Analytical Study of Soil Quality of NCPH Colliery of Koriya District

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Abstract

The study was conducted to evaluate the soil quality and impact of coal mining operations on different physicochemical parameters of soils of paddy fields, located in the NCPH(north chirimiri ponri hill) colliery area of Koriya District. The soil physico-chemical parameters monitored at different sites (site 1- 0.5 Km, NCPHColliery area- site 1, site 2, site 3, site 4 of 2 km, site 5 to site 7 of 4 km and residential area of 6 km from the NCPH Colliery respectively) and at two depths (surface soil of depth 0-10 cm and sub-surface soil of depth 10- 20 cm) were tabulated in table No. 1, 2, 3, 4, 5, 6 different parameter test and table no. 7 total parameter result show. The average values of available nitrogen, phosphorus and Phosphorus 94.2 and 5.9kg/ha. Statistical analysis of the data of organic carbon with parameters like pH, electrical conductivity,organic matter, available phosphorus and available nitrogen.

Keywords - *Soil quality,coal mines,NCPH colliery,NPK analysis.*

I. INTRODUCTION

Earth is only a planet where living beings live, earth is called blue of green planet where 71% area is covered by weather & rest 29% is land area. In simply the places, where human being's and rest of living organism lived called environment. The environment is composed of air, after and soil which is made by the orgianic and inorganic element in deficit proportion. The environment consists of our environment and the need to restrain human activities, which release pollutants and toxic effects into the environment. At present there are many environmental issues, which have been throwing in size and complexity day by day, threatening the survival of making on earth. now to do our environment facing the lots of environmental problems, water pollution might create problem and unfavorable effect upon people, plants and also on many biotic of biopic factors. Which cause many harmful diseases and death in case of living being.

II. SOIL TYPE

Therefore depending on the size of the particles in the soil, it can be classified into these are : Sandy Soil, Silly soil, Clay soil, Loamy soil, Peaty soil and Chalky soil

III. COMPOSITION OF SOIL

The soil consists of four major components, mineral matter, organic matter, and soil air and soil water. All these components can be separated with much satisfaction because they are present very intimately mixed with 'each other. The mineral forms the bulk of soil solids and a very small amount of the solids is occupied by organic matter.

A. Properties of soil

The physical and chemical properties of the soil effects the intake of nutrients, microbiological activities, soil moisture and temperature and governed by physical properties of the soil.

B. Physical characteristic

It includes colour , bulk volume, bulk density , texture (particle size) and structure (Organization of the particles) .Texture and structure air porosity water retention.

C. Chemical characteristics:

It includes pH, Caption exchange capacity, electrical Conductivity and fertility.

IV. STUDY AREA

Koriya is one of the North-West District of Chhattisgarh State. The District came into existence on 25th May 1998 in Madhya Pradesh State. Its parent District was Surguja. After the formation of New State of Chhattisgarh on 1st November 2000, the District falls under the Chhattisgarh State. The District has derived its Name from the Koriya State, the former princely State Koriya.

V. OBIECTIVE OF THE WORK

The principle objectives of the work is *"Analytical Study of Soil Quality in NCPH Colliery area of Koriya District (C.G.)*" study therefore provides an opportunity to investigate some aspects

such as - acidity & basisity nature of soil, NPK Constitution of soil

The main objectives of this study are:-

1. To collect information of soil type, acidity VIZ? Soil causes, trace element deficiencies, N,P,and Kdeficiencies.
2. To study the physical - chemical properties like pH, conductivity organic carbon etc.
3. To know what soil pH & conductivity is and how is itcalculated
4. To understand how soil pH affects nutrients availability in the soil.
5.

VI. MATERIALS AND METHODS

NCPH Colliery areas were chosen in the adjoining vicinity of the coal fields and soil samples were collected by applying accurate sampling protocols. Bulk density was determined by Gravimetric method. The soil texture was determined by International pipette method. pH and electrical conductivity
was determined in suspension with a digital pH meter and conductivity meter respectively. Organic carbon was determined by using the Walkley and Blake Method and the organic matter by using a conversion factor of 1.724. Available phosphorus content was determined by Olsen's Method. Available Nitrogen was determined by the alkaline potassium permagnate Method.

VII. DISCUSSION

Soil samples of different sites in NCPH Colliery area were collected and analysed for the similar parameters all these sampling locations are affected and contaminated view to various mining activities. The nutrients in soils Available N - 125 - 164 (kg/acre), Available P 5.63 - 7.23 (kg/acre), Available K 80-180 (kg/acre) were found. All major types of soils are present in this area. Very high positive correlation coefficient was also observed among organic, available N and available P, while available K did not show strong correlation with other parameters. Component size analysis revealed that sand particles increased, silt and clay particles decreased, with respect to unmanned soil. This trend may be because of increased erosion. The high bulk density of the dumps was evidently influenced by the use of machinery. This has serious implication for subsequent change of soil properties because gaseous diffusion is made more difficult. Such high bulk density would pose restrictions on the growth of deep rooted plants and may be one of the reasons of cessation of plant growth at the shrub stage. The porosity' was found to be than that found in unmated soil due to compaction during excavation good plant as a result, plant cannot grow smoothly. For good plant growth, bulk density be below 1.4-g/cm for clays and 1.6g/cm for sand. The pH of soil dump was acidic due to leaching of basic cations. Under such acidic conditions, H-ion toxicity, high availability of A1 and Mn and unavailability of Mo are the principal deterrents of plant growth. For plant nutrient availability optimum pH is 6.5 to 7.5. Electrical conductivity.was higher than the surrounding unmined soils.A mixing of lower surface horizons may cause this. The available P was lower than the available N and K, because most of the P present in the soil not readily available to plants. The deficiency in nutrients was probably caused by the reduction in soil microbes induced by and caused by the reduction in soil microbe's induction by stockpiling and excessive leaching. Available macronutrients (NPK) decreased considerably in comparison to unmined soil. This may be due to reduction in soil microbes caused by stockpiling and excessive leaching. NPK nutrients and soil amendments in the amounts determined by soil tests should be applied to the redistributed surface soil layer, so that it supports the approved post-mining land use and meets the renegotiation requirement. A detailed chemical analysis of the soil is essential to the planning of a renegotiation program. Analysis is needed to determine elements essential for plant growth and to determine soluble elements that may be toxic to plants. Once the composition of the soil has been established, amendments may be selected to modify soil media do that adopted plant species can be used.

