Assessment of soil degradationin relation to roductivity in some reclaimed lands at el-nasr canal- west el-nubaria area"

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The current study aimed at evaluating the indispensable soil processes that affect soil function and their impact on soil productivity on quantitative basis. It is also intended the use of GIS technique to create map via overlaying different layers of soil attributes, to show where the problem is most acute and the magnitude of degradation impact on productivity loses .Two sites were chosen to represent West Nubaria area that which embracess an appreciable areas of the so—called old reclaimed desert land. The chosen sites are Tieba location with total area of about 35000 fedden and Banger El- Sokkar location with total area of 40000 fadden. In such locations, 24 farm were selected so as to represent the main soil capability classes delineated by the study conducted by land Master plan (Hanna 1986). In each farm a representative soil profile was dug, morphologically described, and soil samples were taken for laboratory analysis. Also in each farm the actual yield of the cultivated crops during the study period, i.e. 3 years was evaluated via questionair sheets answered by the farm owners. from this study, the following results were obtained:1- Tieba area is generally characterized by its deep sandy to sandy loam soil profiles. Nevertheless, same locations are characterized by its shallow profile, due to the presence of high water table or bedrock. Soil structure is generally varies from single grain to weak subangular blocky. Meanwhile Bangar El-Sokkar area are generally characterized by its relatively finer texture and highly calcareous nature. Soil structure is generally massive and hard. Field studies also showed such area are characterized by the presence of a consolidated discontinuous hard pan.1432-The obtained results showed that some areas of Tieba site is non — calcareous as CaCO3 content is less than 10%, whereas some other few areas can be considered calcareous where CaCO3 content ranges between 20 and 30 %; Meanwhile, Bangar El-Sokkar area is highly calcareous because CaCO3% varies from 25 to 50 % of the total soil matrix.3-Bulk densities of i.e. Tieba area are relatively sigh as their values ranging between 1.32 and 1.68 ton/m3, most probably due to the conssledated nature of such soils, the massive structure and/or the relatively coarse texture. Meanwhile bulk density values of Banger El-Sokkar area range between 1.23 and 1.46 ton/m3 . This may be due to the finer soil texture in such soil, compared to Tieba area.4-The total water — stable aggregates of Tieba soils varies from about 10 to 30%, and the MWD of the stable aggregates is equal or less than one. Meanwhile, in Bangar El-Sokkar soils, the total water stable aggregates ranging between about 15 to 40% and MWD of such aggregates, except few case ranges between 1.2 to 3.4 mm, most likely due to the high clay content in this soil compared to Tieba one.5-The basic infiltration rate of Tieba soils except very few cases, ranging between 4cm/hr and 24.6 cm/hr, indicating moderate to rapid ability of such soils to transmit water however, such rates in Bangar El-Sokkar area vary from 0.54 cm/hr to about 4.8 cm/hr, indicating the readiness of such soil to water entry ranging between show and moderate .6-The studied area displayed a relatively high values of penetration resistance (P.R.). Nevertheless, Bangar El-Sokkar area showed lower values of PR, compared to Tieba, probably due to the greater aggregate stability.7-The obtained results showed that some locations of the two study area are salt — affected while other are not.8- The current assessment of soil degradation was performed on basis of the reduction of soil productivity expressed by the values of relative yield.

The obtained results indicated highly significant negative relationship between soil productivity and each of soil salinity, ESP, PR and CaCO3%, while a reverse trend was obtained, in respect to clay content and available water in the root—zone. Regression equation for such relationships were obtained.1- Maps showing the levels and distribution of soil productivity in the study area was created by overlying the GIS layer of the different classes of the soil attributes.The maps should that the total area of the studied soil reached 74500 feddan, out of which about 21400 feddan (i.e. 29 % of the total area) suffer from colligative impacts of severe degradative soil attributes. Therefore, such area produces unacceptable yield, i.e. below 50% the achievable maximum crop yield under the condition of the studied soils. Meanwhile the areas subjected to the moderate integral impact of the degradative soil processes approaches 27200 feddan (i.e 37% of the total area). Soil productivity in such area ranges between 50 and 75% of the maximum yield. Thereby only 24000 feddan (i.e. 32% of the total area) of the study area produces theacceptable yield.In conclusion, finally this study advocates a special effort should be paid for preventing or alleviating the impact of degradation soil attributes via salt leaching and improving land drainage. It also advocates adopting proper management through application of organic matter to rehabilitate soil structure, and optimizing irrigation system to improve the soil water regime.