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REVIEW OF SOIL QUALITY AND DEGRADATION: A CASE STUDY OF MANDYA DISTRICT, INDIA

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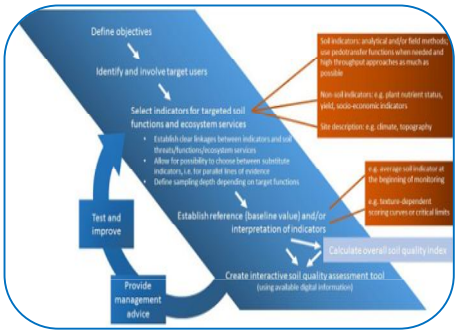
ABSTRACT:



Soil is considered to be very important resources because it is the soil that acts as medium for the cultivation of crops. India being an agricultural country; soil is the primary resource of Agriculture. All our food, clothing and many other daily requirements are derived directly or indirectly from the soil. . The District lies between 76° 19' and 77° 20' East Longitude and 12° 13' and 13° 04' North Latitude. The Mandya district is situated at the height of 762 to 914 meters from the sea level. The district consists of 7 talukas. The main objectives of the study is To asses soil fertility through chemical properties of soil in Mandya district. And To find out talukwise % deficient fields in mandya district. Department of Agriculture, Government of Karnataka collected 5479 soil samples from 7 talukas of mandya districts. The soil samples were processed and analyzed for pH, electrical conductivity (EC) as a measure of salts, organic carbon (as a proxy for available nitrogen), and available phosphorus, potassium, sulfur, boron and zinc using standard methods. These data used to find out talukwise % deficient fields in mandya district. Finally theoretically discussed about causes for soil degradation. In the district all 7 taluks facing soil degradation problem especiaaly K.R. pet and Malavali taluk facing more soil degradation problem.

KEYWORDS: *Soil, ph value, Degradation etc.*

INTRODUCTION :

To the farmers, soil is that portion of the earths surface which t=he can plough and grow crops and it provides him with food and fiber for his needs and that of his animals, to the poor man, soil forms the major ingredient of the mud walls of his house; to the rich an, the same soil is used for making bricks to be used as building materials; to the pattern, soil is the raw material with which he fabricates earthenware's and utensils of daily use as well as objects and art, to the sculpter soil is the basic material with which he carves his models; to the civil engineer, soil provides the foundation for all construction activity-roads, high ways, buildings, run way, embankments of canals and drains; to the oil technologists, soil clays and clay minerals are sources of petroleum cracking agents and drilling muds; to most of us, soil is a safe place for burying toxic wastes including radioactive decay products and organic debris that pose pollution problems and health hazards.

Soil is considered to be very important resources because it is the soil that acts as medium for the cultivation of crops. India being an agricultural country; soil is the primary resource of

Agriculture. All our food, clothing and many other daily requirements are derived directly or indirectly from the soil. The soil of the region are derived from the deccan trap. The characteristics and distribution of soils in the region is essentially influenced by nature and intensity of weathering, mode and rapidity of fluvial transport. Life on earth is supported by the soil, which is fine mixture of minerals, varied organic matter, gases, liquids and countless organisms.

In the soil, a large portion of plant nutrients are bound up in complex compounds that are unavailable to plants. The smaller portion is in simpler, more soluble forms, which are useable by plants. The complex compounds are gradually changed into the simpler compounds by chemical weathering and biological processes. Thus, the chemical fertility of a soil depends in part on how easily the plants can access the nutrients in a form they require. This is referred to as the availability of a nutrient.

The availability of nutrients within the soil is also dependent on a range of factors such as soil pH, soil solution, soil type and the plant age, type and root system of the plant. Plant nutrients are composed of single elements (for example, potassium (K)) or compounds of elements (for example, ammonium nitrate (NH4NO3)). In all cases, the nutrients are all composed of atoms.

STUDY AREA:

Mandya district popularly known as 'Land of Sugar'. The district is located in the south east of Karnataka state and shares its borders with the districts of Mysore, Hassan Tumkur and Bangalore. Most of the land is flat, interspersed with hilly region and sparsely vegetated by thorns and bushes. The District lies between 76° 19' and 77° 20' East Longitude and 12° 13' and 13° 04' North Latitude. The district is situated at the height of 762 to 914 meters from the sea level. The district consists of 7 talukas. Total area of the district is 4961 square kms. Soil of the district can be classified into three groups, such as; Red sandy loams, Red clavey loams, Clavey loams. These type of soils are suitable to cultivate different crops like sugarcane, Paddy, Ragi, Jowar, ground nuts etc.,

OBJECTIVES:

- To asses soil fertility through chemical properties of soil in Mandya district.
- To find out talukwise % deficient fields in mandya district.

METHODOLOGY:

Department of Agriculture, Government of Karnataka collected 5479 soil samples from 7 talukas of mandya districts. The soil samples were processed and analyzed for pH, electrical conductivity (EC) as a measure of salts, organic carbon (as a proxy for available nitrogen), and available phosphorus, potassium, sulfur, boron and zinc using standard methods. These data used to find out talukwise % deficient fields in mandya district. Finally theoretically discussed about causes for soil degradation.

