

Journal of Chemical, Biological and Physical Sciences



An International Peer Review E-3 Journal of Sciences

Available online at www.jcbpsc.org

Section D: Environmental Sciences

CODEN (USA): JCBPAT

Research Notes

Assessment of Soil Fertility of Agricultural soil of Nandurbar District, Maharashtra, India

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Received: 09 September 2014; **Revised:** 14 October 2014; **Accepted:** 18 October 2014

Abstract: The present paper investigates the variation in soil fertility status of the soils land forms of Nandurbar district of Maharashtra, India, banana yards of various localities were undertaken. The survey includes six banana yards and surface soil samples up to depth of 40 cm were collected and after drying were passed through 2 mm sieve. The soil samples were analysed for various parameters. The results of total and available N, P and K contents as well as total Fe, Mn, Cu and Zn contents in the soils were reported.

Keywords: Banana, Nitrogen, Phosphorous, Potassium, pH, Electrical conductivity.

INTRODUCTION

Nutrient depletion and soil degradation have gradually increased and have become serious threats to agricultural productivity in India. Soil fertility is the essential elements of soil quality. Among these, the problem of decline in soil fertility may reduce the maximum growth in productivity¹. Depending upon the cropping pattern, leaching, erosion, fertilizer used etc., soil loses a considerable amount of nutrients and micronutrients every year. Continuous cropping pattern over a period of time without nutrients being restored to the soil, its fertility and crop yield will be reduced^{2, 3}. It is also a medium that is challenged by changing environmental and management conditions⁴. Soil resource is nonrenewable thing in human time scales⁴. The importance of soils to humankind is documented by the many ancient and old civilizations, some of which vanished because mismanagement destroyed the soils on which they depend⁵. Hence, soils must be managed so that they remain helpful to environmental forces and stresses that are a result of farming itself, and this can only be achieved by balancing outputs from the soils with input to it⁶.

The Nandurbar district is one of the tribal district of Maharashtra. The main horticulture crops cultivated in the district are papaya, mango, banana etc. The yield of crop depends on soil fertility and presence of micronutrients in the soil.

EXPERIMENTAL

Six representative sites in and around Nandurbar district were selected for the characterization of the soil samples. From the selected sites, samples were collected in polythene bags, as per the standard procedures. Soil samples were first dried in air under the shade then powdered gently with wooden mallets and sieved through 2 mm sieves then stored in clean polythene bags for the analysis of different parameters. Physicochemical parameters of collected samples were determined by the methods suggested in the literature^{7, 8}. The pH, electrical conductivity, organic carbon, available phosphorus and available potassium were also determined by reported methods⁹⁻¹³. The micronutrients are determined by reported methods¹⁴.

RESULTS AND DISCUSSION

The physicochemical characteristics are given in Table 1, revealed that, soil was clay in texture which is considered to be quite fit for banana growing. The pH values of the soil samples ranged from 7.51 to 8.42, slightly above the optimum range considered to be satisfactory for banana crop cultivation. The normal electrical conductivity (EC) values were observed in the range of 0.415 to 1.060 mhos/cm. The increase in EC value may be due to agricultural runoff and accumulation of salts. Organic carbon content varied from 0.15 to 0.44 (%). The higher organic matter contents (Koparli) may be due to decay of plants residues in soil. Available nitrogen content in the banana fields ranged from 67.2 to 194.88 kg/ha. Lower nitrogen values recorded for sample Amlad and higher value was recorded for Koparli. The higher available nitrogen content in the banana soil is due to application of Inorganic fertilizers. The available phosphorus in the soils ranged from 9.85 to 21.28 kg/ha. The lower and higher values of phosphorus were reported for samples Chikhali and Borad respectively. Since the soils are rich in hydrated as well as amorphous oxides of Fe and Al, the potent source of ‘P’ immobilization, P content in the samples. Available P content was medium at some sites in the study area where pH was neutral. The near neutral pH have a significant role in enhancing P availability. The available P content, increases with pH value and decreases with organic carbon. Data pertaining to available potassium ranged from 300.16 to 470.72 kg/ha. The sample Borad has low potassium content. The available potassium content was high in Sample Koparli. In highly weathered soils, the reduced potassium content. The micronutrients Fe, Cu, Mn and Zn also studied, that Fe found lower at Lonkheda-5.43ppm & higher at Koparli-11.24 ppm, Cu recorded low at Amlad-2.27 ppm & higher at Borad-3.98 ppm, Mn recorded low at Damarkheda-4.86 ppm higher at Lonkheda-12.12 ppm, and Zn recorded low at Amlad-0.45 ppm & higher at Damerkheda-1.8 ppm

Table 1: The physicochemical characteristics

Taluka	Sample Name	pH	EC Mhos/ cm	OC (%)	N Kg/ha.	P Kg/ ha.	K Kg/ha.	Fe ppm	Cu ppm	Mg ppm	Zn ppm
Shahada	Chikhali	7.51	0.415	0.41	103	9.85	339.36	10.9	3.12	11.59	1.22
	Dambarkheda	7.88	1.060	0.33	147.84	18.81	393.34	6.3	2.68	4.86	1.8
Taloda	Amlad	7.63	0.689	0.15	67.2	10.52	345.28	8.78	2.27	10.12	0.45
	Borad	8.42	0.477	0.23	103.04	21.28	300.16	9.5	3.98	9.44	1.22
Nandurbar	Koparli	7.92	0.438	0.44	194.88	9.85	470.72	11.24	3	10.92	0.48
	Lonkheda	7.94	0.803	0.39	174.72	20.60	422.56	5.43	2.9	12.12	1.08

CONCLUSION

The present study shows that there is wide variation in soil fertility status of Nandurbar district. The different nutrients have to be restored through chemical fertilizers or organic manures to maintain soil health. Based on soil fertility and climatic conditions of Nandurbar district is well suited for Horticulture crops like Banana, Papaya Mango etc.

ACKNOWLEDGMENT

Authors are great fully acknowledge to Principal V.N. College, Shahada for providing necessary laboratory facilities. Authors are also thankful to P.S.G.V.P.M. s Institute of Horticulture Shahada.

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