VII. RESULT

By analyzing all the samples the obtained values are presented in table below :-

S.No.	Soil sample	Chemical parameter					
		pH	E.C.	Org carbon(in %)	Available N (Kg/acre)	Available P (Kg/acre)	Available K (Kg/acre)
	1	2	3	4	5	6	7
1	S1	7.0	.38	0.42	161	6.12	180
2	S2	6.9	.27	0.38	152	6.28	143
3	S3	6.2	.40	0.39	160	7.23	120
4	S4	7.8	.28	0.40	155	6.71	80
5	S5	7.4	.25	0.43	162	5.93	115
6	S6	6.3	.36	0.41	160	6.14	178
7	S7	7.2	.33	0.39	157	6.05	175
8	S8	8.1	.15	0.29	125	5.63	63
9	S9	6.5	.35	0.42	159	5.98	172
10	S10	7.6	.36	0.47	164	7.12	169

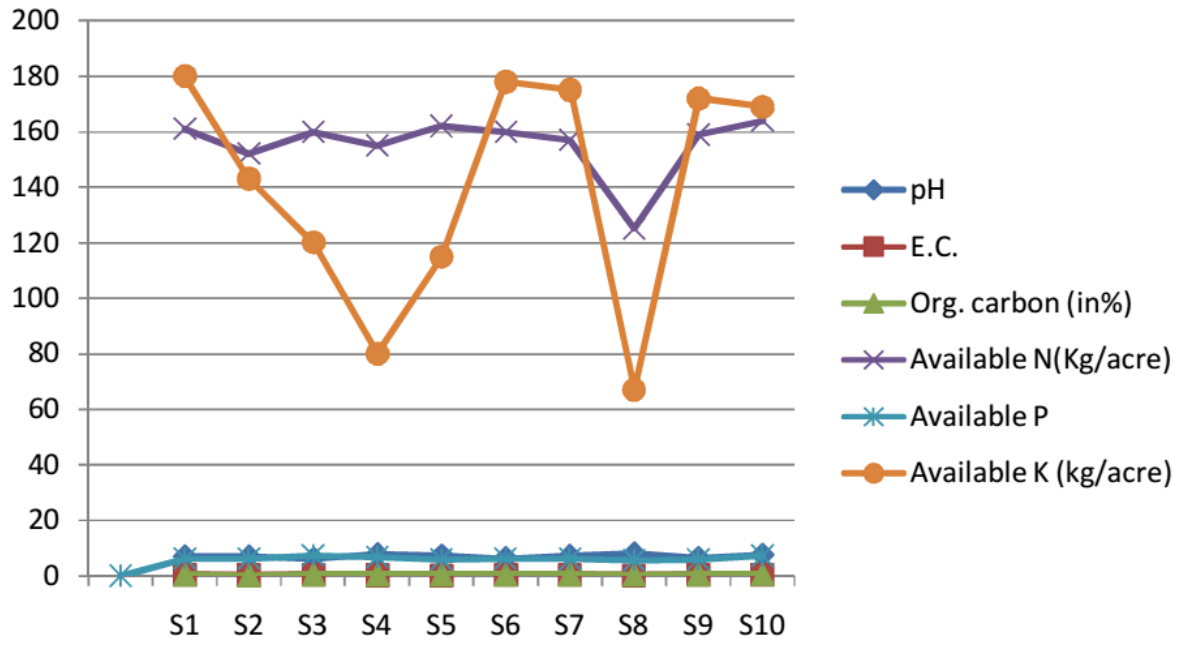

Fig 1: Results of the soil analysis represent of line graph.

VIII. CONCLUSION

In the north Chirimiri Ponri Hill (NCPH) colliery area of koriya district of Chhattisgarh, the available P was lower than the available N and K ,because most of the P present in the soil not readily available to plants .Available macronutrients (NPK) decreased considerably in comparison to unmined soil .This may be due to reduction in soil microbes caused by stockpiling and excessive leaching.NPK nutrient and soil amendments in the amount determined by the soil tests sgould be applied to the redistributed surface soil layer, so that it supports the approved post mining land use and meets the renegotiation requirement .Once the composition of soil has been established ,amendments may be selected to modify soil media do that adopted plant species can ba used.

The biological reclamation, if not done within the self(period up to which the soil will maintain its fertility status to support plant growth),the nutrients released by microbiological activity are lost continuously due to leaching and erosion ,the nutrient cycle is broken down, and the soil ultimately becomes unproductive.

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