



Qualitative Analysis of Soil Fertility on the Basis of Soil Properties for Contaminated Land Due to Chewing Tobacco

Prathamesh Gurme

UG Scholar

Department of Civil Engineering

Bharati Vidhyapeeth's College of Engineering, Lavale, Pune, Maharashtra, India

Abstract:

The Human Life and Nature has been struggling with Quality issues of environment and adverse effects for last few years which came towards the edge of hazards . This Paper focus on identification of prerequisite for quality and effect of selective activates. This study leads to find out vital restrictions in activities which has to require more concentration while dealing with soil fertility. It suggests using chewing tobacco affected land can cause and effect on soil fertility as it is complex quality of Soil that is closest to plant nutrients management. it combines several soil properties all of which affects directly or indirectly to nutrients dynamics and availability. It deals with available nutrients status and its ability to provide nutrients out of its own reserves for crop production .its management is important for optimizing crop nutrition on both short term and long term to achieve sustainable crop production. Under Poor management , soil fertility can be seriously depleted and soil may become useless for agriculture. This study concluded with concerning data analysis and vital checks in activities for retaining quality of Soil , study carried by questionnaire survey, data rating and ideal behavior of Soil . This review is aimed at summarizing and recognize production potentialities and fertility constraints with black soil in the influence under chewing tobacco and enlist specific nutrients imbalances associated with cropping production .So , This restrictions and acknowledge will be Unique and Important towards Green World and Safer for Future Living.

Keywords: Soil Properties, Crop Productivity, Non Fertile, Management, Contaminants, Land use, Nutrition.

I. DEFINITION:

1) Soil Fertility - The quality of Soil enables it to provide essential chemical elements in quantities and proportions for growth of specified plant. [Brandy and Weil, 1999, the nature and property of soil].

2) Soil Fertility - Capacity of Soil to provide crop with the essential plant nutrients. [Merriam Webster Dictionary].

3) Soil Fertility - it is defined as by plant growth typically greater soil fertility , the more plant growth and good soil

fertility is critical for any crop productivity . Only with fertile soil will, achieve yield potential of given soil. [prof. Johannes Lehmann , Cornell University].

4) Soil Fertility - the inherent capacity of soil to supply nutrients to plants in adequate amount and in suitable proportions.

5) Soil Fertility - it is related to its capacity to maintain consistent outputs with minimal inputs.



Figure 1.

II. INTRODUCTION:

Soil Fertility is the most important assets of Nation. Maintenance of soil fertility is an important aspect of agriculture. This fertility problem has been studied in many countries and scientists have brought to light several facts concerning fertility and its maintenance. Black Soil of India is generally described as "Regur" or "black cotton soil" comprises a group of clay textured soils which has been categorized as major soil group in " SOIL TAXONOMY " and " FAO-UNESCO " as Vertisols . Black Soil occupied nearly 84 percent of Maharashtra, 48 percent of Madhya Pradesh and 44 percent of Gujrat in their total Geographical Areas. Soils Fertility is essential for successful cropping. Soils are uppermost part of earth surface formed mainly by weathering of rock, formation of humus and by material transfer. Soils vary a great deal in terms of origin appearance , characteristics and production capacity, A soil consist of mineral matter , organic matter and pore space which is shared by air , water and life forms . In addition to this soil also contains large and varied population of micro organism and macro organisms. Naturally poor or degraded soil can be restored to satisfactory fertility level.

Soil Fertility of Two types,

- a) Permanent Fertility - It is derived from soil itself. It can be improved, maintained or corrected by soil management practices.
- b) Temporary Fertility - It is acquired by suitable soil management but response of built up fertility soil is highly dependent on degree of permanent fertility which is already there. Several methods of controlling known for loss of soil fertility. Plant absorbs water and minerals from the soil which is essential for growth, flowering, crop yield and other vital

activities. Soil is store house for organic and inorganic plant nutrients. Some soil are rich in organic and humus content and they are considered to be fertile and more productive while others that are deficient in humus and minerals are less Productive .the soil is subjected to continuous depletion of nutrients due to its continuous use by crops. This requires addition of mineral resources. The minerals of soil are lost due to crops, leaching or soil erosion. Organic content of soil which is good source of plant nutrients contribute most to fertility of soil.

