



University of Zabol

Graduate School

Faculty of Water and Soil

Department of Range and Watershed Management

**The Thesis Submitted for the Degree of M. Sc  
In the field of Watershed Management**

**Investigation of the Process of Drying, Degradation and  
Watering of Hamoun International Wetlands using Satellite  
Images and GIS**

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## **Abstract:**

Wetlands are one of the most important ecosystems on Earth, accounting for nearly 6% of the world's total surface area. The study area is part of Hamoon Sistan Wetland, which is located on the border with Iran. Hamoon Wetland consists of three parts: Hamoon Poozak, Hamoon Saberi and Hamoon Helmand. This wetland is one of the most important wetlands in the world with an area of about 5700 square kilometers and a depth range of 1 to 5 meters and is located in the desert and desert area of the east of the country. The aim of this study is to investigate the stages of dewatering, drying and land cover changes of Hamoon International Wetland using satellite images over a period of 20 years. To determine the pattern of changes in the land cover of Hamoon Wetland and to determine the areas with the highest water retention, the time period of OLI and TM satellite data of Landsat 8 satellite, field study results have been used during the last two decades (1379 to 1398). After making the necessary corrections on the images, the land use map and land cover were prepared using the combined classification method. The vegetation map was prepared using plant indicators and field sampling and water map, saline and bare soil using normalized water index and PCA processing on the image. Finally, using GIS methods, all the layers of information prepared with each other and the user map and land cover of the region were prepared for each year. The results of this study showed that the accuracy of the production map was calculated by calculating the kappa coefficient and the overall accuracy was more than 0.85 and 90%. Also, the results showed that due to the drying up of the wetland in 2000, changes in underwater areas and irrigated lands with vegetation between the years 1379 to 1384 due to lack of water have no number and the trend of changes is zero. Most of the changes are related to the modified Bayer soil with an area of about 101441 hectares. In the period from 2005 to 2010, the lowest changes related to salt marshes are equal to 57 hectares and the highest changes are related to barren soil with 63632 hectares. Also, the most changes in the period 1394 to 1398 are related to water areas with an area of 31962 hectares. In general, during the statistical period, the use of irrigated lands, the use of vegetation, the use of vegetation and water during the statistical period has been increasing. The use of salt marshes and the use of barren lands during the statistical period has been declining. In addition to the impact of water inflow into the wetland, this shows the wetland's ability to regenerate after dewatering by developing vegetation. With the restoration of Hamoon Wetland and the development of vegetation, the soil has stabilized, and this role will continue even long after the region dries up.

**Key words:** Remote Sensing, Water body change, Hamoon Wetland, GIS