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Influence of changing land use/cover and land management on wind erosion potential in southwestern Iran

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Wind erosion is one of the main factors of soil degradation and air pollution in arid and semiarid regions. In recent years, dust storms have become ever more important sources of air pollution in large areas of Iran. Dust storms previously were confined to the summer season and to western Iran. Nowadays, dust storms occur during eight months of the year and extend to the central regions and the entire south of Iran. This is causing increasing problems for the residents of the affected areas, threatening their health and impairing social, economic and agricultural activities. Ahvaz, the capital of Khuzestan Province, is the city that is most seriously affected by these problems in Iran.

Wind erosion is a multifaceted phenomenon influenced by a variety of factors. One of these factors that has changed considerably in recent time in Iran is land use/cover and land management. To investigate the impact of these changes on wind erosion potential in southwestern Iran we applied an empirical model of the Iran Research Institute of Forest and Rangeland (IRIFR) to remote sensing data extracted from Landsat ETM+ and Landsat 8 imagery of 2010 and 2019. Relationships between changes in wind erosion and land use/cover were determined by cross-tabulation, combining the original spectral bands with synthetic bands and using Maximum Likelihood classification.

The results indicate major changes in wind erosion potential over the last decade in the study area. Interestingly, while areas with a low, medium, and high sediment yield potential decreased, areas with a very high sediment yield potential have increased. Increasing soil erosion potential was primarily related to the conversion of rangeland to agricultural cropland. Moreover, the results indicate an increase in desertification in the study area which is also a clear evidence of increasing in soil erosion.