



Journal

DELINEATION OF PHYSIOGRAPHIC UNITS OF THE WESTERN DESERT OUTSKIRT OF LUXOR GOVERNORATE AND ITS SOIL SUITABILITY FOR AGRICULTURAL UTILIZATION PURPOSES USING MODERN TECHNOLOGY

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ABSTRACT

The Western desert outskirts of Luxor governorate, Egypt, i.e. adjacent to the side of Cairo-Aswan Western Desert road, Egypt is considered a promising area for agricultural utilization as well as a model for representing some physiographic features in the Western Desert, Egypt. So, it selected to be identified within the context of soil physiographic units, soil classification and land evaluation for agriculture irrigated soils. Landsat ETM⁺ (path 175/ row 43) images (2013) and Digital Elevation Model (DEM) were used in Arc.GIS 9.3 software to produce the physiographic map of the study area.

The true color (RGB-world imagery) image is considered a basic for the visual analysis. Such image is based upon the knowledge of relation between physiographic and soil as upon the studied features, which are resulted from some dynamic processes (**Gossen, 1967**). Visual interpretation depends on many elements such as tone, size, pattern, texture, shadow and other association to extract the important landscapes of the study area. The overall view which is a result of the reflectance spectral signature of such bands are used for delineating the promising area, the different units are characterized by their natural reflectance.

From the physiographic point of the view, this landscape includes; young terraces, pediment, outwash plain, old high terraces, old lower terraces and wadi bottom,. The soils of the different physiographic units were represented by 17 soil profiles, the morphological description was carried out and 47 disturbed soil samples were collected for physical and chemical properties. The soils of the studied area followed two orders, Aridisols and Entisols and the soils were classified to the family level on the basis of the Key to the Soil Taxonomy (**USDA2014**). According to land evaluation system undertaken by **Sys and Verheye (1978)** and **Sys et al., (1991)**, the studied soils are affected by many of limiting factors, i.e. soil texture, soil depth, salinity and alkalinity with variable intensity degrees. The current suitability of the studied soils could be categorized into two suitability classes, marginally suitable (S3) and not suitable (N1). To correct the severity of these limitations further land improvement should be executed and in turn potential suitability surveyed as moderately suitable (S2), marginally suitable (S3) and not suitable (N2). This severity can be corrected by application of organic and inorganic soil amendments and salt leaching as well as drip and sprinkler irrigation systems to sustain favorable soil moisture content for plant.

Key words: GIS, physiographic units, Remote Sensing, Soil classification and capability evaluation.