EFFECT OF INFORMAL URBAN ENCROACHMENT ON SOME SOIL QUALITY INDICATORS OF VERTISOLS AND ENTISOLS

By

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B.Sc. Agric. Sci. (Soil Science), Ain Shams University, 2005

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ABSTRACT

Eman Ali Abd El Fattah: Effect of Informal Urban Encroachment on Some Soil Quality Indicators of Vertisols and Entisols. Unpublished M.Sc. Thesis, Department of Soil Science, Faculty of Agriculture, Ain Shams University, 2015.

Urban sprawl is one of the main problems that threaten the limited highly fertile land in the Nile Delta of Egypt. In this research, the Multi-band USA satellite data Landsat 7 Enhanced Thematic Mapper (ETM+) acquired in 2000 and 2007 and Landsat 8 Operational Land Imager (OLI) acquired in 2014 has been used to study the urban sprawl and its impact on agricultural land in Qalubiyah Governorate. The results showed that the urban area in El-Khanka district represented 10.82%, 14.46% and 18.01% in years of 2000, 2007, and 2014 respectively. This urban expansion was reflected on the decrease of the agricultural soil area as well as contaminating of the irrigation water and soil.

Soil and water quality in irrigated arid lands is crucial for human health and sustainability. Heavy metal contamination of environment is a worldwide phenomenon that has attracted a great deal of attention. The current study aimed to track and assess the negative effects of urban encroachment on Entisols and Vertisols soil orders by tracking some soil quality indicators, especially those associated with the contamination of soil in addition to assessing the impact of using contaminated irrigation water from different sources linked to urban encroachment on soil quality. In addition, a health risk assessment for humans in contact with these soils was also conducted. Results revealed that heavy metals contents of irrigation water were at levels within allowed limits. The contamination status of the sediment with heavy metals was confirmed on the basis of

enrichment factor (EF). The EF results supported the fact that the sediments were highly enriched with Pb and Cd due to human activities. Contamination factor (CF) of the soil of Mostorod was more than 3 in case of Pb and Cd indicated that this area are considerably contaminated with Pb and highly contaminated with Cd. Modified degree of contamination index proved that Mostorod area was within the level of high degree contaminated, while results of El-Gabal El-Asfar area showed low degree of contamination. To evaluate the effect of exposure of these metals on human health in these areas, hazard index (HI) was calculated using ingestion, dermal and inhalation of soil. The results revealed that the highest values of hazard index was recorded in case of Cr for children at Mostorod and El-Gabal El-Asfar soil.

Key words: Contamination factor, Enrichment factor, Hazard Index Heavy metals, Modified degree of contamination, Soil quality indicators, Urban encroachment.

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LIST OF ABBREVIATION

Abbreviation	Description
AAS	Atomic Absorption Spectrophotometer
ADD	Average Daily Dose
BOD	Biochemical Oxygen Demand
CDI	Chemical Daily Intake
CF	Contamination Factor
COD	Chemical Oxygen Demand
CR	Cancer Risk
DAD	Dermal Absorbed Dose
DMI	Daily Metal Intake
DTPA	Diethylene Triamine Penta Acetate.
EC	European Commission
EC_e	Electrical Conductivity of soil saturated extract.
EC_{inh}	Exposure Concentration of inhalation
EDTA	Ethylene Diamine Tetra Acetate.
EEA	European Environment Agency
EF	Enrichment Factor
ENSC	Egyptian National Specialized Committee
ESP	Exchangeable Sodium Percentage
ETM	Enhanced Thematic Mapper
EU	European Union
FAO	Food and Agriculture Organization
GIS	Geographic Information System
HI	Hazard Index
HQ	Hazard Quotient
HRI	Health Risk Index
ICP	Inductivity Cupled Plasma
IDSC	Information and Decision Support Center