

Study On Environmental Effects of Extracting and Using Mineral Resources

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ABSTRACT

Minerals are non-renewable and exhaustible resources. These are naturally occurring crystalline solids and inorganic in nature, Minerals have a definite chemical composition and physical properties. Minerals are of two types i). Metallic ii). Non Metallic. Mineral is a homogenous naturally occurring solid inorganic substances with a definable chemical composition and external structure characterised by an orderly arrangement of atoms, ions or molecules in a lattice. More than 3,500 minerals have been identified and only two dozen are very common. These large numbers of minerals are composed from 92 elements but several factors limit the possible number by far most common mineral consists of silicon and oxygen combined. Minerals is naturally occurring, inorganic solid with a definite structure and composition. Minerals are mostly found on earth's crust and they are on most of our everyday items, Minerals have a lot of functions on earth eg. Minerals are used in construction on jewellery, art, utensils, machinery and many more.

Keywords: Types of Mineral Resources, Ecosystem Damage, carbon output.

INTRODUCTION

Mineral is very vital role in human day today life, India is quite rich in minerals substances which are found in the rocks are called minerals. These substances are mined out or pumped out of the earth. Geographical area in Rajasthan and are spread over 550 km. These mountains are rich in mineral wealth. There are about 9,891 mines in this region. The climate and the drainage system in the region and also act as a mini watershed from where seasonal streams originate. Mining adversely affects water, land and forest. According to environmentalists, the mining leads to water depletion in the wells of farmers and also destroys their fertile land. Hence the farmers are forced to join the mines as daily wage earners. Mineral is one of the major environmental impacts of surface mining operation is that it cause damage to the land, forest, agriculture and disturbance of the drainage system and hydrology of the area. By creating ugly dumps at any site, the soil stability and productivity are adversely affected and erosion takes place. The land area affected in the Jharia coalfield region. Different types of land units mining areas to agricultural lands characterise land use pattern of Damodar basin in which the Jharia coalfield centrally situated. It significantly differs in upper, middle and lower valley regions as a function of geomorphology, geology and topography. In the upper valley the forest area wood lands dominates and croplands find their location along the river valleys and rugged topography. With this topographical setup, this area is under dense vegetation cover of mixed forest type.

OBJECTIVES OF THE STUDY

- i. To Assessment of prevailing i.e. pre mining land use of the area and the surroundings.
- ii. To Assessment of the pre mining surface drainage pattern
- iii. To Study of structure of the mineral deposit / body and the geology of the area concerned.
- iv. To Assessment of the life of the mine and the quality of the overburden to be kept outside the mine including the period for which the overburden will be kept out side.

Status of Land degradation in Jharia Coalfield Region :

As mining is one of the major activities in the Jharia coalfield region, and degradation caused due to mining is appreciable. Due to opencast mining and underground operations, a great extent of land is being continuously degraded by open pits, overburdens dumps, mine fire, subsidence etc quality of land is becoming similar to that of waste land resulting in spoiling of highly fertile agricultural lands.

Mineral coalfield is one of the most important coalfields in India. This is the most exploited coalfield because of metallurgical grade coal reserves available in this area. Prior to nationalization, mining in this coalfield was in the hands of private entrepreneurs, who had limited resources and lack of desire for scientific mining. Both opencasts and underground mining methods were adopted. The opencast mining areas were not backfilled and as a result large voids were created in the abandoned mining areas. Extraction of thick seams by caving at shallow depts, damaged the ground surface in the form of subsidence and formation of cracks reaching surface thus enhancing chances of spontaneous heating of coal seams.

Mitigation Measures

To mitigate the impacts of mining on land two basic strategic are required to follow – these are land reclamation and land use planning. It is a true fact that any mining degraded land should be reclaimed at the earliest possible opportunity, which reclamation means putting the land to a beneficial use.

Important Soil Management

The mineral to mine is deep seated covered by OB and top soil preservation of this top soil is very important. It is to be collected separately by scraping the top 10-15 cm layer depending upon the soil profile and stored properly to preserve its bio life and physical properties. In Indian condition tropical climate these are vulnerable to erosion and if lost will create serious ecological damage by forming siltation on surrounding land and water and also creating loss of top soil, worthy natural resource as nature takes several years to form 1 cm of top soil.