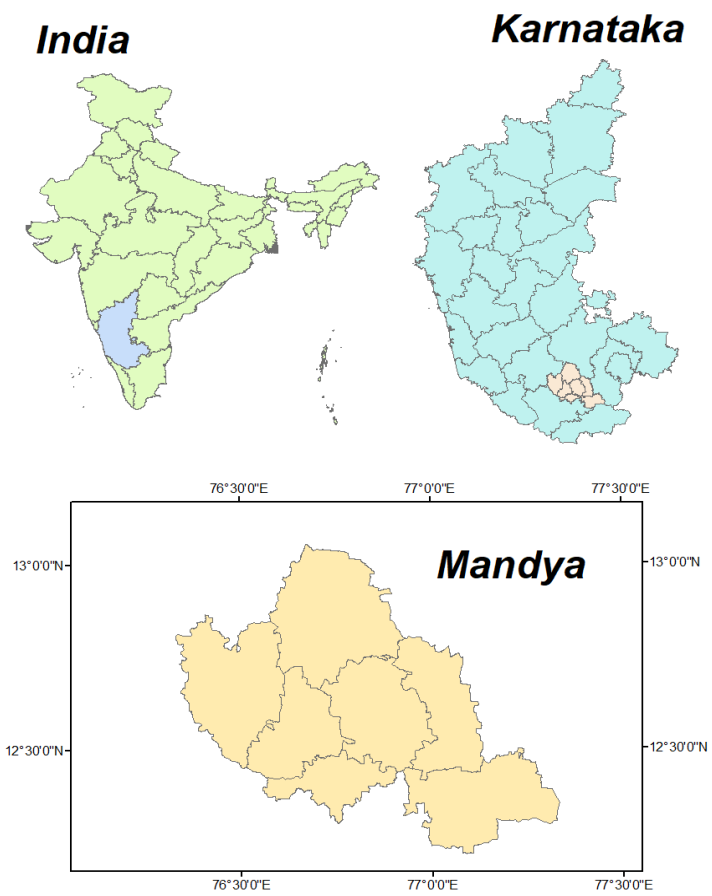


Figure 1. Study Area.

RESULT & ANALYSIS.

Table 1. Chemical characteristics of soil samples collected from farmers field in Mandya district, Karnataka. In 2018

Taluk	Parameter	**pH**	**EC dS/m**	**OC %**	**Av P ppm**	**Av K ppm**	**Av S ppm**	**Av Zn ppm**	**Av B Ppm**	% of Deficient Field
K.R. Pet (1179)	Range	4.3-8.6	0.01-1.80	0.01-1.26	1.5-27.2	10-164	1.0-272.0	0.01-4.75	0.02-3.50	42.3
	Mean	6.8	0.29	0.56	13.5	102	42.0	0.49	0.61	
	% of Deficient Field			47	17	13	32	82	63	
Maddur (620)	Range	4.6-8.6	0.01-2.87	0.03-1.26	1.5-27.2	34-164	1.1-277.2	0.02-3.63	0.01-3.98	30.3
	Mean	6.5	0.38	0.57	14.9	102	45.7	0.88	0.55	
	% of			42	9	4	18	42	67	

	Deficient Field									
Malavalli (680)	Range	4.5-8.7	0.05-1.02	0.01-1.26	1.5-24.3	34-164	1.1-278.3	0.01-2.32	0.03-2.88	41.2
	Mean	6.7	0.32	0.51	10.4	101	52.2	0.55	0.49	
	% of Deficient Field			45	27	8	20	77	70	
Mandya (700)	Range	5.2-8.9	0.01-3.10	0.03-1.26	1.5-26.5	42-164	1.1-260.9	0.01-3.07	0.03-3.00	36.6
	Mean	7.0	0.48	0.56	14.7	109	41.1	0.55	0.65	
	% of Deficient Field			44	12	1	21	79	63	
Nagamangala (1380)	Range	4.8-8.9	0.02-2.89	0.03-1.26	1.8-27.0	7-164	1.1-278.3	0.01-4.86	0.03-3.88	34.5
	Mean	6.6	0.49	0.64	18.7	102	44.9	0.75	0.64	
	% of Deficient Field			40	6	4	32	62	63	
Pandavapura (560)	Range	4.5-8.7	0.10-2.88	0.03-1.21	1.5-26.5	34-164	1.1-269.6	0.01-2.19	0.03-3.10	39.8
	Mean			49	15	3	32	74	66	
	% of Deficient Field			49	15	3	32	74	66	
Shrirangapattana (360)	Range	5.2-8.9	0.02-2.90	0.05-1.24	1.5-26.5	30-164	1.1-201.1	0.01-2.09	0.03—2-45	37.9
	Mean	6.8	0.23	0.77	15.1	106	34.6	0.49	0.59	
	% of Deficient Field			19	19	6	27	87	69	
Mandya District (5479)	Range	4.5-8.9	0.01-3.10	0.01-1.26	1.5-27.2	7-164	1.0-278.3	0.01-4.86	0.01-3.98	37.6
	Mean	6.8	0.39	0.59	15.1	103	43.3	0.62	0.60	
	% of Deficient Field			43	14	6	27	71	65	

The fertility of a soil can be described based on its nutrient supplying power to crops in proper proportions. Out of the 90 elements occurring in nature, 16 elements have been found to be essential for all crops like carbon, hydrogen, oxygen, nitrogen, phosphorous, potassium, calcium magnesium, sulphur, manganese, zinc, copper, iron, boron molybdenum and chlorine. Out of these elements except carbon, hydrogen and oxygen all the other 13 elements are supplied by soil and hence are given importance.

