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ORIGINAL ARTICLE

"TO ASSESS FERTILITY STATUS OF SOILS FROM PADDY FIELDS IN THE DAPOLI TAHSIL OF RATNAGIRI DISTRICT, MAHARASHTRA (INDIA)."

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Abstract:

The present study have been attempted to evaluate soil fertility status from the soils from dapoli tahsil, Ratnagiri District Maharashtra. The 11 soil samples were collected and analyzed for the various basic parameters like pH, Electrical Conductivity (EC), Organic Carbon (OC), and macronutrients like N (Nitrogen), P (Phosphorous), and K (Potassium). The pH of the soil ranges from 5.77 to 7.95 reflecting slightly alkaline nature of the soil. The EC ranging from 0.09 - 0.19 mS/cm. EC of the soil samples indicates the salt free nature of the soil in all samples. The values of the OC ranges from 0.57 to 2.06 % in the soils of tahsil. Majority of the villages 72.72 % have low proportion of the N and 54.54 % villages having medium proportion of P. The proportion of K is high in 72.72 % villages and medium in 27.27 %. This means that the soils in the tahsil lack in N. Low status of Nitrogen and organic carbon indicates the need of adequate Nitrogen fertilization with biofertilizers. The paper suggests the strategy to use biofertiliserss at least 25% per years along with chemical fertilizers.

KEY WORDS:
Soil fertility, Organic matter, Biofertilizers, Nutrient availability.

INTRODUCTION

The organic-matter content of soils of coastal regions is usually low under virgin conditions. It commonly increases with the application of irrigation water and cultivation (Richards L.A. 1954). The optimum plant growth and crop yield depends on the availability nutrients in soil which in turn is controlled by physico-chemical properties like- soil texture, organic carbon and calcium carbonate, cation exchange capacity, pH and electrical conductivity of soil (Bell and Dell, 2008). Intensive cropping, removal or burning of crop residues, imbalanced use of chemical fertilizer and extra tillage have led to the depletion of soil organic matter reserves (Speir et al 2004).

Further, use of excess chemical "N" fertilizer has been associated with increased level of NO3 –N in groundwater and surface waters as observed by Wehrman and Scharpf (1989), More (2008), Bhagat (2002) etc. Similar effects of other nutrients like K and P have been observed by Stanley et al (1995), Dadhich and Somani (2007), Kizilgoz and Sakin (2010) and Naidu et al (2011). The quantity and forms of nitrogen in soils is constantly changing due to biological, chemical, and physical processes and hence it is necessary to study the soils in the study area in the context of cropping pattern, irrigation and market intervention.

Study Area:

Dapoli tahsil has been selected for the study. The absolute location of study area can be expressed as from 170 75' N latitude and from 730 18' E Longitude. The study area lies in the west coast of ratnagiri

district in the coastal area.

Methodology:

Soil samples (0-15 cm) were collected from 11 sites (Fig No: 01) covering 11 revenue villages in the dapoli tahsil. Soils were completely air dried and sieved through 2mm sieve and stored in properly labeled plastic bags for analysis. The names of the sampling stations are given in Table No: 1. The processed soil samples were analyzed for basic soil parameters (pH, EC, OC) and for macronutrients (N, P, K) by using standard procedures set by Ministry of Agriculture, Government of India (MOAGOI 2011).

Table No: 01 Dapoli Tahsil Soil Parameters.

Sr.No	Name of village	pH	EC Mmho ms/cm	OC Organic Carbon %	N Kg/ha	P kg/ha	K kg/ha
S1	Umbershet	6.64	0.11	1.2	135	5	280
S2	Kelshi	5.77	0.13	1.09	289.5	15	847
S3	Anjarla	6.60	0.12	0.912	243	10	377
S4	Harne	7.69	0.19	0.56	208	8	269
S5	Karde	6.80	0.15	1.15	213	18	874
S6	Murud	7.95	0.11	1.38	292	14	271
S7	Panchnadi	6.18	0.13	0.74	189	17	330
S8	Vanoshi	6.41	0.15	0.86	140	8	284
S9	Kolthare	7.40	0.09	0.68	129	20	548
S10	Burondi	6.72	0.14	2.06	295	25	309
S11	Karjagao	7.00	0.11	0.744	185	13	560

Soil pH:

Most nutrients are available to plant in the pH range of 6.5 to 7.5 (DOAGOI 2011).
In the Dapolitahsil the pH ranges from 5.77 to 7.95 reflecting moderately alkaline nature of the soil. This means that pH environment is moderately good in all the tahsil under study.

Electrical Conductivity (EC):

The EC values ranges from 0.09 to 0.19 mS/cm (Table No: 02). All the samples from total 11 villages show EC values in salt free category, It indicates salt free nature of soil.

Table No: 2 General Interpritation of Electrical Conductivity values (MOAGOI 2011).

Soil	**EC**	**Samples**
Salt Free	0-2	S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11
Slightly Saline	4-8	Nil
Mod Saline	8-15	Nil
Highly Saline	<15	Nil

Organic Carbon (OC):

The values of the organic carbon ranging from 0.5 to 2.06 % (Table No: 03) in the tahsil. These values are compared with the critical limit for delineation of the Soil fertility (Table No: 03). Such kind of soil requires adequate nitrogen fertilization through organic manure, biofertilizers and farmyard manure (Deshmukh 2012).

Table No: 03 General Interpretation of Organic Carbon (MOAGOI 2011).

Category	Organic Carbon	No. of Samples
Low	< 0.50	nil
Medium	0.50 to 0.75	S4,S7, S9,S11
High	> 0.75	S1,S2,S3,S5,S6,S8,S10

Available Nittrogen (N):

Considering this kind of importance of the nitrogen attempt has been made to evaluate available Nitorgen form the soils of the tahsil. The results are shown in the table (No: 4).

