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Fertility Status of Soil in the Green Belt of Indapur Tahsil, Dist - Pune (Maharashtra) India

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Abstract - The increasing land use intensity without adequate and balanced use of chemical fertilizers. Little or no use of organic manure have caused severe fertility deterioration of soil. Resulting in declining of crop productivity. Study was carried out in the belts namely sample sites 1 to20 which is a green belt of indapur Tahsil in pune district. (Maharashtra) To investigate the fertility status of soil during 2010 and 2011. Present study show that the soil were acidic and alkaline in nature in all season. Available nitrogen & phosphorous and potash show low soils were not sufficiently fertile for crop production.

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I. Introduction

The demand of soil for diverse purpose such as construction, industrial, agriculture urbanization is increasing continuously thereby decreasing soil quality drastically. Soil quality is the capacity of soil to function within natural or managed ecosystem boundaries to sustain plant and animal productivity maintain or enhance water and air quality and support human health and habitation. (D. L Karlen).

Aeration is important in promoting plant growth chemical interaction taking place between aeration condition & chemical composition of the soil (M. M. Rai 2008) The main reason of soil quality degradation in irrigated areas are the inadequate & unbalanced application of agrochemicals fertilizer pesticides to soil (B. Mujumdar & M. P. Sharma) The knowledge of the fertility status of soil is essential for judicious application for higher crop production. ph ,Organic matter ,N, P & exchangeable K, concentration of macronutrients & micro nutrients are appropriate describing soil quality and agricultural productivity.(R.A. Bowman) Bulky organic manures increase organic matter content & hence improve the physical properties and improve in soil aeration and water holding capacity.

II. Experimental

Twenty representative sites from the study area were selected for the characterization of the soil sample. representative sample sites study area that free from waste water soil sampling was done seasonally for wet & dry seasons during 2010-2011

Soil samples were air dried, crushed & screened through 2 mm sieve. Soil Ph determined by Ph meter. Organic matter, N, P, *exchangeable* K analyzed with soil testing kits.

III. Result

Ph of the soil samples were found acidic and alkaline in both the seasons, The study revealed that ph 6.9-9.1 during dry & wet season. larger amount of ionic matter was present in oil sample during dry & wet season.Organic matter of all the sample was found to be higher in wet season compared with the dry season except site S8,S9,S20 The average N concentration in organic material range of 1 to 13% Gibbsite Al(OH)3 adsorb the greatest amount of Phospharous at Ph 4To5. P availability in most soil is of maximum near ph 6.5 (John L. Halvin2010) The range of available P was 7.3 to38.7 in dry & wet season Soil exchangeable potassium as K2O in both seasons was within medium category (<400Kg/ha) in majority of sample in soil . P availability in most soil is negligible at site rajwadi and saradewadi, which is maximum at a site S1, S5, S9, S11, S13 at site of study area of indapur district pune.

Pre - Monsoon 2010
Physicochemical Parameters of Soil

Sr. No.	Sample Site	P^H	N	P	K	C
1	Nimgaon	8.5	142	36.0	303	0.71
2	Kati	8.9	212	7.4	362	0.84
3	Bijawadi	8.4	137	7.3	354	0.81
4	Bhandgaon	7.6	139	21.4	349	0.92
5	Sardewadi	9.1	152	37.0	406	0.93
6	Rajwadi	7.5	283	--	287	1.20

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7	Zagadewadi	7.6	144	21.1	381	0.89
8	Sardewadi	8.0	212	--	125	0.65
9	Zagadewadi	7.5	376	36.2	383	0.61
10	Malwadi	7.6	421	21.3	331	0.79
11	Varkute	9.1	138	38.7	359	0.72
12	Galandwadi	7.1	110	28.6	341	0.88
13	Varkute	7.5	127	41.0	382	0.93
14	Kalthan 1	8.4	256	21.4	352	0.71
15	Kalthan 2	8.6	197	19.1	297	0.90
16	Pondkulwadi	6.9	403	31.9	171	1.01
17	Bhadalwadi	7.2	396	27.2	187	0.91
18	Karewadi	8.1	317	17.4	156	0.94
19	Walchand Nagar	8.3	258	19.6	298	0.76
20	Bankarwadi	8.6	310	24.1	323	0.61