Factors affecting soil fertility:

- a) Natural Factor - the natural factor are those which influence soil formation and artificial factor are related to proper use of lands.
- b) Artificial Factor - the factors affecting fertility of soil are parent material , climate and vegetation , topography , inherent capacity of soil to supply nutrients , physical condition of soil , soil age , micro organism and availability of plant fertilizer .

Site Description:

This study was carried out on selected farmers field in Latur District of Maharashtra State having average rainfall of district is 600 mm to 800 mm .it is usually during monsoon month from July to October. Moderate temperature are reserved, rainfall is unpredictable in tune with Indian monsoon. Summer is dry and hot. Temperature ranges from 24°C to 39.6°C though at peak they may reach 41°C.the district lies in Godavari river Basin. Much of water used in district comes from Manjra River which is suffered from environmental degradation and silting in the late 20th and early 21st Century.



Figure.2.

Soil Sampling and Analysis for Fertility evaluation:

Three sub soil samples were taken with soil auger from top (0-30 cm) soil depth in zigzag manner from contaminated area with chewing tobacco and adjacent virgin lands . Soils from both Tobacco affected zones and Virgin lands were separately and thoroughly mixed and about 1 kg composite samples were packed in clean Polythene bags, properly labelled samples were collected. these samples were air dried and analysed for pH , total N , P , exchangeable Potassium , Organic Carbon , Ca , Mg , Na , Density etc. Properties of soil Behaviors.

Chemical Properties:

1) **Soil pH** - these soils consistently exhibit neutral or alkaline in reaction with pH range 7.3 to 9.3 as they are mostly derived from calcareous base material in case of Maharashtra . Soil with higher pH values occur in some drier district. The presence of sodium carbonate is indication of alkaline conditions (pH > 8.3) which may destabilise structural beds and leads to very low permeability that is not useful for crop production.

2) **Organic Carbon** - Black soil in India is generally low in organic carbon ranging between 0.7 to 1 percent of surface soil . Organic content in soils of Maharashtra ranges between 0.21 to 0.4 in 4 district and 0.41 to 0.60 in 18 district and 0.61 to 0.80 in 8 district which suggests they all have organic carbon less than 1 percent . Loss of organic carbon content is unusual to soil structure and results in degradation of physical attributes.

3) **Phosphorus** - total phosphorus content is highly dependent on type and origin of parent material and amount of organic matter. Black Soil are generally deficient in available phosphorus. Black soil in India is low in organic matter resulting in low available phosphorus in these soils.

4) **Potassium** - potassium removal by crops in either equal or higher than nitrogen in many cases . Adsorption and release of potassium in soils is influenced by many factors like amount and type of clay , variations of temperature and moisture.

Table .1. Ideal amount of nutrients supply

Nutrient	Approximate percentage supplied by:		
	Mass flow	Root interception	Diffusion
Nitrogen	98.8	1.2	0
Phosphorus	6.3	2.8	90.9
Potassium	20.0	2.3	77.7
Calcium	71.4	28.6	0
Sulfur	95.0	5.0	0
Molybdenum	95.2	4.8	0

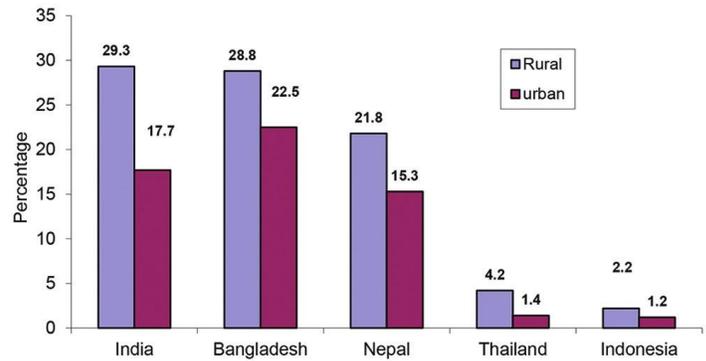


Figure.3. Consumption of chewing tobacco in respective countries

5) **Calcium** - Strongly Alkaline soils are poor in total Ca and their exchange complex is predominantly saturated with Na ions deficiency of calcium is expected where calcium saturation is less than 25 percent or less than 1.5 m . Magnitude of deficiency will vary according to degree of base saturation .

6) **Magnesium** - Condition that favour occurrence of calcium deficiency brings by Mg deficiency soil with low exchangeable and high in natural or applied K usually contains less exchangeable magnesium.

