

Soil Survey for the State of Kuwait

Order I Soil Survey of the

DEMONSTRATION FARM SITES WITH PROPOSED MANAGEMENT

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Kuwait Institute
for
Scientific Research



Public Authority
for Agriculture and
Fish Resources

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How To Use This Soil Survey

This document presents the soil types, physical and chemical properties, soil classification and management, as well as the mapping units and the typical soil profiles.

Start at the Table of Contents on page (vi) to locate sections in this survey. To identify the soil types in the farms, turn to the soil map, locate the area of interest, and identify the map unit number and the full name of the map unit, and turn to the Soil Map Unit Description section for more details. To know more about the soil properties of soil series in the map unit, consult the Soil Series description of each farm and the Use and Management section.

To identify the soil types at each hectare of the farm, turn to the soil maps with squared grids, locate the area of interest, and identify the site number, find the name of the series and taxonomic class name on table associated to those maps.

About KISR, AAD and PAAFR

The Kuwait Institute for Scientific Research (KISR) was established in February 1967 by the Arabian Oil Company Limited, Japan, in fulfillment of its obligations under the oil concession agreement with the Government of the State of Kuwait.

An Amiri Decree in 1981 (Law No. 28) formally established KISR as an independent public institution. The law specified that the Institute would be governed by the Board of Trustees chaired by a minister chosen by the Council of Ministers. The revised objectives of the Institute remain to carry out applied scientific research that helps the advancement of national industry and to undertake studies relating to the preservation of the environment, resources of natural wealth and their discovery, sources of water and energy, methods of agricultural exploitation, and promotion of water wealth. The law entrusted the Institute with undertaking research and scientific and technological consultations for both governmental and private institutions in Kuwait, the Gulf region and the Arab world.

The Aridland Agriculture Department (AAD), formerly known as the Agro-Production Department, is one of the oldest Program Elements of the Food Resources Division (FRD) at KISR. The AAD activities cover a wide range of agricultural sciences: 1) Animal Production - poultry, dairy, sheep; 2) Range and Ecology - livestock, vegetation, wildlife; 3) Plant and Soil Sciences - protected crops, field crops, plant-soil water relationships; and 4) Greenery - open space, landscape, design training. Most of the research studies of the AAD were conducted at the Sulaibiya Field Station established in 1979. The total area measures 5x4 km in Kabd, and is located 35 km southwest of Kuwait City.

The Soil Survey of Kuwait was implemented by the staff of AAD under the leadership of Dr. Samira A.S. Omar. Task-5 (Survey of Demonstration Farms) of the Soil Survey of Kuwait is being completed under the leadership of Dr. Shabbir A. Shahid. The KISR and PAAFR trainees and staff contributed to complete this document.

Public Authority for Agriculture and Fish Resources was established through a decree number 94 issued on June 15th, 1983, and modified by decree number 9 issued on 23rd of February, 1988. Agricultural authority is considered the sole official entity in the State of Kuwait, responsible for the country's agricultural development, protection of the natural landscaping, beautification, and greenery in addition to the responsibility of various fish resources development and their protection.

The scope of the Agricultural Authority responsibilities include also the development, initiation, and review of all agricultural greenery and fish resources policies, combined with the management and proper administration of all related resources, their prospective protection, and the supervision of all related establishments and projects.

To accomplish the above stated endeavors, the Agricultural Authority has five major specialized management sectors: 1) Agricultural Development; 2) Animal and Fish Resources; 3) Landscape and Greenery; 4) Agricultural Areas and Services; and 5) Administration and Finance.

Each of the above sectors is headed by a Deputy Director to the Chairman of the Board of Directors which consists of 10 members, who in turn report directly to the State Minister for Cabinet Affairs.

The Soil Survey of Kuwait is a result of the initiative in partnership of PAAFR with KISR. The project lasted for 3.5 years (November 1995 to May 1999). It was jointly funded by PAAFR and KISR.

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This publication, which describes a very intensive soil survey of three demonstration farms in Kuwait, is a result of the partnership of the Kuwait Institute for Scientific Research (KISR) with the Public Authority for Agriculture and Fish Resources (PAAFR). KISR and PAAFR are the leaders in national agricultural research in the State of Kuwait. This publication is the outcome of one of the six tasks of the Soil Survey and Associated Activities for the State of Kuwait, which is a technical assistance requested by PAAFR from KISR to inventory and assess the soil resources of the State of Kuwait.

