IJSRM
INTERNATIONAL JOURNAL OF SCIENCE AND RESEARCH METHODOLOGY
An Official Publication of Human Journals

Human Journals
Research Article
February 2018 Vol.:8, Issue:4

Physico-Chemical Characteristics of Agricultural Soil Profile in Sangamner Taluka

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Submission: 25 January 2018
Accepted: 31 January 2018
Published: 28 February 2018

Keywords: Physico-Chemical, Characteristics, Agricultural, Soil Profile

ABSTRACT

Sangamner tahsil having total population of 3,53,566 covering area of 1,67,796.34 hectares. Out of the total area that 10,5883.67 hectares land is under cultivation, 27,691.34 hectares land is under forest. Sangamner area and its economy is dependent mainly on the agriculture and agro based industries. The area receives rainfall, chiefly from the south waste monsoon between June and September as the area falls under the rain shadow zone of Western Ghat and receives very low precipitation, annual rainfall ranging from 290 to 594 mm. Integrated use of organic and inorganic fertilizers has better effects on crop growth and yield components of crop as well as soil health than alone.

INTRODUCTION:

In recent years agriculture development has been changed from conventional and traditional farming method too more intensive practices using chemical fertilizers and pesticides with irrigation facilities. Continuous use of chemical fertilizers slowly changed soil properties, ultimately the production in long run is reduced [3]. It has resulted in leaching of chemical into the surface and groundwater. Due to increasing demand for cash crops, the practice of monoculture cropping pattern has further helped to deteriorate water as well as soil quality.

Sangamner area is located in the northern part of the Ahmednagar district of Maharashtra State. The Sangamner tahsil lies between 180 36' N and 1901' N latitude and between 740 1' W and 740 56' W longitude. The Sangamner town is located on the confluence streams of Pravara and the Mhalungi River which is at a distance of 150 km from Pune, on Pune-Nasik National Highway No. NH-50. The area is drained by the Pravara River, which originates in the hilly region of Western Ghats at Ratangarh. Geologically, basalts underlay the Pravara basin. In general, the climate is dry and hot the average maximum temperature during summer is as high as 42^0C in month of May and average minimum temperature falls up to 10^0 C during the month of December.

MATERIALS AND METHODS:

The soil samples were collected as per standard method recommended by ICAR New Delhi, carefully from the different farms at the various depths. While collecting soil samples the upper layer of vegetation, surface litter, stones stubble if any were cleared away. The soil samples were collected in the properly labeled plastic bags and monitored for the various soil quality parameters. The sieved soil samples were used for physical and chemical analysis.[1, 2,10]

The soil pH was determined by Potentiometric pH meter having combined glass electrode and reference electrode using 1:2.5 soil: water suspension ratio by Jackson[4] Electrical conductivity (E.C.) was determined with the help of conductivity meter using soil ratio 1:2.5 by Richard[7] Organic carbon was determined. Available nitrogen was determined by alkaline permanganate method by Subbiah and Asija [9] Potassium is one of the many exchangeable cations, its level and availability is governed by the ions on the exchange complex.[5] and mechanical analysis by international pipette methods.

RESULTS AND DISCUSSION:

The relative proportion of different soil particles such as clay, silt and sand play the most role in productivity.[6] The physicochemical parameters of soil play a major role in the growing, survival and productions as well as water quality[8]. The physicochemical properties of soils are shown in Table 1and 2.

Table 1. Physical properties of soils

Soil no.	Mechanical composition				Textural Class	Maximum water holding capacity %
	Coarse sand (%)	Fine sand (%)	Slit (%)	(Clay %)		
S1	23.24	11.08	25.23	36.65	Clayey	47.15
S2	19.70	12.25	23.18	40.7	Clayey	54.40
S3	6.51	15.12	31.44	42.75	Clay loam	56.37
S4	24.30	12.98	25.21	33.65	Silty clay	49.50
S5	17.65	9.70	27.2	39.3	Clay loam	46.06

Table 2. Chemical properties of soils

Soil no.	Soil pH 1:2.5	Electrical conductivity (E.C.) dsm^{-1}	Organic carbon %	Available N kg/ha	Available P kg/ha	Available K kg/ha
S1	8.36	0.91	0.55	134.52	39.6	833.28
S2	8.36	0.91	0.72	190.93	28.6	734.76
S3	8.23	3.59	0.48	298.45	16.0	685.4
S4	8.37	1.95	0.55	160.60	33.6	710.56
S5	8.43	1.02	0.63	226.82	37.0	542.4

The physical-chemical properties of soil from lift irrigation area, are presented in Table 1and 2.

The soil of Sangavi (S1) Nimgaon paga B.K (S2) having clay percent 36.65 and 40.7 respectively comes under clayey textural class. While the Jorve (S3) and Rahimpur (S5) village soils are of clay loam textural class and the soil lift irrigation from Kolhewadi (S4) village was silty clay loam. It was observed that in al the sita the percentage of clay was maximum followed by silt while sand percentage was minimum in soil. The maximum water holding capacity in all areas varied 46.06 to 56.37 percent.

Soils significantly vary in their chemical properties. This includes set of parameters like pH, electric conductivity, organic carbon, organic matter and available NPK. The soil pH and

electrical conductivity were higher in irrigation area (8.35 and 1.68 dSm-1) The higher pH and electrical conductivity in irrigation area was might be because excesses use of water to percolated in lower soil horizon and dissolved the soluble salts.

Organic carbon and organic matter content of soil from all the five areas of experimentation were in the class of low organic carbon. The nutrient fertility status with respect to available nitrogen content was low in irrigation, areas 202.64, kgha-1. Whereas, the available phosphorus and potassium were in higher fertility class in irrigation area (30.96 kgha-1 and 701.28 kgha-1. The higher nutrient fertility status in irrigation fields might be associated with intensive cultivation and plantation of cash crops like sugarcane, cotton, fruit crops etc. in which use of fertilizers as practiced by the cultivators.

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