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Original Research Paper

Soil characterization of some villages of vaav taluka of Banaskantha district of Gujarat – India

Chemistry

KEYWORDS :

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ABSTRACT

We did Physico-Chemical study of soil based on various parameter like PH, Electrical Conductivity(EC), Total Organic Carbon, Available Phosphorus (P2O5) and available Potassium (K2O). Study lead us to the conclusion of the nutrient's quality of soil of Vaav Taluka. District Banaskantha, Gujarat State. Soil sampling is the most vital step for any soil Analysis. It becomes extremely important to get a truly representative soil sample of the field as a very small fraction of the huge soil mass is used for analysis. The result show that overage all the villages of Vaav taluka have various parameter like EC, PH, OC, P, K. Such studies help farmers to decide the problems related to soil nutrients and amount of fertilizers to be added to soil to increase yield of crop.

Introduction:

Soil sampling is perhaps the most vital step for any soil analysis. As a very small fraction of the soil is used for analysis, routine Soil tests measure only a portion of the total pool of nutrients in the soil[1]. It provides an index describing the availability of nutrients for plant uptake. Soils have large amounts of plant essential nutrients but only a small fraction are in the form that can be taken up directly by plants. Soil analysis can improve corp productivity and minimize wastage of these nutrients. Deficiencies of primary, secondary and micronutrients have been observed in intensive cultivated areas.[2] Several state including Andhra Pradesh, Gujarat, Haryana, Karnataka and Uttar Pradesh have made commendable progress in soil testing programme in various ways. Soil is the medium in which crops grow and hence Soil fertility plays a vital role to increase crop yield. Certain external factors such as air, temperature, light, mechanical support, nutrients and water affect plant growth.

Soil samples of 29 different villages of Vaav Taluka of District Banaskantha were studied. The physicochemical properties such as moisture content, specific gravity, PH measurement and estimations of Organic Carbon, Phosporus, Potassium and Electrical Conductivity were well studied. The fertility of the soil depends on the concentration of N,P,K organic and inorganic materials and water. Amount of nutrients to be added to soil for crop production depend on their present amount in that soil. Fertilizer addition is recommended, now a days on STR (Soil Test Recommendation) basis which determines the amount of major nutrients (N, P, K). Soil analysis determines the quality of soil terms of its nutrient contents (high, medium, or low). On the basis of soil analysis data, it is recommended to suppliment the deficient nutrients.

This interpretation system is meant strictly for the determination of current soil suitability for agronomic or horticulture crop production. Slope, ground cover, incorporation of nutrient sources, timing of application and other considerations all affect the potential movement of nutrients off-site and their potential for adverse environment impact on surface and ground water [3,4]. Fertility is the fundamental feature of the soil that results from the vital activity of micro- population of plant roots of accumulated enzymes and chemical processes, generators of biomass, humus, mineral salts and active biologic substance. The fertility level is related with the potential level of bioaccumulation and mineralization processes, these depending on the programme and conditions of the ecological subsystem evolution and on anthropic influences". This definition has the quality to be analytical. Understanding the definition in detail, the analyses of soil samples can be used for quantifying the level of soil fertility. Present study is an attempt to find out the nutrient's quantity in soil Vaav taluka in Banaskantha District, Gujarat. This information will help farmers to decide the amount of fertilizer to be added to soil to make the production economic. The objective of this paper was to analyze the trend in PH, EC, OC, P, K status of soils of Vaav taluka in Banaskantha District, Gujarat State.

Experiment:

The quality test survey of the soil was conducted in 2013. Twenty nine villages from Vaav Taluka District Banaskantha were selected for this study. A representative soil sample collected from each village. Representative soil samples were collected following standard quadric procedure and taken in polythene bags. In laboratory these samples were analyzed for different chemical parameters following standard methods [5]. AR grade reagents and double distilled water were used for soil analysis. Results were compared with standard values to find out low, medium or high nutrient's content essential for STR [6].

The collected samples were analyzed for major Physical and Chemical soil quality parameter like PH, Electrical Conductivity (EC), Organic Carbon (OC). Organic matter is oxidized with chromic acid (Potassium Di-chromate, +2 H2So4). This method is widely used in Indian Laboratories. The K and P analysis by standard method. PH was measured using PH meter, EC was measured using a conductivity meter, OC was measured using calorimeter, Potassium was measured using Flame photometer, Phosphorus was measured using Spectrophotometer.

(1) Soil Temperature :- Soil temperature is one of the most important soil properties that effect crop growth. The major source of heat is sun and heat generated by the chemical and biological activity of the soil is negligible.

(2) PH :- The soil reaction or PH is meant to express the acidity or alkalinity of the soil. The PH is very important property of the soil is it determines the capacity. The PH values fluctuated less than 8.5 (Table-1). The limit of PH value for soil Acidic. < 6.5, Normal 6.5-7.8, Alkaline 7.8- 8.5, Alkali > 8.5.

