



Usage of medium-scale space images and GIS in analyzing the agriculture production limiting factors at the Northwestern coast, Egypt

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The northwestern coast of Egypt is characterized by an international interest due to its history and magnificent environment. The area was known as being the bread basket during the Greek and Roman periods. Recently, drastic changes in land use resulting in destructing many of water harvesting tools, thus diminution of the agriculture importance. Restoration of the area and planning self sufficient communities needs to develop a sustainable land resources database for these regions. The medium scale space data provide a spatial resolution of 30 meters, in addition to multi-temporal imaging. Moreover, Geographic Information System (GIS) permits to store, merge, and manipulate the huge amounts of thematic maps and attribute data.

A number of 7 Landsat ETM scenes covering the whole northwestern coast of Egypt were acquired and merged. ERDAS-IMAGINE software was used for image processing and analyzing. A number of 53 topographic maps at scale 1:50000 were used to input GIS thematic layers relevant to land resources, using Arc_GIS 9.2 system. Field investigation was carried out to represent different soil units and collect ground control points. Chemical and physical soil properties were determined, upon which soil classification was based. MicroLEIS system was employed to define soil restrictive elements for the local common agricultural practices. (i.e. cultivation of olives, peach, wheat, beans, and sunflower crops).

The results showed that the presence of Calcic, Petrogypsic and Salic horizons are responsible for the problems of water logging, hard workability and secondary salinization. The identified great groups include Torripsamments, Torriorthents, Haplosalids, Petrogypsids and Haplocalcids. Soils of the alluvial fans and watershed basins are deep to moderately deep with a texture ranging between fine sand to clay loam. The salinity is relatively low (EC is +/- 2 dS/m) whereas the CaCO₃ content is mostly over 8 %. The limiting factors found in the piedmont and coastal plains are salinity, soil depth and texture. These factors decrease the suitability classes to be between S2 and S5.

It can be concluded that the digital survey of agricultural land resources, are achieved by progress of Geographic Information System (GIS) and data provided by satellite images. Determining the agriculture limiting factors are very essential for the sustainable development of environmental sensitive areas. Updating and manipulating the digital thematic maps are accessible and economically effective. Usage of the digital maps and their attribute tables assist the decision support systems and may result in obtaining maps required for controlling sustainable development projects.

Key words: Soils, Space data, GIS, Agricultural constraints Egypt