

ABSTRACT

Forests are the natural resources which have been degraded during the last few decades continuously either by natural or through man-made activities. The study is carried out in Sonai-Rupai Wildlife Sanctuary which is located in the foothills of the Eastern Himalayas in Sonitpur district of Assam, India. The present study was conducted with an objective to investigate the causes and effect of deforestation and forest fragmentation in the Sanctuary. To achieve the objectives, first of all Landuse/Landcover change were assessed and compared over a period of 45 years (1960-2005) by using Remote Sensing (RS) and Geographic Information Systems (GIS) technique. The results show that Sonai-Rupai wildlife Sanctuary has undergone tremendous changes. Of the total 220 km² area of the sanctuary it was found that 85.9% was forest cover during the period 1960 to 1988 which has been reduced to 49.8% in 2005. Secondly, environmental status of the sanctuary was studied in terms of soil quality, water quality and status as well as diversity of tree species. Soil quality was conducted to investigate the seasonal changes of the nutrients in the soil under different land uses within the sanctuary. It was found that the presence of vegetation influences the status of nutrients available in the soil. The soils in study area vary from clay to sandy texture in different landuse. The content of organic carbon, and available nitrogen, available phosphorous and potassium contents were found to be comparatively higher in forest soil than grassland soil and barren land soil. The water quality study was under taken in three (3) important rivers of the Sanctuary. It has been found that water quality of River Gelgeli is good and pollution free. The analysis results of physico-chemical parameters of River Belseri and Gabru indicates that the water quality is

deteriorating with the change in human life style, construction activities, utilization of agricultural land, construction of embankment in the river bank, waste disposal and deforestation in the river bank areas. It was observed that a strong relationship exist between DO, BOD, COD, Nitrate and phosphate. The concentration of these parameters were found to be high during monsoon which may be due to presence of high organic load which gets into the river due to surface runoff which has animal wastes and runoff from agricultural field. The river water was found to be highly turbid which may be because of erosion of the river bank. Water quality index was also calculated for the river water in the study area and was found to be good and satisfactory.

A baseline study on tree species of the sanctuary was done using quadrat method. A total of 45 tree species belonging to 41 genera and 27 families were recorded from the study sites. The Shannon-Wiener's diversity index of 3.54 and Species Richness of 7.2 was found in the study area. The highest species diversity was recorded from the family *Malvaceae*, *Meliaceae* and *Moraceae*. The maximum family importance value (FIV) was recorded for *Combretaceae* (34.31) with 2 species and 1 genera showing tree density (93 individual/ ha) and basal area (278.7596 m²ha⁻¹). Along with *Meliaceae* (27.73), *Malvaceae* (26.40) was the co-dominant family in the Wildlife Sanctuary. The regeneration status of tree species was found to be low which may be due to human disturbances in the study area.

Socio economic studies of encroached villages in and around the Sonai-Rupai Wildlife Sanctuary was undertaken to assess the economic and social status of the villages. From the present study it was observed that people are mainly migrated from different part of the state for livelihood. Majority of the respondent were illiterate and were not aware about their concerns towards environment. It has been observed that

78.9 % of population uses wood as source of energy for cooking. About 71.1% of populations are using the sanctuary as a grazing ground for their livestock. The important threats identified in the sanctuary were poaching, hunting, and deforestation resulting from cutting down of forest for farm plots and illegal logging.

River channel migration was found to be one of the important natural factors causing forest loss and habitat fragmentation in the Sanctuary. Total area covered by the rivers in 1960 was 11.67 km² which increased to 19.07 km² during 2005. From 1960 to 1988 estimated erosion was 9.81 km² and deposition was 5.27 km² with a loss of 4.29 km² of forest. During the period, 1988-2001 estimated erosion and deposition were 6.16 km² and 3.52 km² respectively with a 3.77 km² net loss of forest land and in 2001-2005 estimated erosion was 4.3 sq km and deposition was 4.9 sq km. The result shows that the River Gelgeli, Belseri, and Gabru are very meandering river which is causing problems of erosion and deposition as well as they open up new channel leaving behind abandoned channel causing forest loss and fragmentation. During the last few decades encroachment and deforestation due to illegal logging and other human activities has made the forest prone to erosion. The lateral migration of the river bank line is causing loss of forest and is affecting the wildlife habitat by fragmenting the natural habitat. Channel migration is also affecting the soil and water quality of the sanctuary. The deposition of sediments makes the soil unfavourable for the growth of vegetation. From the water quality study it was found that water was found to be highly turbid increasing in turbidity and total suspended solids due to flood and erosion.

Anthropogenic as well as natural processes are causing forest loss and fragmentation in the study area. In the present study the causes of deforestation identified are the conversion of forested lands for agriculture and settlements;

overgrazing; illegal logging fuel-wood gathering and construction of boundary wall by Army Cantonment. Natural cause, such as erosion and sedimentation due to flood has been also identified as one of the important causes of deforestation. The expansion of human population and loss of natural habitat for wildlife have increased the conflicts between man and wild animal especially large mammals such as elephant. Any further deforestation and encroachment in the sanctuary and in the nearby forests should be effectively resisted. The remaining habitat should be intensively protected and managed with emphasis on restoration of a closed canopy structure. The Sanctuary has a vital environment and scene for Eco-Tourism. Eco-Tourism can promote the participation of local communities in conservation and management of wildlife resources by enhancing and improving the quality of their livelihood and thus by increasing their stake in well being of wildlife.

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