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Studies on Soil Chemistry of Latur District, Maharashtra, India

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A B S T R A C T

Regarding yield of the crops and growth regulation fertility of soil is most important but today's scenario of agriculture farming in India is not care about it. Without any analysis farmer used unwanted and abundant quantity of fertilizer and water, both results reduce fertility of soil. For sustainable agriculture development and production, analysis, chemical composition, micronutrient, macronutrients and micro fauna from soil is must. Soil is an important natural resource and plays a crucial role in maintaining environmental balance.
The present investigation deals with the chemical composition of soils collected from 10 villages of Renapur tehsil of Latur district in the Marathwada region of Maharashtra. Thesoil samples were analyzed for nine parameters like pH, Organic carbon,P_2O_5,K_2O, Ca, Mg, Na, and $CaCO_3$ plays an important role about soil fertility and crop yield.

Introduction

Soil sampling is perhaps the most vital step for any soil analysis. As a very small fraction of the huge soil mass is used for analysis, it becomes extremely important to get a truly representative soil sample of the field. Soil test based nutrient management has emerged as a key issue in efforts to increase agricultural productivity and production since optimal use of nutrients, based on soil analysis can improve crop productivity and minimize wastage of these nutrients. Several states including Andhra Pradesh, Gujarat, Haryana, Karnataka and Uttar Pradesh have made commendable progress in soil testing programme in various ways. Soil may be defined as a thin layer of earth's crust which serves as a natural medium for the growth of plants. Soil provides a medium for plant growth to meet our food and fiber need. Soil filters water, decomposes waste, stores heat and exchanges gases and hence have great bearing on environmental balance (Bear, 1976). Fertility of soil is one of the most important factors which regulate growth and yield of crops.

Due to an imbalance and an inadequate use of fertilizers, improper irrigation and various cultural practices the soil quality depleting rapidly (Bacchewar and Gajbhiye, 2011). Soil is an important natural resource and plays a crucial role in maintaining environmental balance (R. Chandra and S.K. Singh, 2009). Its proper use greatly determines the capability

of life support system and socio-economic development of nation (Chaudhari and Ahire, 2013). Micronutrients play an important role in maintaining soil health and productivity of crops for the sustainable agricultural production. The information of soil characterization in relation to fertility status of the soils of the region will be useful. In order to meet the ever increasing food requirement for growing population, it is essential that soil and water resources should be used judiciously. Thephysic-chemical properties of soil play an important role in determining the retention and availability of nutrients in the soils. The nutrient supply in soils is depends on the level of organic matter, the degree of microbial activity, change in pH types and amount of clay and status of soil moisture.

Materials and Methods

Soil samples were collected (0-10cm) from 10 Villages (table 1) in Renapur tehsil of Latur district in the Marathwada region of Maharashtra. Soils were completely air dried and passed through 2mm sieve and stored in properly labeled plastic bags for analysis. The sieved out particles are then oven dried to a temperature around 110^{o}Cfor several hours in order to completely remove any trace of moisture.

The processed soil samples were analyzed for their physico-chemical properties as per standard methods. Soil texture determination was carried out by hydrometer method as outlined by Bouyoucos (1927). Soil pH was determined by using glass electrode pH meter (Shoemaker *et al.,* 1961). Free CaCo3 was determined by rapid titration method (Methods Manual, 2011).

Organic carbon was estimated by modified method of Walkly and Black, 1934. Exchangeable calcium and magnesium was determined by Versenate method (Patil and Shingte, 1982).E.C. was determined by electrometrically (Methods Manual, 2011).

Results and Discussion

pH is an important parameter as it helps in ensuring availability of plant nutrients. It also helps in maintaining the soil fertility. In the present investigation pH ranges from 7.5 to 8.5.The minimum pH (7.5) recorded at village Murdhav and Ghansargaon and maximum (8.5) at Patharwadi, Chukarwadi and Bitargaon. The E.C. values range from 0.24 to 0.36m/s recorded in the study area. Less E.C.(0.24) at Pangaon and maximum (0.36) at Patharwadi. The EC range is within the limit. It indicates soil is salt free. The organic carbon range between 0.60 to 0.88 recorded in which high percentage of O.C.(0.88) recorded in Bitargaon l where as low percentage of O.C. (0.60)recorded in Murdhav. The P_2O_5 range recorded in between 53.5 to 80.3in the study area in which high value of P_2O_5(80.3) recorded at Patharwadi and the lowest value of P_2O_5(53.5)recorded in Pangaon. The K_2Ovalue are recorded in the range of 584 to 852 in which high value of K_2O (852) recorded Pangaon where where as lowest value of K_2O (584) recorded in Bhandarwadi. The Ca value are recorded in between 22.6 to 36.2 in which high value of Ca (36.2) recorded at Chukarwadi and the location lowest value of Ca (22.6) recorded at Wala. The mg value are recorded in the range of 11.6 to 26.3 in which high value of Mg (26.3) recorded at Kamkheda where as lowest value of Mg(11.6) recorded at Ghansaargaon. The Na values are recorded in between 110 to 127 in which highest value of Na (127) recorded at Kamkheda where as lowest value of Na(110) recorded in Bhandarwadi and the CaCo3 values are recorded in the range of 9.6 to 14.4 in which maximum value (14.4) recorded at Murdhav where as the minimum value(9.6) recorded in Pangaon.

Table.1 Village wise chemical parameters of soil samples

Sr.No.	Village	pH	E.C m/s	O.C %	P_2O_5 k/hec.	K_2O k/hec.	Ca m/100gm	Mg m/100gm	Na m/100gm	CaCo3 %
1	Bhandarwadi	8.2	0.28	0.78	62.2	584	30.2	12.6	110	13.1
2	Patharwadi	8.5	0.36	0.82	53.5	670	32.8	13.8	118	14.3
3	Chukarwadi	8.5	0.31	0.76	58.2	820	36.2	14.2	116	12.8
4	Murdhav	7.5	0.26	0.88	60.2	790	30.7	11.8	120	14.4
5	Govindnagar	8.2	0.31	0.68	78.6	760	34.7	16.4	119	12.7
6	Pangaon	8.1	0.24	0.62	80.3	852	28.6	20.6	121	9.6
7	Kamkheda	8.2	0.27	0.74	68.4	842	26.2	26.3	127	13.2
8	Wala	7.6	0.32	0.84	72.2	782	22.6	22.4	114	10.4
9	Bitargaon	8.5	0.34	0.60	56.0	710	34.6	15.2	122	12.3
10	Ghansargaon	7.5	0.32	0.73	72.6	692	30.2	11.6	112	11.12

Hence concluded that the present investigation helps in determining the values of different chemical parameters and the nutrient concentrations of soil samples collected from 10 villages of Renapur tehsil in Latur district of Marathwada region in Maharashtra. All the parameters either directly or indirectly influence on the soil ecosystem. There is a necessity to minimize the use of chemical fertilizers and increase the use of organic manure for agriculture. It is right time to take action about soil fertility otherwise in few years soil will be reduce its fertility and badly impact on agriculture economy of Nation.

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