



MINERAL AND BIOTIC ENVIRONMENT AND ECOLOGICAL DEGRADATION OF THE ERRAMALAI AND NALLAMALAI HILLS OF THE KADAPA BASIN, ANDHRA PRADESH, INDIA, USING REMOTE SENSING DATA

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ABSTRACT

The Nallamalai and Erramalai hills cover an area of about 18,060 Km² are located in the Kadapa basin in the form of kidney structure belongs to Proterozoic formations. The hills are composed of sedimentary and metamorphic rocks. The IRS-IB Geocoded data on scale 1:50,000 are used to map the land, mineral and biotic resources of the Nallamalai and Erramalai hills on scale 1:50,000. From the mapping of the resources it is found that the Nallamalai hills are formed of good biotic environment with variety of species of trees, medicinal plants, creepers, climbers and grasses. They are dry deciduous forests. The Erramalai hills are formed of scrubby forests but the hills possess very rich minerals like limestone, dolomite, claystone, ochres, quartz and quartzite. In some pockets of the Erramalai hills iron ore, barites and silica sands are found. The ecological land degradation is taking place at alarming rate in the Erramalai hills by over extraction of the mineral resources. Ravine and gully erosion are very common. In the Nallamalai hills deforestation activities are taking place in some pockets by illicit smugglers. The biotic environment of the Nallamalai hills is disturbed for construction of high ways, railway lines, communication lines and electrical lines. Fortunately the Nallamalai hills are raised to a high of about 600 to 900 meters above MSL and receive an average annual rainfall of about 1000mm. The Nallamalai hills are influenced by both southwest and northeast monsoon. The valleys of Nallamalai hills are flourished with thick forest. The Erramalai hills have raised to a high of about 300 to 600 meters above MSL and receive only 600mm of annual rainfall. The Environment Impact Assessment has been evaluated basing on amount of soil removal, Sediment Yield Index, Erosion Index and extent of ecological degradation. In the present study an attempt is made to describe the biotic environment mineral environmental and land degradation of the Nallamalai and Erramalai hills and suggestion are made for eco- restoration and ecological development of the Nallamalai and Erramalai hills.

Key words: Proterozoic, environment, dry deciduous, deforestation, degradation.

Study Area:

The Kadapa basin covers an area of about 18,060 km² is formed of Proterozoic formations consisting of shales, quartzite, limestone etc. The geographical location of the Kadapa basin is 78⁰ to 79⁰ East latitude and 14.30⁰ to 16⁰ North longitudes. The basin is formed of Nallamalai, Seshachalam and Erramalai hills with black soil plains in between. The river Kunderu flows through Kadapa basin and



joins with river Pennar near Kamalapuram. Climatologically the Kadapa basin enjoys dry sub humid type of climate.

Objectives:

The main objectives of the research paper are

1. to map the mineral resources of the Kadapa basin
2. to describe the biotic resources of the Kadapa basin
3. to map the ecologically degraded zones and
4. to suggest appropriate measures for conservation and optimum utilization of mineral and biotic resources of the Kadapa basin.

Methodology:

The land resources of the Nallamalai and Erramalai hilly regions are evaluated based on studies from Survey of India topographic sheets on scale 1:50,000. IRS- IB False colour composites on scale 1:250,000 and IRS-IB Geo-coded data on scale 1:50,000. The physical elements like relief, slope and drainage are studied from SOI topographic sheets. The land degradation and ecologically disturbed pockets are demarcated from the study of IRS-IB Geo-coded data. The environmental impact assessment of the Nallamalai and Erramalai hilly regions are assessed using ecological disturbances and ecological degradation, wood smuggling, forest fires, soil erosion, mining, growth of mineral based industries and urbanization following [3] method and intensity of soil erosion [2] method, Sediment Yield Index and Erosion Index of the hills [6].

Mineral Resources of The Kadapa Basin:

The major mineral resources found in the Kadapa basin are limestone, barytes, ochers, talc, claystone, dolomite, steatite, copper, silica and iron ore. The limestone, steatite, asbestos and claystone are found in Erramalai hills. The barytes concentration is high in and around Mangam Peta area near Railway Kodur. There are about 75 billion tones high grade barytes and on average about 2,250 tones of barytes are quarried daily. Large quantities of limestone deposit are found in Erramalai hills around Tadipatri and Yerraguntla and on average daily about 10 thousand tones of limestone of quarried. About 15 cement factories have been established for manufacture of cement in and around Tadipatri and Yerraguntla. High quantities claystone is found in Tadipatri, Ankkireddypalli, Jammalamadugu and Bethamcherla about 20,000 tones of clay and napa slab are quarried daily. There are about 250 napa slab polishing units established in Bethamcherla, Dhone, Ramapuram, Cherlopalli, Racharla, Tadipatri, Ankkireddypalli and Jammalamadugu. Steatites, Serpentine along with dolomite are found in Bethamcherla, Milkapuram, Dhone, Rangapuram and Kothapalli. High grade limestone is found in Erramalai hills Steatite is found in Muddavaram, Balapalapalli, Pendekal and Chadrapapalli of Dhone manda of Kurnool district. Large quantities of quartzite with silica sand are found in Orvakal, Pulicherla and Kamarole of Kurnool district. The quartz is found as veins in Gorantla, Haddapiri and Kapirala villages of the Kurnool district. Superior quality of yellow ochers are found in Bethamcherla, Vedruthi, Ramallakota villages in Kurnool district. There are about 200 mining leases granted for mining of barytes in about 1500



