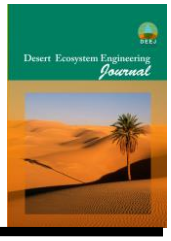
DEEJ (2021) 11 (34) 1-14

University of Kashan

Desert Ecosystem Engineering Journal

Journal homepage: http://deej.kashanu.ac.ir



Ecosystem change detection in arid area in relation to stockholders The case study: Hamoun wetland

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Received: 24/06/2021 Accepted: 14/06/2022

Extended Abstract

Introduction: Wetlands are valuable water resources that have different stakeholders due to the ecosystem services they provide. Since the dependence of these stakeholders on the wetland is higher in arid and semi-arid areas, changes in water supply in the wetland are more important. Analysis of changes in water resources in relation to wetland stakeholders, in addition, to supporting the life and sustainable management of the ecosystem, is used to address the importance of wetland protection. In this study, to highlight the importance of Hamoun wetland restoration as the only water source in the Sistan plain, the changes of this wetland in relation to stakeholders were investigated.

Method: The land-cover classes were determined based on the importance of each class for the stockholders of the wetland. Then, the land-use/ land-cover map of the wetland in the years 2020, 2015, 2000, 1977 was created using Landsat satellite images. The SVM classification method was used to classify the images and produce the land-use/land-cover maps. The anomaly of the climate variables including mean annual temperature and mean annual precipitation were calculated to show the change in climate variables. The changes in water level of Hamoun wetland, temperature, and annual precipitation in relation to changes in the area of each land-use/land-cover class of each group of stockholders were investigated.

Results: The results of the stakeholder-related classes show that in 1977 all stakeholders had a good condition in this region and the potential for soil erosion has decreased in this year. In natural conditions, the Sistan plain is a suitable area for residents despite locating in an arid area. But in 2000, due to the lack of water resources, the potential for soil eruption has increased the classes used by stakeholders have decreased and the ecosystem services of the wetland were limited. In 2015, the water body was increased in comparison to 2000, and the area of vegetation and agriculture were increased. The area of bare-land was decreased. Based on these results the stockholders had better conditions than 2000. In 2020, the area of the water body was more than 2000 and 2015. The vegetation and agriculture area were increased in this year. Therefore, the condition of life for stockholders was improved. These results show the importance of Hamoun wetland restoration as the only water source in the Sistan plain. As seen, the changes of this wetland affect the well-being of stakeholders.

Conclusion: According to the results obtained in 1977, when the temperature and rainfall were better, a higher area of water resources existed. As a result, favorable conditions could be for farmers, livestock, and wildlife. The bare-lands have decreased, thus, the potential for soil erosion in the region has been decreased. In addition, the potential for soil erosion has decreased. Because the soil of the area was covered with water and vegetation. However, in

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DOI: 10.22052/deej.2021.11.34.49

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2000, when the drought occurred, due to the lack of water resources in Hamoun Wetland, the wetland body has changed to bare-lands, and the possibility of soil eruption has increased. In such a situation, because the water body did not exist, the conditions were not suitable for the stakeholders of the region. Especially agriculture, which is the most important occupation of the local people in this area. In case of drought and lack of water resources in Hamoun wetland, the potential of soil erosion increased and, as a result of which dust increases during storms. In addition to economic problems in the region, these factors also endanger the health of local communities. The results showed that after several years of dryness of the bed of Hamoun wetland, with the inundation of the Hamoun in 2020, the level of usable areas for the region's stakeholders has increased. Therefore, the living condition of the people and the wildlife have been improved. Because agriculture and vegetation have expanded, thus the potential for soil erosion has decreased due to the reduction of barren lands. The results of this study show the importance of wetland life in an arid and semi-arid region. With the change of wetland, the level of the lands that are related to each of the groups of users of the wetland also changes. Therefore, rehabilitation and protection of wetland, and water resources management is necessary for sustainable living conditions in the region.

Keywords: Stockholders, Scio-economic, Agriculture, Drought, Sistan plain.