Study of Soil Parameters of Agriculture Land of Mehsana District, North Gujarat, India

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Abstract: In present research work**,** we have made analytical study of chemical parameters of agricultural soil of different villages of Mehsana district of North Gujarat**.** My primary focus is to study of Moth beans which is based on randomly selected 20 soil samples. Soil samples were collected by locally trained farmers and brought for soil test at Laboratory. Soil analysis is done by standard methods. The aim of this work is to study the fertility of soil of different agricultural land of Mehsana district by measuring soil parameters,

Key words: Soil, Moth, Nutrient, Mehsana, North Gujarat.

INTRODUCTION :

For analysis of soil, it is necessary to know the fundamental needs of soil. Soil is a natural medium which provides water, nutrients, air and heat to the plants for its wholesome growth and give mechanical support to the plant. Soil is a reservoir of major nutrients required by the crops but it doesn't provide all the necessary nutrient immediately as requirement of plants. The aim of this analysis is to assess the surplus, adequacy or deficiency of available nutrients for growth of crop and to monitor change by farming of crop. Plant growth depends on fertility of soil and soil fertility is determined by the availability of nutrients either in the form of macro or micro.

The area of this study is agricultural land of different taluka of Mehsana district which is situated in North Gujarat in India. Its area is more than 4,500 km². The temperature variation is 45ºC (max.) to 12ºC (min.) and   average rainfall is 800-900 mm.

Major soils are medium black, sandy and hydromorphic type. Major field crops are bajra, green gram, castor, groundnut, cotton, wheat, moth bean and major horticultural crops are mango, papaya, banana, cucurbits etc.

MATERIALS AND METHODS:

We have selected 20 soil samples based on Moth crop from different agricultural land of Mehsana district for this study. The detail of the collected soil samples are shown in table 1.

Table No-1   Identification of Soil samples

SAMPLE NO.	NAME OF VILLAGE	NAME OF TALUKA	SAMPLE NO.	NAME OF VILLAGE	NAME OF TALUKA
1	Manekpura	Vijapur	11	Vav	Satlasana
2	Kada	Visnagar	12	Kansa	Visnagar
3	Aithor	Unjha	13	Transvad	Kheralu
4	Gunjala	Mehsana	14	Pilvai	Vijapur
5	Nandasana	Kadi	15	Kadi	Kadi
6	Bechraji	Bechraji	16	Sunshi	Visnagar
7	Kukarvada	Vijapur	17	Undhai	Kheralu
8	Pimpaldar	Kheralu	18	Karali	Unjha
9	Soneripura	Mehsana	19	Malosan	Vijapur
10	Kharod	Vijapur	20	Kamana	Visnagar

TOOLS AND TECHNIQUES:

Mean, Maximum, Minimum and Standard Deviation are calculated from the measured soil parameters. Descriptive statistical analysis is used to analyze the data of soil samples. Variables like Phosphorus (P), Potassium (K), Electrical Conductivity (EC), Organic Carbon (OC) and pH are included in this study for analysis.

SOIL SAMPLING AND ANALYSIS:

These samples were collected by a systematic sampling strategy at 0 to 15 cm depth below the surface of soil. The samples were dried and passed through a 2 mm sieve to prepare them for testing. All the samples were tested using standard Manual-Soil Testing Methods used in India.

Physical parameters like electrical conductivity (EC), phosphorus (P), potassium (K), Organic carbon (OC) and pH are measured for different collected soil samples.

RESULTS AND DISCUSSION:

The statistics analysis of parameters of soil samples are shown in table 2. The pH parameter of collected soil samples varies between the range 8.7 and 6.9 with the mean value of 7.69. As presented in table-2 and table - 3, pH value indicates soils are neutral to alkaline in reaction. (6.9 -8.7).Majority samples are alkaline and 5% samples are neutral. No sample is acidic in nature (pH < 6.5). The Electrical conductivity (EC) is varied from 0.27 to 0.55 dScm-1 with a mean value of 0.40 dScm-1. The values of EC is in the range 0 - 2. This shows that all samples are salt free (ref: table 3). Organic carbon (OC) of the soil is varied from 0.35– 0.76 with a mean value of 0.58 as in table-2. It is very low (< 0.50) in 5% soil samples, 90% soil samples are medium and 5% samples are with high value (> 0.75). Phosphorus(P) parameter in the samples is 30–52 kg/ha.

Table 2: Soil characteristics of selected samples from the study area

Sample No.	P	K	OC	pH	EC
1	46	252	0.66	7.3	0.28
2	38	248	0.65	7.7	0.32
3	42	262	0.57	7.4	0.27
4	42	270	0.76	6.9	0.42
5	35	268	0.72	8.1	0.42
6	30	242	0..66	8.5	0.55
7	37	232	0.55	8.2	0.33
8	46	281	0.47	7.6	0.45
9	48	291	0.64	8.7	0.47
10	52	266	0.35	7.3	0.28
11	47	256	0.48	7.0	0.36
12	45	244	0.54	8.1	0.38
13	42	257	0.68	7.9	0.41
14	36	264	0.72	7.6	0.52
15	38	245	0.59	8.2	0.47
16	32	232	0.52	7.6	0.37
17	38	278	0.65	7.3	0.38
18	36	271	0.74	7.3	0.44
19	48	283	0.71	7.8	0.53
20	52	263	0.63	7.2	0.43
Mean	41.5	260.2	0.58	7.69	0.40
Minimum	30	232	0.35	6.9	0.27
Maximum	52	291	0.76	8.7	0.55
Standard Deviation	6.37	16.49	0.11	0.49	0.083

Table – 3 General Interpretation of Soil Parameters

Parameters	pH	EC dS/cm	OC %	K Kg/ha	P Kg/ha	S
Interpretation	< 4.6 Extremely Acidic 4.6 – 5.5 Strongly Acidic 5.6 – 6.5 Moderate Acidic 6.6 – 6.9 Slight Acidic 7 Neutral 7.1 -8.5 ModerateAlkaline > 8.5 Strongly Alkaline	0 – 2 Sault free 4– 8 Slightly Saline 9-15 Moderate Saline >15 Highly Saline	< 0.5 Low 0.5 – 0.75 Medium > 0.75 High	< 108 Low 108 –280 Medium >280 High	< 10 Low 10 –24.6 Medium >24.6 High	8 – 10 (ppm) Critical limit

It is observed that phosphorous in all the samples are of high range (> 24.6). It can be due to high fertilizer practice. In case of potassium no sample is in low range. Among 20 samples, 85% contains medium amount (108 – 280) whereas remaining 15% are with very high amount (> 280). It may be due to use of over fertilizers.

CONCLUSION :

Study shows that the study area is free from salt, not even acidic in nature. It is moderately neutral in nature. Very high value of potassium and phosphorus indicates much use of fertilizers. EC and pH of study area are fairly good for agriculture.

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