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Title : **Anthropogenic Stress on the Environment of Wular Lake: A Spatio- temporal Analysis.**

ABSTRACT

Wular Lake is the largest freshwater Lake of India in Western Himalayas has got deteriorated over the period due to the enough human interference within its catchment areas. It plays an important role in the local hydrography of Kashmir Valley which acts as absorption sink for the floodwaters during excessive rains. It has been affected by changing land uses in its catchment. The increasing role of human activities in fragile ecosystems of Western Himalayas, like that of Wular Lake lays emphasis on the need to analyze the impact of anthropogenic activities on its environment and particularly its water quality. Land reclamation in the Lake surroundings for anthropogenic activities had adverse effects on the ecology and environment of Wular Lake which has led to shrinkage in its area at a faster rate. The interchange between different land use classes is the result of the human influence both in Wular catchment as well as Wular Lake which has witnessed a huge change in their respective areas. The purpose of the present research study is to identify the changes in Land Use and Land Cover in the Wular Catchment as well as its transformation into other classes and its impact on the overall water quality of the Lake. For the present study Landsat (TM) imageries of 1991 and (OLI) 2015 have been used for analyzing the dynamics in Land use/Land cover. Regarding water quality, water samples were collected from five different spots of the Lake in four different seasons of the year-- from December 2014 to September 2015. The sites from which water samples were collected are Vintage Park, Ashtungo, Watlab, Makhdomyari and Ningal as site 1,2,3,4, and 5 respectively. Supervised classification technique along with maximum likelihood method was used to generate LULC maps of different categories pertaining to study area for years 1992 and 2015. Some parameters of water like temperature, transparency, depth, conductivity and pH were examined on the spot

during the sample collection by their respective measuring instruments. The present study has attempted to analyze the factors responsible for the shrinkage and deterioration of Wular Lake in Kashmir Valley which will be helpful in the conservation of this Lake and other lakes of the world in general. The study has emphasized on the counter reactions of Wular Lake against the human populations residing around it.

The growing population around the Wular Lake is posing a big threat to the natural environment of the Lake. The Wular Catchment has witnessed a sharp increase in its population from the last few decades which has directly or indirectly affected the environment of the Lake. Research findings show that Wular Lake has lost more than half of its area (2706.78 hectare) during the period 1991 and 2015 because of various anthropogenic activities occurring in its peripheral area. The quality of water in Lake has degraded drastically with the passage of time due to addition of high levels of untreated sewage and runoff from cultivable fields. Due to the geomorphological setting of the Lake as mentioned earlier, it acts as a recipient/absorption sink for entire wastewater of the upper Jhelum and its own catchment. None of the human habitations till the present date have been provided with sewage treatment facilities, which have resulted in to the discharge of wastewater/untreated sewage directly into the water body which has impaired the water quality of the Lake. During the last 2 decades illegal settlements have been coming up continuously and people have also encroached over large parts of the Lake and have directly converted it for agricultural Land use, residential purposes, willow plantations, orchards etc. The refuse and sewage generated from these settlements surrounding the Lake is either dumped directly into the Lake or goes directly into the Lake via its inlet Streams and rivers without any treatment which has drastically degraded the overall water quality of the Lake. The household survey has revealed that the sewerage and municipal facilities are totally absent in the Lakeshore villages. The domestic sewage and solid waste is directly drained out into open street drainage and open spaces respectively which ultimately flows into the Lake with surface runoff.