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ABSTRACT

Wetland around the world have been reported to be degrading and lost due to anthropogenic activities mainly because of land use / land cover change. Land use/ land cover change is the interaction in space and time between geophysical and human dimensions. The changes in land use and land cover influence the environment at different levels. The land transformation by humans over the last few decades has been extensive and it has greatly disturbed the natural processes that have affected aquatic ecosystems. Wetland ecosystems are linked to their watersheds/upper catchments and integrate many upstream processes with the differential contributions of spatially distributed controlling factors. A quantitative analysis of ecological responses to land alteration is imperative to understand natural aquatic processes. The rates and temporal variation of delivery of water, sediment, and nutrients from land surfaces to water bodies strongly influence a range of ecosystem processes. These processes vary geographically with differences in land use/land cover and generate great spatial heterogeneity in the wetland ecosystems. In view of the significant importance of wetlands in the ecosystem and regional economy, an attempt has been made to analyze the impact of land use / land cover dynamics on ecosystem of Hokar Sar wetland, a Ramsar Site located in Kashmir Valley. Multi-temporal (1986, 1995, 2005) land use/land cover of the watershed has been evaluated using remote sensing data of SPOT HRV-I, Landsat-ETM and IRS-LISS-III, respectively. The land use / land cover statistics revealed that significant changes have taken place from 1986 to 2005 in the watershed. Besides, the nearest city, Srinagar, located in the eastern fringe of the Doodhganga watershed has encroached upon substantial area of the watershed. The settlement area around the wetland has increased tremendously from 1969 to 2005, especially from the north eastern and south eastern side of the wetland. The significant increase in the settlement area is result of many factors, such as, increase in population, the area is relatively plane and there is no physical barrier like mountains ranges from eastern and south eastern side of the city. National corridor and railway track which run within the vicinity of wetland, has also favoured the new constructions in the area. In response to these upstream land use/land cover changes and surrounding settlement expansion, the Hokar Sar wetland has exhibited changes in spatial extension, structure and hydrological characteristics. As a consequence of continuous inflow of sediment load and nutrients from

upper catchment due to changing land use, the wetland has fragmented into various spatial zones with varying physicochemical characteristics. A series of water characteristics of the wetland were examined and most of them showed the symptoms of interference attained mostly due to upstream land use/land cover changes. The average water depth of the wetland has reduced significantly, wetland has attained eutrophication condition and the overall ecosystem of the wetland has been found to be degraded. Further a survey was conducted to determine the economic dependence of the nearby villages on the Hokar Sar wetland. Approximate evaluation of wetland resources based on its use was determined by conducting interviews of local communities. A random survey of villages around the wetland was carried out using a standard questionnaire format designed for this purpose. The evaluation of wetland products was done using market price method. This explains the pressure on the wetland, requirements of local community and their economic dependency on the wetland. It has been observed that a good proportion of local population is directly or indirectly dependent on Hokar Sar wetland for number of reasons. The exploitation of wetland products forms the good source of income for considerable proportion of local population which in turn has put a pressure on the Hokar Sar wetland.

The status of Hokar Sar wetland has been amply demonstrated in the present study. It has been observed that Land use/land cover changes in the Doodhganga watershed and human interference has resulted in the degradation and loss of this valuable resource. Wetlands, if properly managed can be used profitably for meeting a wide variety of the human requirements and for deriving environmental benefits. The management of these wetlands requires inter-agency cooperation, policy making, capacity building and technology transfer. The present work has come up with some factual findings based on interpretation of satellite data, GIS analysis and ground surveys. Suggestions have been given for the preservation, conservation and management of wetlands of Kashmir valley in general and Hokar Sar Wetland in particular. The information generated in the present work is expected to serve as a baseline for understanding the dynamics of wetlands in the region and at the same time serve as a detailed, comprehensive study for devising implementation plans for the sustenance of Hokar Sar wetland.