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CHARACTERIZATION AND ASSESSMENT OF LAND DEGRADATION IN WEST NILE DELTA REGION USING REMOTE SENSING AND GIS

By

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B.Sc., Agric. Sci. (Soil), Ain Shams University, 2008
M.Sc., Agric. Sci. (Soil), Ain Shams University, 2015

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Faculty of Agriculture
Ain Shams University

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Approval Sheet

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ABSTRACT

Hoda Nour Eldin Hafez Mashhour: Characterization and Assessment of Land Degradation in West Nile Delta Region Using Remote Sensing and GIS. Unpublished PhD. Thesis, Department of Arid Land Agricultural Graduate Studies and Research Institute, Faculty of Agriculture, Ain Shams University, 2021.

Land degradation is considered a worldwide problem, which has negative impacts such as environmental hazards, loss of biodiversity, a higher food prices, food insecurity, climate changes and ecosystem services. The study aims to characterize and assess land degradation in Wadi El Natrun area and its outskirts using Remote Sensing and GIS applications. To fulfill this objective, Landsat data of TM 5 in 1998 and 2008 and Landsat-8 in 2018 were used. Supervised classification technique was performed to track changes in land cover of the study area. ASTERDEM, TM image 2018 and topographic maps (1:50000) were used to identify of the different physiographic units. A total number of 85 of soil surface and 7 very deep soil profiles were dug. Soil samples were collected for lab analysis. IDW interpolation method was employed for mapping three types of land degradation. Desertification sensitive spatial modeling was used for determining the desertification index in the study area. Land suitability was assessed using ASLE software on basis of the rates of crop requirements. The study indicated that there was a noticeable change in the land cover during the duration of 1998-2008 and the duration of 2008-2018. Results showed increases in cultivated area and urban area meanwhile bare area were decreased. The study revealed that the cultivated area was remarkably increased recording 5.9 % at 1998, 32.8 % at 2008 and 54.2 % at 2018 of the total study area. However, the percentage of bare land decreased as 93.1%, 66.1 and 44.5 at 1998, 2008 and 2018 respectively. The delineated physiographic units within the study area are dissected rock land, alluvial terraces, gullied piedmonts, wadis, playa, sabkha, aeolian plain and aeolian dune. Salinity map explained that the very slightly saline soils represented 55.9 % while the

slightly saline soils represented 17.4 % of total area. The Non-saline soils and moderately saline soils occupied 16.7 % and 0.9%. Strongly saline soils affected by salts represented 15.4% from total area and sodic soils occupied 5.7 %, while saline – Alkaline soils represented 2.9 %. Desertification index indicated that the majority of the study area was covered by low sensitive areas amounting (66.6 %). However, the very sensitive areas were recorded (6.6 %). The total recorded areas of moderately sensitive and sensitive classes were nearly the same levels; 9.8 % and 8.3 %, respectively. Land suitability map for some crops explained that the study area was highly suitable for Olive by only 52.1 and suitable for potato by 66.4. However, the suitable areas for watermelon and pepper were 59.7 % and 66.4 % respectively.

Keywords: Physiography, land Cover, Land degradation, Remote Sensing, GIS, Desertification, Land suitability and Wadi El Natrun.

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