Post - Monsoon 2011

Physicochemical Parameters of Soil

Sr. No.	Sample Site	P^H	N	P	K	C
1	Nimgaon	8.7	167	26.0	341	0.79
2	Kati	9.1	241	13.4	379	0.91
3	Bijawadi	8.5	156	14.3	368	0.86
4	Bhandgaon	7.8	183	27.4	387	0.95
5	Sardewadi	9.0	174	39.2	438	0.98
6	Rajwadi	7.8	294	9.3	314	1.10
7	Zagadewadi	7.6	179	12.1	391	0.90
8	Sardewadi	8.3	272	7.2	215	0.67
9	Zagadewadi	7.8	396	31.2	417	0.72
10	Malwadi	7.6	483	22.3	351	0.84
11	Varkute	9.0	196	28.6	386	0.86
12	Galandwadi	7.4	173	21.6	370	0.90
13	Varkute	7.8	149	35.0	431	1.06
14	Kalthan 1	8.6	279	12.4	383	0.75
15	Kalthan 2	8.5	237	9.6	347	0.96
16	Pondkulwadi	7.2	441	28.9	267	1.01
17	Bhadalwadi	7.4	423	23.7	234	0.97
18	Karewadi	8.3	361	14.4	215	0.97
19	Walchand Nagar	8.6	278	17.6	318	0.86
20	Bankarwadi	8.6	351	21.1	384	0.69

Table 1 : Standard Specification for soil - ISO

Sr. No	Parameters	Std. permissible limit
1	pHtr	6.5 to 9
2	Organic carbon	1 to 3 %
3	Phosphorous pent oxide	55 Kg/acre
4	Potassium oxide(potash)	300 Kg/acre

IV. Discussions

Soil PH data showed that it was slightly declined in the wet season in all the locations due to runoff of nutrients in the rainy season. continuous expose of soil to highly alkaline irrigation effluents leads to salinity in soil making it unsuitable for irrigation purpose (P. K. Bauru) soil sample were found more acidic in wet season than the dry seasons by the leaching effect of rain water during summer which replace basic cat ions (Ca+, Mg+, Na+, and K+) with H+ ions .Applicable of long term inorganic fertilizers instead of green manure farmyard manure and crop straw residues had also enhanced in decreasing soil Ph (K.N. Tiwari) Thus Micro nutrient Fe ,Cu ,Zn in soil were more available to plant . The availability of N, P, K& organic carbon decreases with the decrease in ph. The increase in EC due to agricultural runoff from farmland and domestic waste water disposal. Low soil ph in wet seasons is due to higher leaching induced by heavy rainfall in the absence of adequate amount of soil organic matter.

Agriculture soils of the study area promote soil aggregation prevent losses of nutrient and enhance the mineralization of organic N;P making a suitable environment for plant growth [C.Palm.et.al] organic matter content thus may serve as a reservoir of plant nutrients promoting water storage as well as microbial activity .Organic carbon content of surface soil increased significantly in wet seasons in all sampling sits with incorporation of waste organic substances .application of domestic waste products, green manure, farm yard manure and crop straw residue with fertilizer in fields by the rural people of the study area might also increased Organic Matter in wet season available N content in wet season was found to be higher in majority of soil sample which might be due to the extensive application of nitrogenous fertilizers and also the decomposition of domestic waste product in aqueous environment. Which is increase in available N in surface of soil might be attributed to the direct addition nitrogen through farmyard manure and green manure to the soil. Available P in soil samples show medium to high category and it was found to be decreased from dry season to wet higher amount of organic matter in wet season enhanced the mineralization of organic P to available P. due to higher rainfall and higher rate of decomposition of organic matter increase the leaching of available P from surface soils [Jayswal et .al] due to smaller size of k+ ion it can be easily leached from the surface soil during the rainy season , continuous use of fertilizers and intensive cropping had resulting in lowering of potassium status of soil indicating need to apply the potassium to the crop macro-nutrient (N , P, K, Ca, Mg, Na are needed in plant relatively higher amount than micro nutrients (Fe,Mn,Cu,Zn etc.) [Dilip kumar Das 2004]

V. Conclusion

The study was the understanding of complex nature of soil using an integrated approach which can be applied to monitor, soil quality of fields and support management decisions .Socioeconomic issues also have a strong effect on soil .quality. hence the soil quality assessments were successful in reconciling farmers and scientific knowledge the results indicate that without both local and scientific knowledge a satisfactory level of crop production and maintenance of soil quality cannot be achieve at the same time ,therefore researchers must continue to face the challenge to provide base for bridge building between farmers and scientist knowledge reconciling local and scientific knowledge is one of the most important steps towards evaluating the feasibility of alternative production systems and sustainability of land use in terms of long term soil quality.

Now it is the demand of the time to developed an integrated inorganic, organic soil fertilization program me for higher crop yield and improved soil health to achieve the goal of increase and sustained soil productivity without inclusion of integrated inorganic, organic fertilization, programmed with special attention.

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