Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

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DEVELOPING A QUANTITATIVE MODEL FOR ENVIRONMENTAL RESOURCE MANAGEMENT IN THE FUNCTIONAL SCOPE OF LARGE DAMS (A CASE STUDY OF KARKHEH DAM)

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Abstract

This study was performed to quantify the effects of land use changes resulting from the construction of Karkheh Dam, in southwest of Iran, on the water quality of Karkheh River. For this purpose, the periodical Landsat TM and ETM+ images were used to assess the changing trends of the land use types before and after the dam construction. The water quality data were collected from the hydrometric stations and the possible correlation between the changes in the land use types and water quality parameters was detected through regression models. The obtained results showed a significant correlation between the changes in the different land use types and the variations of the water quality parameters in the lower basin of Karkheh Dam at the confidence intervals of 95% and 99% (p-values=0.05 and 0.01). The results indicated that the development of the irrigated lands and water supply for the farmlands would be the main factor for the declined water quality of the river at the downstream areas. The land use map showed that the current area of the irrigated lands is approximately 76% of the entire basin area, while the regression models revealed that the maximum permissible area of this land use type should be 46% of the total area of the basin. This indicates that the development of agricultural fields would be the main cause for the decline in the water quality of the river at downstream areas.

Keywords: land allocation, land use, Landsat images, large dam, water quality

Received: December, 2019; Revised final: May, 2020; Accepted: July, 2020

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