# *5 – SUMMARY AND CONCLUSION*

# 5 . SUMMARY

The studied area lies between longitudes $28^{O}$ 32\ and $28^{O}$ 38\ east, and latitudes $22^{O}$ 41\ and $22^{O}$ 46\ north in East El-Oweinat region, and it has great amounts of best quality ground water. So, the current study aims to give an scientific idea about the importance of soil characteristics, potentialities and suitability for certain crops at the studied area, as well as the giving suitable recommendations for a successful agriculture utilization.

1) Soil texture ranges between slightly gravelly loamy sand and extremely gravelly sand.

2) Soil bulk density ranges from 1.69 and 1.94 $g.cm^{-3}$, and has either positive and significant correlation with both sand and gravel or negative and significant correlation with both clay and silt.

3) Values of both hydraulic conductivity and infiltration rate vary between moderately rapid and rapid, indicate that their affecting positively and significant with sand and gravel constants.

4) The moisture constants, i.e., field capacity, wilting point and available water, as well as, pore size distribution are more affected by the skeletal nature of the studied soils.

5) The soils appear not saline or sodic category, soluble $Na^{+} > Ca^{++} > Mg^{++} > K^{+}$ and $Cl^{-} > SO_4^{--} > HCO_3^{-}$

6) Total carbonate ranges widely between 0.22 and 26.46%.

7) Gypsum and organic matter contents are found in low values of 1.0 - 1.34% and 0.01 - 0.07%, respectively.

8) The soils of the studied are classified into six taxonomic units (family level) as follows:

- Typic Torripsamments, very deep, siliceous, hyperthermic.
- Typic Torriorthents, sandy, very deep, mixed, hyperthermic.
- Typic Torriorthents, sandy skeletal, very deep, mixed, calcareous, hyperthermic.
- Typic Haplocalcids, sandy, very deep, mixed, calcareous, hyperthermic.
- Typic Haplocalcids, sandy skeletal, very deep, mixed, hyperthermic.
- Lithic Haplocalcids, sandy skeletal, shallow, mixed, calcareous, hyperthermic.

9) Total contents of some micronutrients are 5185.7 - 16488.7, 38.3 - 175.5, 52.1 - 119.4 and 7.5 to 27.5 $mg.kg^{-1}$ for total iron, manganese, zinc and copper, respectively. Their values show positive and significant correlation with silt, clay and silt + clay while , the reverse is true with sand. Also, their distribution pattern and homogeneity are discussed through weighted mean, trend and specific range.

10) Available contents of the previous micro-nutrients represent very small fraction of their total contents and are more affected by the skeletal nature of the studied soils.

11) Heavy metal contents of lead, nickel, and cobalt in the soil under consideration have a safety levels.

12) Data of grain size parameters show that medium sand is a predominant constituent. The studied soil sediments have poorly and very poorly sorting, nearly symmetrical (homogeneous distribution) or fine and strongly fine skeweed, which reveal that the they have a tail of fine grain. Dominant values of kurtosis were lepto and very leptokurtic, indicating high energy environment and low modification of grain size. The environment of deposition is fluvial (deltic) deposits. The transportation mechanism is dominated by rolling and suspension forms.

13) The mineralogical study of sand fraction reveals that distribution of heavy minerals follows an order of opaque minerals > zircon > rutile > tourmaline > amphiboles > epidote > biotite > pyroxenes > garnet > kyanite > other distinguish or not distinguish minerals. The distribution of dominant heavy minerals were between 33.98 and 45.45%, 20.23 and 28.74%, 3.62 and 11.51%, 1.36 and 9.35% of total heavy minerals for opaque minerals, zircon, rutile and tourmaline, respectively. With regard to light mineral contents, quartz content varies between 95.5 and 97.0% of total light minerals, while the rest ones range between 3.0 and 4.5% of total light minerals and are represented by the feldspars. Mineralogical examination shows that heavy and light minerals have high and very high relief as well as tend to be rounded, which reveal to reworked sediments.

14) Soil evaluation of the studied area appears that the soils of the studied six units are marginally suitable (S3), except small area has N1 (limitations can be corrected) or N2 (limitations can not be corrected).

15) Suitable crops for the studied area are discussed, and found that olives, watermelon and palm are more suitable crops.

16) Seasonal consumptive use (mm & $m^3$/fed.) are calculated for selected best crops under the prevailing climatic conditions.