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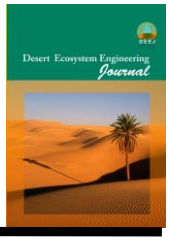

Investigating the Vegetation Status and its Relationship with Climatic Factors: A Case Study of Jiroft City Pastures

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Extended abstract

Introduction: The conditions and performance of the ecosystem are affected by the changes made in some phenomena and conditions of the earth's surface (such as vegetation condition) over time due to various factors, including natural or human ones, making it necessary to identify, predict, and pay attention to such changes. Considering the extreme vulnerability of arid and semi-arid regions to climate change worldwide, it is crucially important to investigate and evaluate climate change-induced alterations in vegetation in such regions. Therefore, this study sought to investigate the trend of vegetation changes in the three pastures of Farash Sardo, Kal-Bido, and Shoroiye located in Jiroft city with a dry and semi-arid climate, trying to examine the relationship between such changes and climatic factors.

Materials and Methods: The study area comprises three pastures, namely the Farash Sardo, Shoroiye, and Kal Bido, that were selected out of 375 pastures existing in Jiroft city, taking into account their significance for vegetation. To conduct the study, the monthly data of the Normalized Difference Vegetation Index (NDVI) and climatic data, including evaporation, average air pressure, average precipitation, relative humidity, sunny hours, dew point temperature, average maximum and minimum temperature rates, average temperature rate, and wind speed were used.

To this end, first, the long-term temporal changes in vegetation and climatic variables were evaluated using Mann-Kendall statistical test. Then, the most important climatic parameters affecting such changes were identified through multivariate regression, followed by the application of the root mean square error (RMSE) and the coefficient of determination (R^2) to compare and assess the performance of the obtained models. Finally, the most important climatic factors involved in the changes made in the vegetation conditions of the study area were identified based on the selected model.

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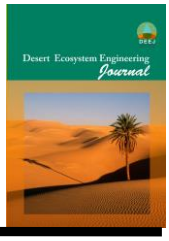

Results and discussion: The study's findings revealed that vegetation changes had an increasing trend in Farash Sardo pasture at annual, winter, and spring time scales throughout the study period. Moreover, significant increasing trends were observed in the pasture of the Cal-Bido at annual, autumn, winter, and spring scales. However, no significant trend was found in the Shoroiye pasture.

On the other hand, the investigation of annual climatic factors indicated a significant increase and decrease in the wind speed and the dew point temperature in the Farash Sardo pasture, respectively. Also, while a significant increasing trend was found in evapotranspiration and average minimum temperature in the Cal-Bido pasture, the trend of changes was decreasing trend in the pasture in terms of air pressure, relative humidity, dew point temperature, average maximum temperature, and average temperature. As for the Shuroiye pasture, the results suggested a significant increasing trend in evapotranspiration and average minimum temperature, and a significant decreasing trend in the values of dew point temperature, relative humidity, air pressure, and average temperature.

Moreover, the modeling results showed that the most important climatic factors involved in NDVI changes in the Farash Sardo pasture were temperature, air pressure, spring evapotranspiration, and changes in winter air pressure and annual precipitation. On the other hand, the most important climatic factors affecting NDVI changes in the Cal-Bido pasture were identified as spring dew point temperature, air pressure, autumn air pressure, winter air pressure, maximum temperature, and annual air pressure. As for the Shoroiye pasture, the most important climatic factors involved in NDVI changes were found to be wind speed, precipitation, minimum and maximum temperature rate, average spring temperature, summer air pressure, autumn sunny hours, and winter sunny hours.

In general, the investigation of the relationship between drought and vegetation status of the pastures via land sampling and remote sensing data is suggested to be used for improving the results and increasing awareness concerning climate hazards for vegetation. Such a study together with the examination of the contribution of human interventions on vegetation changes can also be used for managing the environment during critical periods and setting appropriate plans.

Keywords: Vegetation, remote sensing, climate variables, change trend, Jiroft city.