(3) EC :- Total soluble salts are estimated from electrical conductivity (EC) of aqueous soil extracts. Standard value of EC in soil- Normal < 0.8 dsm -1 , critical for salt sensitive crops, critical for salt tolerant crops 1.6 -2.5 dsm -1 , Injurious to most crops > 2.5 dsm -1 . The EC value 0.20 to 1.96 (Table no.1)

(4) Organic Carbon :- Soil organic carbon is the seat of nitrogen in soil and its determination is often carried out as

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an index of nitrogen availability. In the colorimeter method (Datta et al, 1962), Organic matter is oxidized with chromic acid. OC in Vaav taluka 0.37 to 0.91 (Table no.1). Standard value of OC low < 0.50, medium 0.50- 0.75 and high > 0.75.

(5) Phosphorus :- Phosphorus was found in the range of 0.38 to 49.83 (Table no.1). Inorganic phosphorus as orthophosphate plays a dynamic role in aquatic ecosystem. Phosphorus, the most important micro nutrient, is utilized by plant in the form of H2PO4- & HPO42 - species.

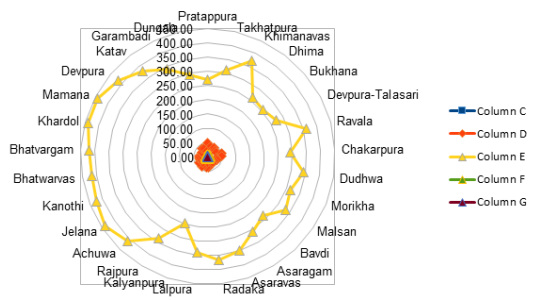
(6) Potassium :- Value of Potassium as K2O in soil range between 247.32 and 439.86 as shown in Table 1.

Analysis:

Table 1: Soil characteristic data for various village of taluka: Vav, Distrist Banaskantha

Sr.No.	Name of Village	Organic Carbon	P	K	PH	E.C.
1	Pratappura	0.49	48.31	272.66	7.13	0.25
2	Takhatpura	0.59	35.96	312.99	6.91	0.33
3	Khimanavas	0.45	21.00	372.95	7.04	0.25
4	Dhima	0.57	39.88	260.56	7.25	0.40
5	Bukhana	0.54	33.54	257.03	6.98	0.80
6	Devpura-Talasari	0.49	33.56	274.31	7.93	0.37
7	Ravala	0.42	49.83	362.08	6.94	0.36
8	Chakarpura	0.53	49.03	291.53	7.87	0.40
9	Dudhwa	0.78	30.77	341.74	7.45	0.42
10	Morikha	0.62	34.07	316.16	7.55	1.14
11	Malsan	0.37	27.91	334.37	7.62	0.71
12	Bavdi	0.83	25.15	284.10	8.00	0.38
13	Asaragam	0.74	29.72	309.98	7.58	0.76
14	Asaravas	0.91	30.77	348.97	7.40	0.64
15	Radaka	0.72	37.95	367.04	7.42	1.30
16	Lalpura	0.64	38.82	338.48	7.73	0.37
17	Kalyanpura	0.40	33.44	247.32	6.57	0.32
18	Rajpura	0.42	38.79	335.52	7.60	0.25
19	Achuwa	0.61	27.43	410.11	6.78	0.80
20	Jelana	0.41	35.96	437.11	7.13	1.19
21	Kanothi	0.45	27.72	423.11	7.38	1.96
22	Bhatwarvas	0.46	31.19	416.55	7.19	1.65
23	Bhatvargam	0.44	30.94	419.86	7.15	1.44
24	Khardol	0.49	24.98	439.86	6.62	0.32
25	Mamana	0.47	22.64	439.45	6.89	1.69
26	Devpura	0.46	24.91	413.87	6.52	0.61
27	Katav	0.50	34.28	379.22	7.02	0.24
28	Garambadi	0.46	32.10	338.31	7.10	0.80
29	Dungala	0.47	20.38	293.57	6.57	0.20

Figure 1: Net chart for physico-chemical variables for villages of Vav taluka in Banaskantha district.



Results, Discussion and Conclusion:

Total 29 villages soil samples of Vaav taluka District Banaskantha were collected in clean polythene bags and brought to the Laboratory. The soil samples were dried in shade and crushed with the help of pestle and mortar and sieved through 2 mm stainless steel sieve. Then the samples were analysed. It can be concluded from this study that the available EC, PH, OC, P, K, deficient soil is recommended for rich fertilizer, to predict the probable crop response to applied nutrients and to identify the type and degree of soil related problems like salinity, alkalinity and acidity etc. and to suggest appropriate reclamation / amelioration measure, to find out suitability for growing crops and orchard, to find out suitability for irrigation and to study the soil genesis.

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