7) **Sulphur** - Sulphur availability in black soil are generally sufficient sulphur, deficient is becoming more pronounced due to the use of sulphur free N-P-K fertilizer under intensive cropping.

Nutrients deficiency and toxicity cause crop health and productivity to decrease and may result in appearance of unusual visual symptoms. As a diagnostic tool, visual observations can be limited by various factor, including hidden hunger by pseudo deficiency, soil or plant testing will be required to verify nutrients stress . Then evaluation of visual symptoms in the field is an inexpensive and quick for detecting potential nutrients deficiency or toxicity in crop and learning to identify symptoms and their causes is an important skills for managing and correcting soil fertility and crop production Problem.

III. RESULT AND DISCUSSION:

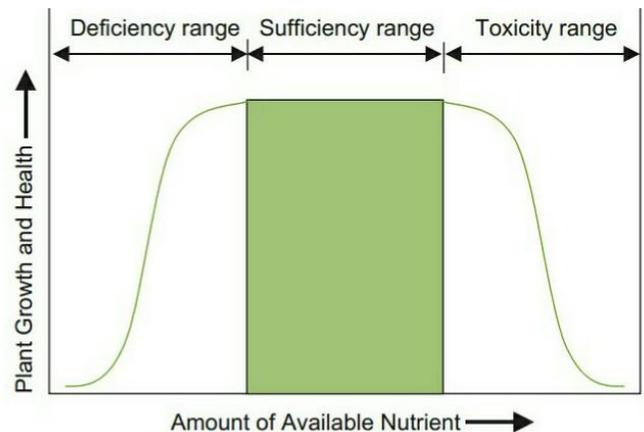


Figure.4.

Result for soil fertility based on soil Properties of study sites are shown as below table. Soil pH were significantly higher (pH = 8.16) on tobacco affected lands compared to virgin or fertile land . Nitrogen, Phosphorus and Organic Carbon were observed

to be lesser for tobacco land compared with virgin lands. Soil exchangeable Potassium (K ions) was higher on tobacco affected land than virgin land however differences are significantly different. Soils in tobacco contaminated land were more alkaline with pH of 8.16 than virgin land with average pH of 6.5 - 7.5 .tobacco contaminated land has low soil N , P , Organic

Carbon since soil N < 0.25 percent and P <= 10.9 and OC < 4 percent levels are classified as Low. The virgin land showed higher levels of N, P, OC compared to tobacco contaminated lands and also these lands were high in amount for calcium and magnesium than virgin land concentration.

Table.2. Observation

Sr. No.	Properties	Observed Data	Standard Data	Conclusion
1	Soil pH	a. 8.16 b. 8.11 c. 8.12	6.5 to 7.5	Medium Alkaline
2	Organic Carbon	a. 0.38 percent b. 0.35 c. 0.37	0.40 to 0.60	Less
3	Phosphorus	a. 10.09 b. 10.00 c. 10.05	14 to 21 kg / hectare	Less
4	Potassium	a. 422.4 b. 414.8 c. 420.2	150 to 200 kg/hectare	Very High
5	Free Lime	a. 13.75 b. 12.45 c. 13.19	2.5 to 5.0 percent	Very Large
6	Specific Gravity	1.69	5 to 15	--
7	Bulk Density	1.37	5 to 15	--
8	Porosity	a. 2.74 b. 2.72 c. 2.65	5 to 15	--
9	Calcium	a. 29.09 b. 28.24 c. 28.67	2.5 to 5.0	High
10	Magnesium	a. 10.69 b. 10.12 c. 10.44	2.5 to 5.0	High
11	Sodium	a. 1.92 b. 1.65 c. 1.80	5 to 15	Less
12	Humidity	a. 5.93 b. 5.56 c. 4.96	2.5 to 5.0 percent	High

IV. CONCLUSION:

Nutrients deficiency and toxicity cause crop health and productivity to decrease .In order to achieve improved and sustained productivity , a balanced nutrients management is must . We have to calculate nutrient requirements and suitable crop for these zones. Nutrients capacity of supplying these zones can be estimated by soil test and using GIS modelling approach improving productivity of these zones in black soil remains as major challenge owing to management problem For failure to recognize nutrients limitations. So it's needed to trace these contaminants and restrict ascertain impact on environment. this data analysis form unique trends in avoiding spitting chewing tobacco on well fertile soil otherwise it will turns into barren and non fertile land so we have to make restrictions to avoid such hazards with environment and human living.

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