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Authors and Contributors

Foreword

This publication contains the first order survey of three demonstration farm sites located in the Wafra, Abdali and Shagaya areas of Kuwait. It presents soil types, their physical and chemical characteristics, classification and management issues. The evaluation of these farms is based on predictions of measurements for future research aims. The survey also highlights limitations and constraints inherent at these three sites, and suggests recommendations needed to overcome or reduce the limitations.

The researchers will use this survey to conduct experiments at these farms, and to apply the results to other areas of a similar nature with great confidence. Farmers will benefit from the results obtained from the research conducted at these farms for maximum crop production.

This survey of three demonstration farms presents a number of soil types that cover most of the area of the State of Kuwait and, therefore, is of a wider scope. The soils of the Wafra area are mainly sandy, Abdali is rich in gypsum and calcium carbonate contents, and Shagaya has a wide distribution of gatch enriched with gypsum, calcium carbonate or both.

At these farms, great differences in soil properties occur within short distances, which is the basis for separating soil types and soil taxonomic classes, and in establishing the soil map units on the landscape. The differences in soil properties affect research and wise soil use and management. The location of each soil type is shown on the soil map at grid 100x100m.

This survey is unique in its scope and purpose in the State of Kuwait, and is a product of the commitment manifested in the vision of future agricultural, in particular soil research, in Kuwait. It is hoped that countless numbers of individuals will benefit from this document in Kuwait, the GCC countries and in countries having similar soil and climatic conditions.

Dr. Nader Al-Awadhi

Chairman

Technical Committee

Soil Survey and Associated Activities
for the State of Kuwait

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Summary

An Order I soil survey of three demonstration farm sites at Wafra, Abdali and Shagaya was conducted with the objective to bring together all the available information on soils and their properties, with special emphasis on those aspects that would remain valid in the years ahead. These farm sites belong to the Public Authority for Agriculture Affairs and Fish Resources (PAAFR). At Shagaya, the site is a fenced enclosure, whereas the Abdali and Wafra sites are not fenced. These sites were selected by joint KISR/PAAFR staff visits to a number of PAAFR areas. The very intensive survey of these sites was completed using the standards as specified by the United States Department of Agriculture publications. The USDA's system of soil surveying and classification is very widely accepted and used in many countries of the world. The system covers a range of soils from all over the world. The survey was completed on a grid basis (100m x 100m), and the center of each ha was the observation point, where either a soil pit or a typical profile was made. The soil pit/profile was described for various aspects, and soil samples were collected for further evaluation in the laboratory.

Out of 12 soil orders reported in the world, only two have been identified in the demonstration farms, they are Aridisols and Entisols. Aridisols represent the soils of the dry regions. The soil profile present a number of diagnostic horizons to be based on taxonomic names. Entisols represent recently formed soils (sandy) with no diagnostic horizon development. The soils at Abdali and Shagaya were classified as Aridisols and Wafra as Entisols; however, only two sites were identified as Aridisols at the Wafra farm.

A total of 16 (Wafra 3, Abdali 6, and Shagaya 7) soil series have been mapped. Generalized soil maps of three demonstration farm sites are presented. Each soil series is presented with the description of typical soil profile, range in characteristics and soil analytical data. Usually display of associated landscape and typical soil profiles of important soil series is also presented.

At the Wafra farm, the soils are dominantly sandy in nature. They may require special management measures for irrigated agriculture development. The management aspects are presented very comprehensively in this document. The soils at the Abdali farm are identified to contain appreciable amounts of gypsum and calcium carbonates. The soils are given ranks from 1 to 3, and their possible uses and management aspects are presented. The soils at the Shagaya farm present gatch frequently on all observation sites. They are also rich in gypsum contents. The soils require special management measures, or alternative uses of the site. Management aspects and technologies are suggested to manage the farm site.

There will be challenges to manage the soils at the three farms; however, the survey of these farm sites highlighted the importance of selecting the best soils for future commercial farm operations. The survey also emphasizes the need of a prior assessment of soil types in the farm, for a successful farming. In future, there is a great opportunity to test the suitability of these soils for various crops to establish the potential of the soils and for technology transfer to the farmers.