Detection of soil desertification in the northern part of the delta using multi temporal processing

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The present study was carried out to evaluate soils of North Delta area which runs generally from Damietta branch in the east to Rosetta branch in the west penetrating the old cultivatied lands in the south and stretching between longitudes 30° 20’ to 31° 50’ east and latitudes 30°45’ to 31° 36’ north, The electrical conductivity values (ECe) for soil profiles Nos. : 1 , 10 , 12 , 22, 24, 27, 32, 43, and 48 were 5.52, 5.95, 5.28, 5.55, 6.73, 6.74, 7.05, 7.72 and 5.43 dS/m for the surface horizons of these profiles, respectively, which is considered as slightly saline according to soil Survey Staff, (1993). Also, the ECe values were 9.83 and 13.8 dS/m for the soil surface of profiles 50 and 51 which were moderately saline according to Soil Survey Staff , (1993), respectively. The ECe values of profiles nos. 1, 12, 19, 24, and 50 , increased with depth and reached 8.25 , 8.46 , 17.32, 6.80 and 13.39 dS/m for the subsoils Cz3, Czn, Czn3, Czn and Czn2 horizons for these profiles, respectively.This is related to leaching of salts from the soil surface with down ward movement of irrigation water On the other hand, data of chemical analysis showed that the electrical conductivity values (ECe) for the soil profiles Nos. 32and 51 decreased with depth , where the highest values were 7.05 and 13.8 dS/m in the surface soil; Apz horizon of both soil profiles could be classified as moderately saline according to Soil Survey Staff , (1993). The accumulation of salts on soil surface layer is due to the raising capillary uppermovement of the evaporative pumping of the relatively saline ground water resulted in accumulation and mineralization of salts on the soil surface Apz horizon which also , shown by occurrence of salts in morphological description.The studied soil profiles Nos. 10 and 27 have mode for occurrence the salinization process, wherea were accumulated at the medium depth at Czn and C respectively. The ECe values for these horizons ar 7.16 dS/m, this is due to both downward movement water and leaching the salts from surface to sub surf also, the pumping evaporative action of saline goun raising the salts from the bottom horizon Cz3 to the and Cz 1 horizons of soil profile, Nos. 10 and 27, resp a different e, the salts 1 horizons, 6.37 and f irrigation ce soil and water and upper Czn ctively, As mentioned above these studied soil profiles , 12, 22, 24, 27 , 32, 43 , 48 ,50 and 51 which saline and moderately saline soils in the current i were non saline according to soil Survey Studies w that associated to occurrence of desertification procesos. 1 , 10 e slightly vestigation ich means Both the morphological description and data f chemical analysis, show that the studied soil profiles Nos, 5, 30 , 35, 40 , and 45 have the properties of alkaline soils. The r electrical conductivity values (ECe) are <4.0 dS/m, the pH val es for Cnl and Cn2 horizon of soil profiles Nos. 5, 7 and 30, 40, 45 and Cn horizon of soil profile No. 35 were more than 8.5 hich were strongly alkaline according to soil survey staff, (1993 . Also, the sodium adsorption ratio (SAR) for these studied hor zons are > 13. Soil Survey Studies reported that the above studied soil profiles had no alkaline conditions, in the period of 1960s. Therefore, the current study indicates that they are assocaited with desertification process (alkaliniation).On the other hand, the studied soil profiles Nos 1 , 10 , 12 , 24 , 50 and 51 are considered as saline alkaline soil according to Commettee,(1987), wherease their ECe values m re than 4.0 dS/m, also have horizons of SAR more than 13 and p >8.5, the morphological description of the studied that the water table level for the studied soil profiles , 15, 18 , 21 were at 50 , 55 , 65 , 70 , 80, cm frea, shows os. 12 , 13 m the soil •surface, respectively. These levels are classified as shollow and moderately deep according to Soil Survey Staff (1993). This is due to the mismanagement of irrigation water, the lateral seepage

from the canals, and the difficulties of drainage Measurements of encroachment in 1991 at Kafr El Sheikh governorate were different than in 1985 for areas where it had ranged from 8 to 150 feddan with annual rate ranged from 1.3 to 25 feddan. The highest rate was in Kafr El Sheikh and the less one was in Mahalet Deyay village Increments were 61,42,21 and 16 feddan in cities of Desok, Hamol, Motobus and Sanhour respectively. But in 1998, the data indicated markedly increasing in the rate more than in 1991 But for motobus the measurements in 1998 had increased than in 1991 with areas ranged from 37 to 984 feddan with annual rate ranged from 5.3 to 140.6 feddan The highest rate was in Kafr El Sheikh city followed by Desok center but as for Mahalet Deyay and Sanhour villages the increase rate was closest to the rate of Hamol center and was more than Motobus center rate The total loss in the crops caused by urbanization process in the studied positions between year 1930 and year 1998 were 8556.8, 7640.0, 1222.4 and 7334.4 ton for wheat, rice, cotton and maize, respectively, The loss in income by L.E. caused by urbanization process (desertification) in the studied positions between year 1930 and 1998 due to the loss of wheat, rice, cotton and maize crops are 6112000, 6112000, 8556800, and 6112000 L.E. respectively. Therefore the total annual loss in national income in L.E. between year 1930 and year 1998 due to urbanization is 24,992,800 about 25 million L.E, The eastern land over flow in Damietta beach was reduced by about 8.85 Km2 (more than 2100 feddan with average of 48.8 feddan per year which had been eroded to the sea). Between year 1972 to 1991 were 6.73 Km2 (1654 feddan) with annual eroded of 87.05 feddan per year.