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Pedological Studies Bearing on Genesis and Morphology  
of Soils of Maryut Area

by  
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Approved

Handwritten signatures on approval lines, including 'H. H. Ahmed' and 'H. H. El-Kady'.



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## I. INTRODUCTION

The geological aspects of the Coastal Zone revealed that the soils are formed from different sources namely: limestones, red shales and marls of the libyan plateau, and the Cretacic limestones that amplitude parallel to the Mediterranean Shoreline. Furthermore, accumulation of soil materials is ascribed to different geomorphic processes, e.g.: alluvial, aeolian, marine and littoral processes. The area also bears the symptom of alternating cycles of climatic fluctuation from humid toward arid in Pleistocene up to Holocene era respectively. Under such conditions, the soil profile is formed by successive depositional cycles that affect the morphology of these soils.

Studies concerning soil morphology and classification of soils at the Western Mediterranean Littoral are extensively treated in the literature. Soil classification was mainly based on geomorphological aspects of the terrain and morphological features of soil Profiles. The relative developmental stage of soil profiles was nearly judged by the degree of lime enrichment of their subsurface horizons.

The current work is carried out in the field of soil genesis and morphology with regard to soils at Maryut area. The latter is located about 25 kilometers west of Alexandria and total about 150,000 acres.

The writer got the opportunity to share in surveying 15,000 acres on a semi-detailed basis at this area during 1961. It was felt that the soils exhibit different morphological features, stages of development and represent most of the land types previously mentioned at the Coastal Zone. Accordingly, it was reasonable to study genesis and morphology of these soils using all possible meticulous techniques for obtaining reasonable information.

The successive studies undertaken for the approach of morphology and genesis of these soils could be outlined in the following:

- 1- The continuations of photo analyses and field work led to reconnaissance soil survey. Accordingly, different taxonomic units were established on basis of distinguishable morphological diagnostic horizons that led to reasonable soil classification.
- 2- On basis of morphological observations in the field, micromorphological investigations for some undisturbed horizon samples and morphological units were carried out in order to distinguish their specific nature and the internal fabric.
- 3- Mineralogical analyses for the heavy residue and the particle size distribution of the carbonate free sand were undertaken.

for selected profiles to discriminate between different depositional environments and to establish the uniformity of parent material in the horizons of soil profile.

- 1- Analyses of the particle size distribution of the mechanical soil separates are discussed from the view point of pedogenesis and sedimentation.
- 2- Mineralogical aspect of the clay fraction has been identified to state the associability of authigenic processes with new types of clay minerals.

It is hoped that the adopted approach would contribute to a better understanding of morphology, classification and genesis of the calcareous soils in the Coastal Litteral of  
A.R.

## 2. PHYSIOGRAPHIC FEATURES

### 2.1. Location and Present Development:

The investigated area is located at the eastern portion of Egypt's Mediterranean Coastal Strip and is known by the Maryut area (Fig. 1) Specifically, it is bounded by the Mediterranean sea, the base line 910 north of origin, the Cairo-Alexandria desert road and the base line 480 east of origin from north, south, east and west respectively. The area under consideration is intersected by latitude  $30^{\circ} 55'$  north and longitude  $29^{\circ} 45'$  east and totals approximately 150,000 acres.

The area is characterized by a low relief and mild topography as elevation rarely exceeds 70 m. above the present sea level; with a regional slope in the north and north east directions (Fig. 2). In the north, the surface is characterized by a series of outcrop rocky ridges alternating with depressions all run parallel to the present coast. Southward, the topography is slightly undulating and the surface is dotted by scattered hillocks known as "Korum".

Agriculture activities are confined to low lying areas where relatively deep soils and available water resources are found, barely cultures cover most of these soils while orchard cultures are limited and sporadic.

The south eastern portion of this area is recently under development and is a part from the so-called Maryut Project. (Fig. 3) . The project aims at the cultivation of about 80,000 acres

