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ECOLOGICAL REHABILITATION OF COAL MINED LAND OF KALAKOTE RANGE, RAJOURI (J&K), INDIA

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ABSTRACT

Mining is a devastating operation, which is associated with problems of deforestation, waste disposal, water pollution, air pollution, seismological vibrations from blasting, soil subsidence, drop in underground water tables and soil erosion. Various technological measures should be used for reclamation of surface mined lands like contour terracing, contour trenching, mulching and normal soil placement. Biotic protection along with rehabilitation measures will reduce erosion and shall increase the vegetal cover.

INTRODUCTION

History of mining has run parallel to the human civilization, and stone, bronze and iron ages are linked with minerals and mining in different stages of historical development. Mining leads to disturbing ecology, environment and habitat in order to extract various deposits commercially from bowl of the mother earth. It involves selection and results in depletion of natural resources. Rejection and generation of various pollutants, directly or indirectly, are inbuilt features of such selectivity.

In India, 56 minerals are exploited including the fossil fuels and atomic minerals. The number of mines exceeds 4000. Erstwhile Bihar has been a fortunate State from the viewpoint of endowment with mineral resources. Iron ore, limestone, china clay and bauxite are the traditional surfaces of hilly deposits where open cast method of mining is applied. Coal is extracted by both modes of mining, whereas copper ore, mica, pyrites and atomic minerals are extracted by underground mining.

Kalakote range lies between 33°10' N latitude and 74°45' E longitude in District Rajouri of Jammu and Kashmir state. The area mainly constitutes inner Shivaliks. The area is undulating with moderately sloped hills. Altitude of area ranges from 600m to 1070m.

In study area coalfields are situated at Mahogala, Mehtka, Kalakote and Tatapani. Builtup of infrastructural facilities on surface for mining, beneficiation, housing and other activities take heavy toll of forest bearing areas. Right from the first stage of mineral extraction, the environmental degradation of land, addition of pollutants to air, water and deforestation occur, and remain unchecked.

Surface mining of coal results in huge removal of overburden and mineral waste, which are dumped into nearby fertile soil. Large excavations and denudation of vegetation in the coalfields have been commonly observed. One inch of fertile topsoil takes 500-1000 years for formation but unfortunately in mining areas no one bothers about this topsoil, which is thrown or mingled casually. The trees, lower vegetation and surface topsoil are removed from coalfields, which lead to denudation of the study area. It is reported that by open cast mining alone about 0.2 million ha of land is being environmentally disturbed every year and forests form a large proportion of this.

In Mahogala and Mehtka, where underground mining is done, subsidence of land is a common feature. Due to subsidence, depression of various sizes are formed affecting adversely the growing vegetation. In underground mining areas, there is continuous seepage of water into mines, which is pumped out from the mines and ultimately disturb the soil and water in particular, and groundwater in general.

REHABILITATION MEASURES

It is well known that adverse ecological impacts are associated with mineral excavation process alone but process of ecological degradation starts even before the actual mineral exploitation begins and continues even after the process is over. Pre-mining impacts include development of infrastructural facilities such as road construction, transportation of heavy vehicles and machinery and clearing of land for use of ore extraction. Surface mining of coal resulting in huge removal of overburden and mineral wastes, which is dumped into nearby fertile soils, has been observed in the present study area. Similar observations have also been reported by Soni et al. (1989,19191). Varma et al. (1989) analysed the impact of mining on the flora of Motijharana, Ranjmahal hills and revealed similar results which are in consonance with the observations of the present study.

In highly degraded mine areas, where establishment of vegetation is very difficult due to moisture stress, absence of fertile soil, movement of mine spoils and rocky material on steep slopes, mechanical measures are essential for controlling erosion, soil, water and nutrients conservation and helping the vegetation to establish. Similar measures have been suggested by Dhruvanarayana et al. (1987) and Dadhwal & Katiyar (1990). The main mechanical measures to be adopted consist of planned placement of overburden in hilly terrain, provision of construction of trenches on denuded slopes, terracing of overburden deposited in heaps, and construction of retaining walls. Dadhwal (1999) suggested similar measures for reclamation of mined land.

With biotic interference, accelerated soil erosion and poor soil fertility, it is difficult for vegetation to establish. The grass, which grows automatically on the rehabilitated topsoil, has to be protected against grazing by fencing during the early days of revegetation. According to Kilmartin & Haigh (1988) the local species are generally better adopted than imported exotics. In the present study area, plants like *Agave americana, Euphorbia royaleana, Parthenium hysterophorus, Cassia tora, Cassia occidentalis, Cynodon dactylon, Ipomoea carnea, Carissa opaca, Adhatoda vasica,Cassia fistula* and *Dodonaea viscosa* are best suited for early vegetation. According to Singh & Singh (1998) the achievement of an early vegetation cover and high biomass production can be approached through proper selection and planting of early successional native tree species because such species are able to exist under harsh soil conditions and require less long term maintenance. Preference should be given to local leguminous species because they can survive in unfavourable condition and will reduce initial nitrogen requirement and also fix nitrogen required for successional species. It was also found that the fine root systems in leguminous tree species were better developed than that of the non-leguminous trees, which is essential for nutrient and energy fluxes in the system. Similar results have been observed in the present study.

CONCLUSION

The mining industry in India has a very important role to play in the economic and industrial development of the country. In fact, the environmental planning and management have now reached a point where details of eventual reclamation and operations towards this end are as important as the

method of working itself. So, environmental management is comprehensive, multiple goal strategy for environmentally sound resource utilization for attaining the politically desirable socio-economic status for all people while at the same time conserving vital components of the environment so that coming generations are well taken care off.

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