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Effects of Open Cast Mining and Stone Cutting Industry on Soil, Shahbad, District Chittorgarh, Rajasthan

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ABSTRACT
During the process of open cast mining, several changes occur in physical, chemical, microbiological properties of soil. Stone cutting industry is one of the major environmental pollutants in Chittorgarh District. At present most of the stone slurry waste produced by the stone cutting industry, in the study area is disposed of in agricultural land, open areas and sewage networks. This practice adversely affects the fertility of the soil, contaminates the ground, reduces ground water recharge and increases the drainage problem. This study discusses the issue of soil contamination by stone waste in Shahbad, Chittorgarh district. It focuses on the effect of stone slurry waste on pH, Electrical Conductivity (EC), organic matter (OM), Water holding capacity, Nitrogen, Potassium.
Keywords: *Open cast, stone cutting, agricultural land, ground water, drainage, contamination, stone slurry*

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INTRODUCTION

Soil is an important part of environment. The opencast mining deteriorates the environment in numerous ways. One of the aspects of environment, it harms the most to the Soil and Water. Thus, estimation of quality of Soil is extremely important for proper assessment of the associated hazards. Due to the lack of proper planning and negligence of regulations, an appreciable amount of environmental degradation and ecological damage to Soil occurs Soil contamination is defined as the build-up in soils of persistent toxic compounds, chemicals, heavy metals, salts, radioactive materials, or disease causing agents, which have adverse effects on plant growth, human and animal health [1]. Mining is one of the important pathways by which soils are polluted [2].The greatest impact of mining on the nations soil resources is due to opencast mining, which is having a very much potential for the deterioration of soil quality than underground operations. Topsoil is an essential component in abandoned mines for growth of vegetation and has to be preserved for post-mining land reclamation. [3]. Sendlein *et al* [4] indicate, however, that systematic handling and storage practice can protect physical and chemical characteristics of topsoil while in storage and also after it has been redistributed into the regarded area.

STUDY AREA

Mining lease of Mangrol –Tilakhera Limestone Mine is situated near village Mangrol, Tilakhera, Tehsil – Nimbahera, District Chittorgarh, Rajasthan in an area of 299.20 hectare. Shahbad Village situated at 0.5 km towards S.

MATERIAL AND METHOD

On account of availability of limited time, resource and data the study of the whole limestone mining region was not feasible. One of the lime stones producing area Shahbad was therefore selected for the purpose of study. Soil samples were collected randomly for this study and the physic- chemical analysis of soil done by APHA method.

RESULT AND DISCUSSION

The pH of soil samples collected was observed to be between 7.98 and 7.78 which tends to prove that the soil is slightly alkaline. Conductivity results for the samples collected indicate moderate presence of minerals and soluble salts in the soil. The Nitrogen and phosphorous content is low. These values indicate

good fertility of soil. Nitrogen and Phosphorous in the soil is the most important element for plant development. It is required in large amounts and must be added to the soil to avoid a deficiency. Very low quantity of nitrogen and Phosphorous is not good for the soil fertility. Water holding capacity of the samples collected indicated of high clay content of the soil. Based on the above and the texture of the soil, it gets classified as black cotton soil at most of the places, which supports the growth of crops and plants.

Table 1: Soil Quality Monitoring Analysis of Samples

S.NO.	PARAMETER	SAMPLE(1)	SAMPLE(2)
1	**Texture**	Clay	Clay
2	**pH**	7.98	7.78
3	**Electro conductivity**	228	234
4	**Organic Matter(%)**	1.08	1.12
5	**Nitrogen (Mg/100gm.)**	268	272
6	**Phosphorus (Mg/100gm.)**	138	146
7	**Water Holding Capacity (%)**	28.9	31.2

EFFECT ON SOIL QUALITY:

The mine dust and water may cause severe problems of low crop yielding and soil pollution in the nearby agriculture activities [5].The major impact is on air quality, surface and ground water, on flora and fauna due to contamination of agricultural soil. Open-pit mines produce 8 to 10 times as much waste as underground mines [6].

CONCLUSION:

Due to above value and unbalancing of nutrients, resulting in to loss of soil cover, loss of vegetation and deterioration of the land quality in study area and hence soil degradation is directly related to crop production. Apart from the soil health that would be in danger due to soil nutrient imbalance and study area may be adversely affected also due to reduced crop yield they may experience.

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