hectares of land. The dolomite is mined in Bramhanapalli and Vempalli villages. From the study of geographical area of the mining areas it is found that more mines of Kadapa slabs are found between Bugganapalli, Dhone, Tadipatri and Pulivendula, Yerraguntla and Kadapa. The Andhra Pradesh Mineral Corporation is mining barytes in Mangampeta area. Unscientific mining of minerals is leading to land degradation.

The local tribal people are able to participate in the protection and posturing of forest in Nallamalai hills. Forest are also degraded for laying communicational lines, high power electrical power lines, roads and railway lines.

The unscientific unauthorized mining activities taking place in Erramalai hills for mining dolomite, limestone, Yellow ochers, steatites, quartzite and silica sands are leading to land degradation at a faster rate and living behind artificial pits. The underground mining of steatite and asbestos may lead to land subsidence of landslides, slumping are commonly noticed in mining of dolomite, calcite and ochers from derby slopes. The open cast mining of barytes at Mangampeta area has paved way for dumping of wastage along the roads has ridges. Similarly the mining of napa slabs as left behind the artificial pits around Ankkireddypalli, Tadipatri, Jammalamadugu, Bethamcherla etc. and paved away for dumping waste material as use heaps along major road sides.

Biotic Environmental:

The Nallamalai hills of the Kadapa basin possess rich biotic resources which consist of thick forests, medicinal plants, creepers, climbers and grasses. There are about 1000 spices of different variety of trees, medicinal plants, creepers, climbers and grasses in the Nallamalai hills. They are reported by the Department of Botany, Sri Krishnadevaraya University, Anantapuram. The Erramalai hills are formed of scrubs and shrubs. The Erramalai hills are rich in mineral and lie at an altitude of 300 to 600 above MSL. The average annual rainfall is about 600mm. Due to low rainfall, low altitude and rich minerals resources only scrubs and shrubs are found in Erramalai hills. The Nallamalai hills have raised to a height of about 600 to 900 meters above MSL and receive an annual rainfall of about 1000mm are more. The valleys formed in Nallamalai hills possess high value medicinal plants, bamboo and teak plantations. They are found in Nallamalai hills. Unfortunately wood smugglers are high in Nallamalai hills and illicit mining is high in Erramalai hills. Due to unauthorized deforestation activities and mining in Nallamalai and Erramalai hills, the land degradation is very high. In-between Erramalai and Nallamalai hills the terrain is formed of buried pediment plains consisting of creep built plains, wash plains and fluvial plains. They are utilized for cultivation of food and non food crops.

Ecological Degradation:

The Nallamalai and Erramalai hills are ecologically degraded due to deforestation and mining activities. The forests present in the valley of the Nallamalai hills are slowly transformed into cultivable lands by cutting the thick forests. The valley present between Dornala and Srisailam are disturbed by human activities. The wood smugglers are felling the trees and marketing the wood illegally. Similarly the



woods is cut for firewood by the tribal people and are selling the firewood in the nearby towns like Nandyal, Giddalur, Markapuram, Allagadda, Srisailam, Rajampet, Kadapa, Badvel and Mydukuru. Due to felling of trees on an average about 500 hectares of forest land per annum is disappeared. The Government of Andhra Pradesh has issued an order on August 28, 1992 to adopt the system of 'Joint Forest Management' to enable the local community to take part in afforestation, forestry and are benefited by forest products. Under joint the forest management scheme world bank has given funds to Joint Forest Management scheme, afforestation, social forestry, forest research, biodiversity, conservation, management of forest information system, forest inventory, collaborate forest scheme and tribal development scheme in Andhra Pradesh about 200 Vana Samrakshana Samithi have been constituted to protect the forests.

Environmental Impact Assessment:

The environmental assessment of the Kadapa basin has been worked out using Intensity of soil removal, Sedimentary Yield Index and Erosion Index adopting Jenkins (1992) method. From the mapping of Environmental Impact Assessment it is found the Erramalai hills are subjected to severe land degradation, Nallamalai hills are subjected to moderate to high land degradation and the buried pediment plains are subjected to low land degradation.

Conclusions:

From the study of environmental degradation of the Kadapa basin it is found that the Nallamalai hills are rich in biotic resources and the rate of land degradation is high only in deforested areas. The Erramalai hills are rich in mineral resources and the rate of land degradation is very high due to unscientific and illicit mining of minerals. The buried pediment plains present in between Nallamalai and Erramalai hills are utilized for cultivation of food and non food crops and the rate of land degradation is very low.

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