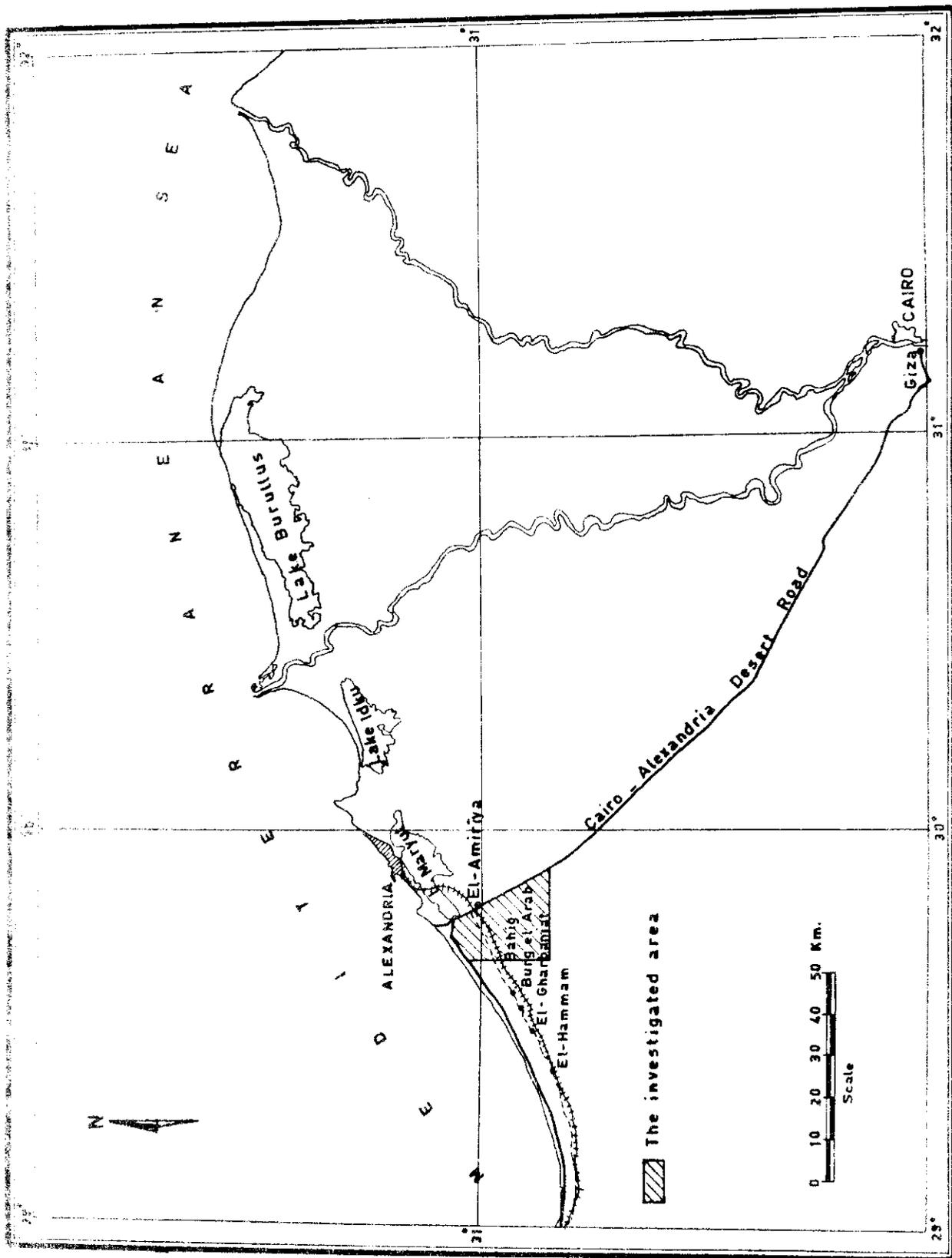
