was observed for plot at P_1, P_2, P_3, P_4 and P_8 whereas plot at P_5, P_6, and P_7 had insufficient zinc. Therefore, different sources of zinc and manganese should be applied in the plot to reduce their deficiency before planting.

Table 2 The analytical values obtained during physicochemical analysis of soil samples

S. N.	Parameters (Units)	Observed analytical value at different plot sites								Standard limits
		P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	
	Colour	Black	Black	Black	brown	Black	Brown	Brown	Black	--
	pH	6.80	6.84	6.97	6.88	7.00	6.91	6.93	6.67	6.5-7.0
	EC (dS/m)	0.61	0.76	0.85	0.73	0.89	0.92	0.97	1.84	0.0-1.0
	OC (%)	0.409	0.329	0.519	0.415	0.385	0.381	0.382	0.596	0.41-0.60
	OM (%)	0.703	0.565	0.892	0.713	0.662	0.655	0.657	1.025	0.71-1.03
	N (Kg/H)	269.4	312.56	415.76	387.12	264.39	266.39	267.39	417.31	280-420
	P (Kg/H)	20.04	19.29.	16.35	17.28	19.73	19.58	19.58	12.209	14.0-21.0
	K (Kg/H)	284.26	211.32	171.51	185.88	329.54	326.32	320.31	369.6	150-200
	Cu (PPM)	0.89	0.28	0.43	0.39	0.332	0.32	0.41	0.41	0.20-5.0
	Fe (PPM)	3.24	2.52	4.57	3.45	3.59	3.56	3.24	4.24	2.5-4.5
	Mn (PPM)	1.62	1.68	2.15	3.69	3.12	3.17	3.12	1.32	2.0-4.0
	Zn (PPM)	0.66	0.65	0.63	0.83	0.52	0.57	0.59	0.68	0.6-1.5

Abbreviations: EC=electrical conductivity, OC= organic carbon, OM= Organic matter, N= Nitrogen, P= Phosphorous and K= Potassium, Cu= Copper, Fe= Iron, Mn= manganese and Zn= Zinc

4. CONCLUSION:

The analytical reports of farming soil showed remarkable variation in physicochemical parameters. The conductivity of soil samples is found in prescribed limit except P_8 plot samples. The organic carbon, organic matter, nitrogen, manganese and zinc is insufficient at some plots. So different sources of organic carbon,

organic matter, nitrogen, manganese and zinc must be added for proper growth and development of the crops on or before planting. These studies give sufficiency and or insufficiency of nutrients in plot soil. On that basis, farmer has select type of crop suitable for his field, arrange the amount and type of fertilizers and nutrients for selected crop to increase the productivity of that crops. It is advised that monitoring of macro and micronutrients in the farming soils should be done periodically as it is an efficient way to assess the qualitative and quantitative abundances of soil nutrients.

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5. REFERENCES

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