The fertility of soil can be judged based on the ability of a soil to supply these 13 elements to plants for their proper growth. In the present study, an attempt has been made to assess the fertility status of soils of Mandya District by estimating the organic carbon, available phosphorous and available potassium content of soil. Of all the constituents of soil, organic matter content is considered more important from the point of view of fertility as it helps in improving the physical, chemical and

biological properties of soils. The organic carbon content of a soil has a direct relation with the available nitrogen, phosphorous ans sulphur content of soil as these are releases to soil during decomposition of organic matter.

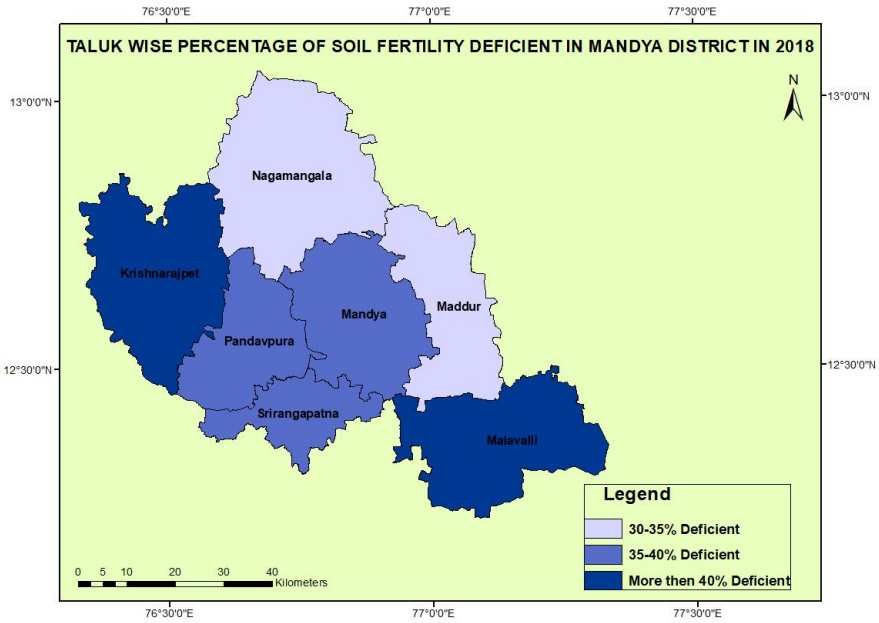


Figure 2. Taluk wise % of soil fertility deficient in mandya District.

The organic carbon content of soil samples collected from large, medium and small farmers belonging to different taluks of Mandya district has been presented in Table.

The organic carbon content of soil of Pandavapura taluk was found to be in low category while majority of the samples were medium category. This may be due to the application of organic manures and due to its addition through vegetation. These organic carbon directly influenced by other elements like pH, ES, P, K, S etc.

In all seven taluks of Mandya District soil fertility is less. Out of seven taluks Malavali and K.R. Pet taluks are more deficient in soil fertility due to unscientific cultivation.

The importance of soil fertility and plant nutrient management is being increasingly recognized in all the countries of the world, particularly the developing once. The only way by which the demand for food and other raw materials required by man could be met is by increasing the productivity of crops per unit land area per unit time productivity is the ability of a soil for producing crop yields under a definite set of management practices. It is measured in terms of output in-relation to the inputs of production factors. Of the various factors which determine productivity, soil fertility is one of the important factors. By evaluating the fertility of a soil, one can easily predict the productive capacity of the at soil after careful examination of the various factors which many affect crop growth. Based in soil test results it is also possible to advocate farmers on the quantity of fertilizers to be applied for getting optimum crop yield.

CONCLUSION:

The Mandya District is the well developed district in southern part of Karnataka. Agriculture is the main activity which has its positive impact on industrial, socio-cultural, economic development of the Mandya district but with this economic growth, some advers impact has been witnessed within last three decades. Increased population, industrial growth and raising demand for food has its pressure on

the environment, malpractices concerning the highest agricultural production. Now, it becomes the threat, and reason of various problems environmental degradation due to the agricultural development is now world wide issue some problems like soil, water and vegetation degradation are also witnessed in the study area. It is reason of depletion of the natural resources so main three topics are concerned with the impact on nature and analytic views concerned and focused on the environmental degradation. To stop the environmental degradation and for the sustainable development of environment suggestion and recommendations are concerned, as follows in, the context of an analytic review of conclusion related to the change in cropping pattern and agricultural productivity has its impact on the environment.

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