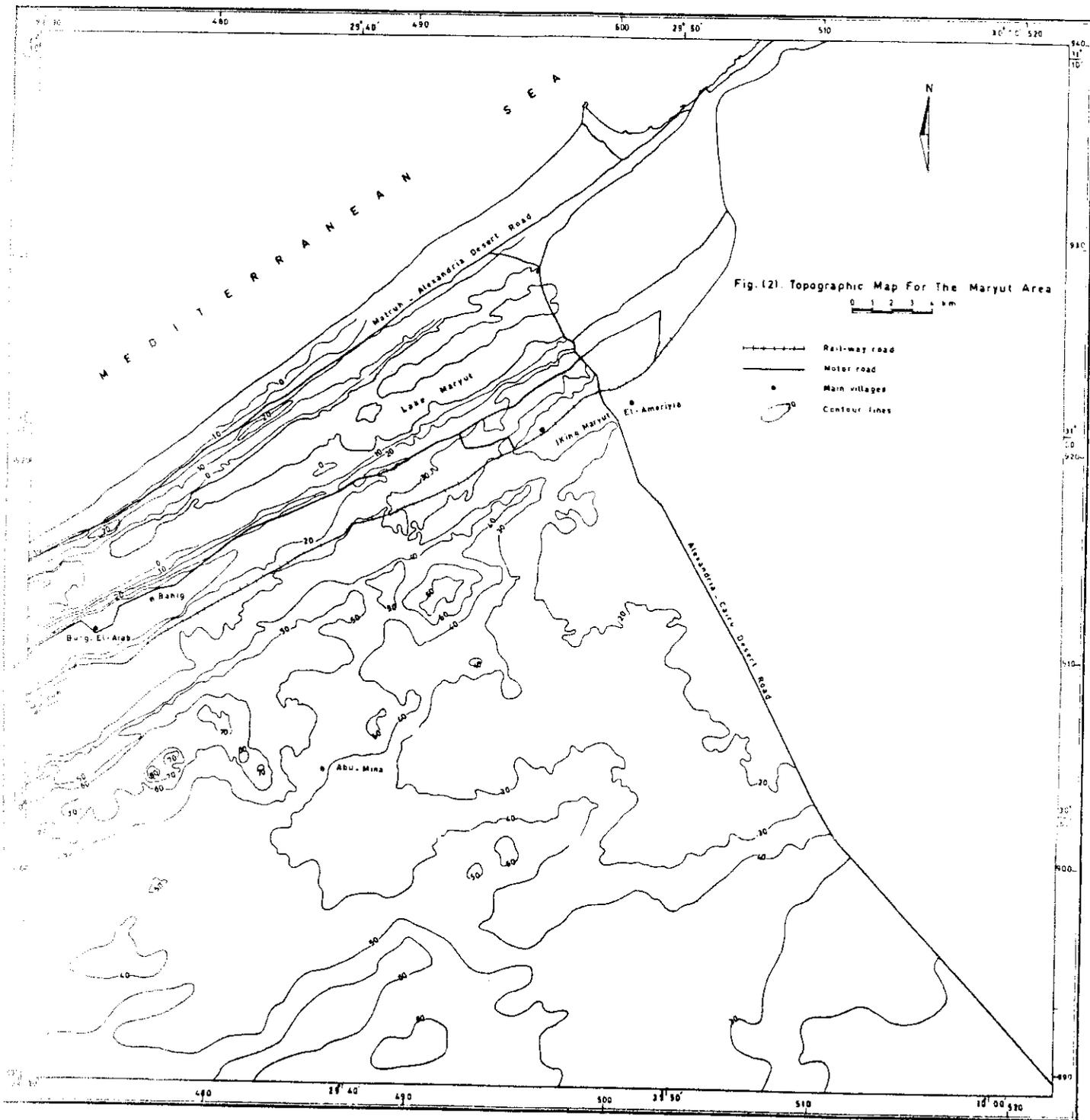