The available Nitrogen ranges from 129 to 292.5 Kg/ha. The sample number S1, S3, S4, S5, S7, S8, S9, and S11 shows low status of Nitrogen. However, the sample number S2, S6, S10 shows medium status of soil. It shows that the soil from the tahsil has low status of the nitrogen. The proportion of Nitrogen in the soils of the India is very low (Deshmukh 2012, Saptarshi 1993). Hence, adequate Nitrogen fertilization needs to be added to the soils of the tahsil.

Available Phosporous (P):

The present analysis report reveals that the available P status in the soils of the tahsil ranges from 5 to 25 Kg/ha. It is evident from the table (Table No: 04) that the 04 samples show low while 06 samples having medium status and only one sample shows high status of P in the soil. This is possibly due to moderately alkaline condition of soil.

Available Potassium (K):

The available K in the Soil ranges from 269 to 874 Kg/ha. Three samples shows medium and 08 samples shows high status of K in the soil.

Table No: 04 Nutrient Status of Soil Generally Followed At National Level (MOAGOI 2011).

Nutrients	**SOIL FERTILITY RATING**		
	Low	**Medium**	**High**
Av. Nitrogen (Kg/ha)	**< 280**	**280-560**	**> 560**
No. of Samples	S1, S3, S4, S5, S7, S8, S9, S11 **(72.72%)**	S2, S6 ,S10 **(27.27%)**	**Nil**
Av. Phosporous (Kg/ha)	**<10**	**10-24.6**	**>24.6**
No. of Samples	S5, S3,S4, S8 **(36.36 %)**	S2.S5,S6, S7, S9, S11 **(54.54%**)	S10 **(9.09 %)**
Av. Potassium (Kg/ha)	**<108**	**108-280**	**>280**
No. of Samples	**Nil**	S1,S4,S6 **(27.27 %)**	S11, S2, S3, S5, S7, S9, S10, S11 **(72.72 %)**

Conclusion:

The study reveals that soils from the tahsil are moderately alkaline in Nature. The result of EC reveals that the soil is free from salinity. Organic Carbon ranges from 0.5 to 2.06 %. Low status of OC is probably due to moderately alkaline conditions.

The available nitrogen and phosphorus in the soils are in low category. However, medium to higher content of K was observed in the soils. The high value of K in the soils indicates use of intensive agricultural practices. The information from our study could be incorporated in the soil fertility management of tahsil.

It may be suggested that the farmers should adopt the model of optimization of water resources so that crop diversity would be maintained without compromising profitability. This may further be reinforced by increasing use of biofertilizers replacing chemical fertilizers at least by 25% per year.

References:

Bell, R.W. and Dell, B. (2008): Micronutrients for Sustainable Food, Feed, Fibre and Bioenergy Production. First edition, IFA, Paris.

Bhagat, Vijay (2002): Agro-based model for sustainable development in the Purandhar tahsil of Pune District Maharashtra, Unpublished Ph.D thesis submitted to University of Pune (2002).

Dadhich, S. K. and Somani, L. L. (2007): Effect of integrated nutrient management in Soybean-Wheat crop sequence on the yield, micronutrient uptake and post-harvest availability of micronutrients on Typic Ustochrepts soil. Acta Agronomica Hungarica, Volume 55, No 2 , p205–216.

Deshmukh, K. K (2012): Evaluation Of Soil Fertility Status From Sangamner Area, Ahmednagar District, Maharashtra, India, Rasayan Journal of Chemistry, July- September, 2012 Volume. 5 , No.3 , p 398-406 .

Kizilgoz, I. and Sakin, E. (2010): The effects of increased phosphorus application on shoot dry matter, shoot P and Zn concentrations in wheat (Triticum durum L.) and maize (Zea mays L.) grown in a calcareous soil. African Journal of Biotechnology,Volume 9, No 36 p 5893-5896.

Ministry of Agriculture, Government of India, MOAGOI (2011): Methods manual, Soil testing in India. Department of Agriculture and Corporation, Ministry of Agriculture, Government of India. New Delhi. January 2011.

Naidu, L. G. K. V. Ramamurthy, G. S. Sidhu and Dipak Sarkar (2011): Emerging deficiency of potassium in soils and crops of India, Karnataka J. Agric. Sci, Volume 24 No: 1 , p 12-19.

Richards, L.A. (1954): U.S. Salinity Laboratory Staff, Diagnosis and Improvement of saline and alkali soils, USDA, Handbook No. 60, U.S. Dept of Agriculture, Washington D.C. (1954).

Saptarshi, Praveen (1993): Resource appraisal and Planning strategy for Drought prone areas_ A case study of Karjat tahsil District Ahmednagar, Maharashtra. Unpublished P.hD thesis submitted to University of Pune (1993).

Speir, TW, Horswell J, Mclaren RG, Fietje G Van Schalik AP (2004): Composted biosolids enhance fertility of a sandy loam soils under dairy pasture. Biol Fertility Soils p 349-358.

Stanley, C.D., NcNeal B.L., Gilreath P.R., Creighton J.F., Graham W.D. and Alverio G (1995): Nutrient loss trends for vegetable and citrus fields in west-central Florida: II. Phosphate. J. Environ.Qual.Volume 24 p 101–106.

Wehrman J. and Scharpf H.C (1989): Reduction of nitrate leaching in a vegetable farm: fertilization, crop rotation, plant residues. In: Germon J.G. ed., Management Systems to Reduce Impact of Nitrates. Elsevier, London, UK, p. 147–157