Remote Sensing and GIS for Land Resources Digital Mapping, Northwestern Coast of Egypt

 GAD, A.1**, M.M. Hammad**2 **and R.R. ALI**3

1. National Authority for Remote Sensing and Space Science (NARSS)

2. Faculty of Agriculture, Al Azhar University 3-National Research Centre (NRC)

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 civilization periods. Recently, drastic changes in land use took place, resulting in destructing many of water harvesting tools thus a 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 area were acquired and merged. ENVI 4.2 software was used for image processing and analyzing. A number of 53 topographic maps at scale 1:50,000 were used to input GIS thematic layers relevant to special and non special inferences of 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. Soil map was produced including dominant geographic units and soil association. MicroLEIS system was employed, using the created database, to define soil suitability classes to olives, peach, wheat, beans, and sunflower crops.

The results showed that the soils are generally characterized by the presence of Calcic,

Petrogypsic and Salic horizons. 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 $CaCO_3$content is mostly over 8 %. Concerning the land suitability, 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 S_2 and S_5.

It can be concluded that the digital mapping of land resources encouraged by the progress of Geographic Information System (GIS) and data provided by satellite images. Such approach may preserve in the investment spent in soil and other thematic mapping, as the digital maps are more granted compared with analogue ones. 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, Digital soil mapping, Egypt