Fig. 1 The Location of the Investigated Area



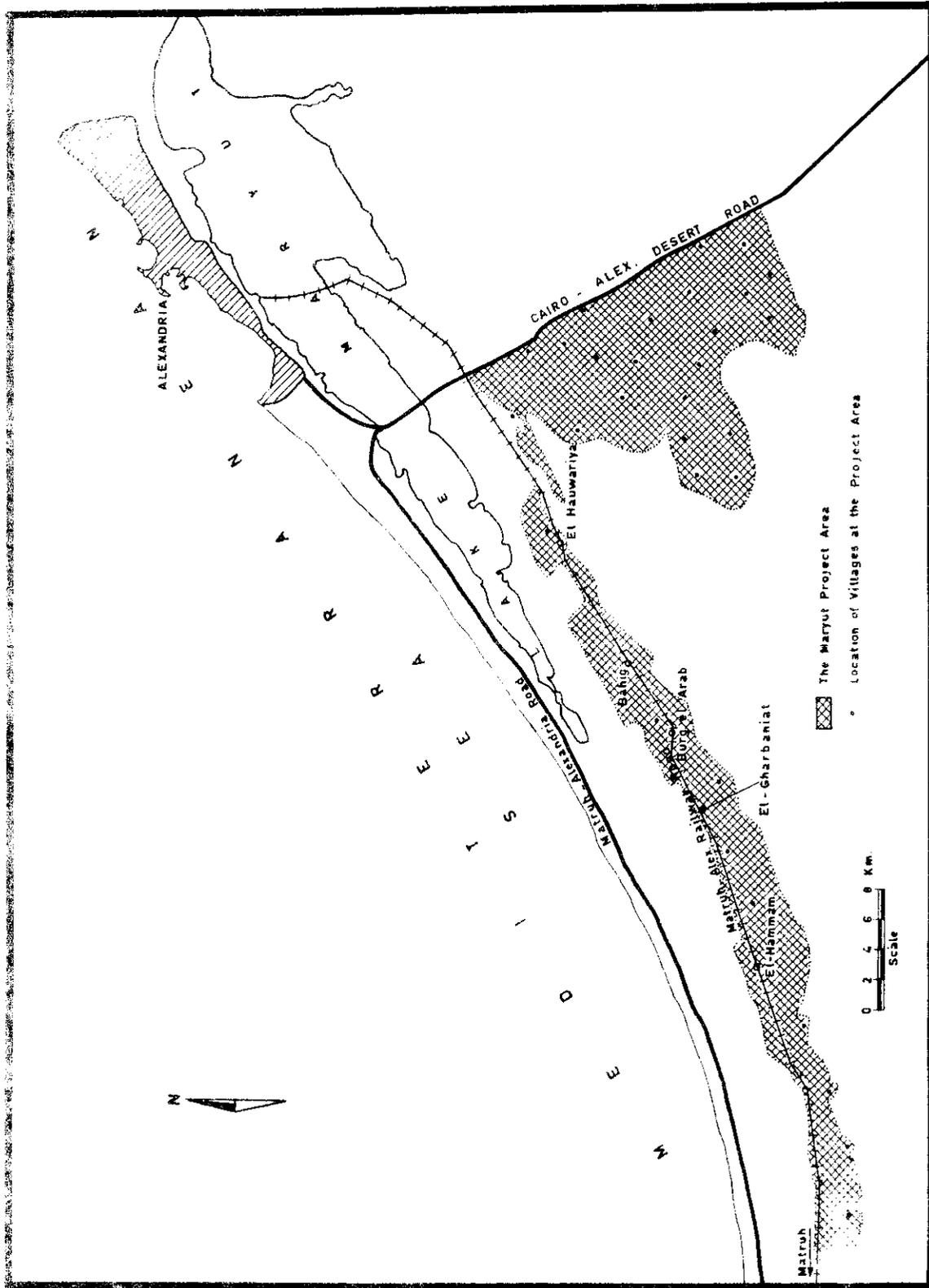


Fig (3) The Location of the Maryut Project Area

under permanent irrigation system. There is also the Maryut Extension Project which expands the cultivated area to about 200,000 acres. Water for irrigation is conveyed through the Nubaria Canal. During the season of water peak demand, the Nile water is mixed with the saline drainage water from El-Onum drain.

In the Maryut project area, 32 villages has been constructed. They are interconnected by good paved roads. The Iking Maryut is now the Capital of the project area as it is intersected by the rialway that leads to Alexandria. As a sequence of this developmental stage, 17,400 families representing 87,000 Persons are going to be settled.

The Maryut project area is planned to be cultivated mostly by fruit trees and truck crops namely:

27.000	acres	grapes
12.500	"	Olives
10.000	"	Almonds
23.500	"	Grain crops
10.000	"	Fodder
3.000	"	Figs
3.500	"	Vegetables

The agricultural Policy is presently under execution.

## 2. . Water Supply :-

The main source of water in the Coastal Zone area is the underground water which is of rainfall origin. When rain water falls in sufficient quantities, it infiltrates through soil to a point below the range of capillary rise. It then accumulates above impervious substrate or above layers saturated with sea-water. Generally, this water remains in place. Gradual loss, however, will take place if the water bearing strata is above sea-level and there is permeable strata in connection with the sea.

The water supply for the Maryut area depends generally on: Coastal sand dune galleries, native wells, cisterns & Nile water; these are discussed briefly in the following:

**Coastal sand dune galleries:** These galleries are located at the Coastal depression almost close to the sand dunes. They consist of tunnels with shafts which are about 3.0m. deep and 75 cm. wide. The water supplies of galleries owe their existence to the ground water mount in the main water-table resulting in vertical percolation of direct rainfall on the dunes from lateral seepage of accumulated surface runoff south of the dunes as well as from hydrological retardation of the northward ground water movement.

**Native Wells:** These wells are usually shallow ranging between 5 to 20 meters depth and restricted to

depressions almost close to the Mediterranean sea.

**Cisterns:** They are deep wells built by the Romans, their average capacities range between 200 and 500 M<sup>3</sup> of fresh water per year, Pavlov (1962).

**Irrigation water from the River Nile :-**

A considerable portion of the Maryut area has been recently under permnant irrigation system in order to cultivate 80,000 acres. The required water for irrigation is supplied through mixing the water of El-Omum Drain with that of Nubaria Canal (Nile Water).

Noteworthy to mention that making use of El-Omum Drain waters for irrigation is undertaken because of limitations of water sources from Nubaria Canal and the large discharge of this drain that amounts to about 3 million m<sup>3</sup>. per day.

With regard to the quality of El-Omum drain for irrigation, the water is not favourable because its high level of total soluble salts as well as the sodium percentage that averages about 2500 p.p.m and 70% respectively (table, 1) Application of this water for irrigation may increase the exchangeable sodium on the adsorptive complex, Abdel Salam (1964). Consequently, mixing El-Omum drain water with that of the Nubaria canal (Total soluble salts averages 250 p.p.m)