

CLASSIFICATION AND EVALUATION OF SIWA OASIS SOILS

By

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ABSTRACT

**Mohamed Kamel Abd El Aty Abd El Samie.
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Siwa Oasis is bounded by longitudes $25^{\circ} 18'$ and $26^{\circ} 06'$ East, and latitudes $29^{\circ} 05'$ and $29^{\circ} 20'$ North, and located at about 300 km Southwest of the capital of Marsa Matruh Governorate.

To fulfil the aim of the current study, 49 soil profiles were chosen to represent the cultivated, under reclamation, barren and sabkha soils in the different regions of Siwa Oasis; El Maraqui, Khamisa, Siwa, Aghormi, Qureishet, Abu Shrouf, El Zeitun and Timeira- El Maasir regions. These profiles were carefully examined in the field, morphologically described and 206 soil samples representing the successive layers, were analyzed.

The analyses involved were to evaluate the physical, chemical and fertility properties of the soils to be used for their classification and evaluation view points.

Forty five water samples were collected from the deep wells, shallow wells and springs located near the profiles locations. The evaluation of ground water for irrigation purposes shows that the majority of ground waters in Siwa Oasis are suitable for irrigation.

Soil classification according to Soil Survey Staff (1975) and (1998) showed that *Entisols* and *Aridisols* are the main orders of Siwa soils. These orders could be classified into thirty four families on the family level.

According to USDA (1961) system and the main agricultural limitations, most soils of Siwa Oasis, from the land capability classification point of view, could be categorized under three classes; III, IV and V.

According to FAO (1976) system and the main agricultural limitations, most soils of the studied area, from land suitability classification point of view, could be placed under three classes; S3, N1 and N2.

Keywords: Siwa Oasis soils, Morphology, Physical properties, Chemical properties, Fertile properties, Groundwater, Irrigation purposes, Classification, Evaluation.

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1. INTRODUCTION

Egypt area is about one million square kilometer, which are desert lands with the exception of a small cultivated area concentrated around the River Nile Valley, occupying 4% of the whole Egypt area. This situation creates a great burden on the state, represented in lack of food security and the unemployment problems.

Therefore, to get an excellent solution to overcome these problems, the Egyptian authorities strategy adopted to cope with this situation to expand and extend land productivity in horizontal and vertical aspects. In this accord, tremendous efforts and huge investments are under way, with the assistance of the national and international agencies and organizations, by bringing new lands under cultivation especially those located in the remote desert areas.

The desert lands in Egypt have some cultivated areas (using ground water). These areas dominate the Egyptian Oases of the western desert. Siwa Oasis is among the famous ones of these oases, as it has certainly the most interesting, touristic attraction of all the Egyptian Oases due to its famed temple and the largest naturally flowing springs, however, it suffers from several problems that strictly affect its development. The main problem is the continuous deterioration of its cultivated lands and changing most of them to very low productive ones.

Accordingly, this work is undertaken to evaluate soil potentialities of Siwa Oasis and to classify its soils in scientific term worthy of agriculture utilization and development.

2. THE ENVIRONMENTAL SETTING

2.1. Location and General Nature:

Siwa Oasis is a natural depression situated in the north western portion of the western desert between Longitudes 25° 18` and 26° 06` E, and Latitudes 29° 05` and 29° 20` N.

The depression is located at about 300km southwest of the capital of Marsa Matruh Governorate, Fig.(1).

The depression has an irregular elongated shape, about 75 km in E-W direction with an average width of about 13km, and total area about 1100km²

The depression is bounded in the northern side by the escarpment of the Marmarican plateau which rises to about 100m above the depression floor and by another escarpment in the southern side that it is relatively lower than the northern one, but differs from it in that it is covered with sand dunes, trending in NW-SE direction. The lowest parts of the depression floor reach 18m. below sea level. To the east and west, the depression floor rises gradually to merge with the general desert level, making it difficult to define clearly the eastern and western boundaries.

Several major regions are distinguished in the depression, the most important of them from west to east are: El Maraqui region, Khamisa region, Siwa region, Aghormi region, Qureishet region, Abu Shrouf region, El Zeitun region and Timeira- El Maasir region.

Recent and sub-recent alluvial and aeolian deposits are the main sediments characterizing the depression as they occur as thin deposits lying on the depression floor and as dune sand that bordering the depression on the south. Generally, the soils occupied the depression do not exceed

Fig. (1)

3ms in thickness in some localities but they are very shallow in many places due to the high water table level and/or rocky exposures. Moreover, the low-lying areas, spread along the depression, contain intermixed salts and sand deposits known as Korsheif. These deposits are so hard that they are used for building houses in the oasis.

The only source of water for irrigation use in Siwa depression is the ground water. Hydrological studies indicate that there are two aquifers; the upper aquifer (Miocene formation) and the lower aquifer (Nubian sandstones). The present irrigation water is discharged from the upper aquifer through 226 natural springs spreading all-over the depression with water quality varies from 1500 to 8000 ppm. On the other hand, the surface of the lower aquifer is about 600m below the ground surface and has a good wter quality as its salt content varies from 300 to 700 ppm.

Though the total area of Siwa depression is about 1100 km² (264,000 FDs), about 5% of this area is now under cultivation, while the remaining area is mainly saline, rocky or occupied by salty lakes. The agriculture potential of land in the depression is marginal, it is still partly utilized via nomadic forms. Another agricultural activity is the extensive natural range lands which accounts for more than 0.42% of the whole depression. The main cultivated crops in the depression are date palm and olive as cash money crops. However, few areas are planted with citrus and some fruit orchards together with alfalfa as intercropping. It is worth to note that symptoms of large scale past cultivation are marked, however, according to recent studies, some of cultivated areas are severely degraded due to the misuse of irrigation water that created the conditions of water logging and salinization. Therefore, many efforts are conducted to correct this situation through reclaiming the uncultivated