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ABSTRACT



Environmental impact of coal mining and super thermal projects in Singrauli Coalfields spreading over an area of 1800 sq km in Sidhi and Sonbhadra districts of M.P and U.P., respectively was assessed through integrated remote sensing technique. The study involved evaluation of resource potential of the area in terms of landuse/landcover, hydrogeomorphology, slope, drainage, soil, infrastructure facility and assessment of impact on land, air and water. Based on resource potential and impacts studied an environmental management plan was suggested for the area.

The resource maps viz. landuse/landcover, hydrogeomorphology and soil were prepared through visual interpretation of satellite data with limited ground truth verification, while drainage/surface waterbody / watershed and transport network / settlement location were generated using Survey of India toposheets. Impact on land was studied in terms of land transformation which occurred at different time spans. The air and water pollution was studied using both the satellite data as well as laboratory methods.

The study revealed that the major landuse/landcover in the area was agriculture followed by forest, wasteland, mining area and built-up land within a span of 22 years (1976 -1998). The areas under built-up land, agricultural land, mining area and wasteland increased while loss of forest land was observed. Hydrogeomorphology described on the basis of geology, geomorphology and structure revealed that alluvial plains and valley fills had

excellent to very good ground water potential zones while poor to nil prospect was found in case of denudational hill, structural hill, ridges, butte and inselburg. Moderate to poor ground water potential was observed for buried pediplain. The soil types encountered were mainly dark reddish brown, yellowish brown and dark brown. Topographically the coal mining areas were confined to strongly sloping, moderately steep sloping area. The other areas fell into very level to gently sloping to moderately sloping classes. Drainage pattern observed was dendritic to sub-dendritic, sub-rectangular to sub-parallel. The basic amenities available were health, education, postal services, drinking water and electric supply.

Impact on land studied in terms of land transformation revealed loss of forest land by 4.51% of the total area and out of that mining activities alone engulfed 1.33% of the total area. Air pollution studied in terms of dust deposition showed that deposition was more in 5 km radius than in 10 km radius. Individual effects of dust deposition from coal mines and flyash from thermal power station was in the lesser area than the cumulative effect of both covering maximum area. Based on pollutant load discharged into water bodies three zones of surface water quality were identified. These were river stream polluted by mining waste water, reservoir/tank affected by mining waste water / flyash pond overflow and clear water.

Environmental management plan proposed for the eco-restoration of the area comprised of reclamation of degraded land by biological and technical methods, control of dust pollution through tree curtain or green belt around the

periphery of coal mines and thermal power establishment and engineering methods for control of stack emission from thermal power plants. Suitable plantation techniques were also suggested for checking of soil erosion along the banks of Govind Ballabh Pant reservoir, river/stream in the vicinity of coal mines and mining overburden dump. The study revealed utility of integrated remote sensing technique combined with conventional methods for assessment of natural resources and impact on land air and water in coal mining areas like Singrauli, so that a proper environmental management plan can be prepared for long term eco-conservation of the area.