Depletion of Mineral Resources

Exploitation of mineral wealth as a rapid rate shall naturally deplete our good quality deposits. The ever rising demands shall compel miners to carry on the extraction from increasingly lower and lower grade of deposits which possess a poorer percentage of the metal for example copper was extracted from ores containing 8-10 % of metal content about 500 years ago. Now people are using deposits which contain only 0.35 % of copper. To produce one tonne of copper metal miners have to dig out 285 tonnes of one. This shall naturally involve a large amount of energy expenditure as well as a large quantity of waste material production. Due to the excessive exploitation many minerals are going to be depleted in near future. So it calls for conservation and judicious utilization.

Ecological Problem

Mineral extraction has led to serious environmental problems. Rapidly growing mining activity has rendered large agricultural tracts almost useless. Natural vegetation has been removed from vast tracts. Such areas suffer from frequent floods and for want of proper drainage, they have become breeding grounds for mosquitoes spreading malaria with vengeance.

Pollution

Moving huge amounts of sand silt and clay etc, requires energy. Concentration of one requires energy. Smelting and refining operations require energy. Electrolytic processes used for refining of some metals, like Aluminium require energy. The overall worldwide requirement of energy in mining industry adds up to an enormous amount. This energy comes from diverse sources which mostly include fire wood coal, petroleum, natural gas and electricity. Many mineral producing areas lead to air and water pollution in the surrounding region which in turn leads to various health hazards.

Social Problem

New discoveries of minerals often lead to displacement of people. As many tribal areas are rich in minerals, the tribal people are most affected. Industrialization of such areas has badly shattered their economy, values and lifestyle.

Ecosystem Damage

Mines are highly damaging to the ecosystem surrounding them. Many different types of mines affect many different types of ecosystem for example deep sea mines are at high risk of eliminating rare and potentially valuable organisms. Mining destroys animal habitats and ecosystem. Mining can completely destroy ecosystem by adding or taking out something from the animals' everyday lives, therefore throwing the whole thing out of balance.

Air Pollution

Mining has a great effect on the quality of the air. Since mines need to blast through rock to get to an ore, dust may be produced in the process. Coal mines release methane, which contributes to environmental issues because it is a greenhouse gas. The methane is sometimes captured but only where it is economically feasible to do so. Some cooling plants may release ozone depleting substances, but the amount released is very small non vegetated or uncapped tailings dams release dust, and where radioactive elements are found in the ore, radiation is emitted.

Land Pollution

There are many environmental converts about the effects mining has on the land. Trees need to be cut down in order to have a mine built and whole forests could be destroyed. Mining involves moving large quantities of rock and in surface mining overburden land impacts are immense. Overburden is the material that lies overtop of the desirable mineral deposits that must be removed before the mining process begins some mines make an effort to return the rock and land to its original appearance by returning the rock and overburden to the pit that they were taken out of.

Conclusion

Minerals are part of virtually every product we use. Common examples include copper used in electrical wiring and titanium used to make airplane frames and paint pigments. The Information Age has ushered in a number of new mineral uses in a number of products including cell phones (e.g., tantalum) and liquid crystal displays (e.g., indium). For some minerals, such as the platinum group metals used to make catalytic converters in cars, there is no substitute.

SUGGESTION

Economy in use of Mineral Resources : The simplest way to conserve mineral resources economy in the use of metals and minerals. Careful use, or use only where it is necessary can reduce much of consumption of metals and minerals.

Making Finished products long lasting : The use and throw away practice of western society after a product has lost its utility is a wasteful practice. The metal components in the product are also discarded and wasted. Repair and re use is a very promising method of conservation of metals and mineral products.

Re use and re cycling of metals : As rapid consumption of virgin minerals depletes our resources why not use mineral products more effectively or again and again. A machine having brass components can be pulled apart, its components used to make another object of utility. In India most of the copper, brass bronze and aluminium objects are regularly recycled.

Use of cheaper substitutes : There are a number of finished products in which cheaper material other than metals may be used. Why use a metal bucket when cheaper plastic buckets are available. Wherever possible cheaper materials may be substituted for mineral products and metals.

More efficient recovery of materials from minerals

A number of minerals occur as a complex mixture of a number of elements. An ore is never pure. Even ores with a metal content as high as 20 % may contain other elements which are either discarded as tailings during concentration or during smelting.

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