

Soil Survey for the Emirate of Abu Dhabi



Soil regions map of the United Arab Emirates, portraying soil diversity on the landscape.



Aridity and salinization are main causes of land degradation in the UAE. Soil salinity makes up over 34% of UAE soils, greatly reducing their productive capacity.

Thematic Area: Assessment of Natural Resources in Marginal Environments

Purpose: Provide digital soil-related information to decision makers for broad land-use planning and agriculture expansion

Geographic Scope: UAE

Timeline: 2006 - 2009

Funding Agency: Environment Agency – Abu Dhabi (EAD)

Partners:

- Environment Agency – Abu Dhabi (EAD)
- GRM International Australia

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As a fundamental step in helping to feed a growing population, there is an urgent need to determine how soil can best be utilized in marginal environments. Soil is a natural resource of growing global importance, especially in areas such as the United Arab Emirates (UAE) where sandy soils make up nearly 75% of the landscape requiring special management practices for productive cultivation. Discovering the capabilities and limitations of soils in such environment is an essential pre-requisite for sustainability and improving the quality of life of local rural communities.

The International Center for Biosaline Agriculture (ICBA) in partnership with Environment Agency – Abu Dhabi (EAD) and international contractor, GRM International Australia, launched the “Soil Survey for the Emirate of Abu Dhabi” project. The project’s main objective was to provide digital soil information to aid in broad land use planning and agricultural expansion in the emirate of Abu Dhabi. The survey was conducted using the latest norms and standards of the United States Department of Agriculture (USDA) and Natural Resources Conservation Service (NRCS).

Activities and Outcomes

The project spanned a period of 42 months and consisted of two phases. **Phase I** included a survey that was completed at a scale of 1:100,000. Its scope spanned collection and generation of soil information to develop broad statements concerning land-use planning and general agriculture expansion. From Phase I results, an area of one million hectares was identified, of which 400,000 ha was surveyed under **Phase II** at a scale of 1:25,000 for irrigated agriculture.

Soil, thematic and current land use maps were published at different scales. A comprehensive web-based soil information system was designed and designated personnel from Environment Agency – Abu Dhabi, Abu Dhabi Food Control Authority, Ministry of Environment and Water, Municipalities of Abu Dhabi, Ajman, Dubai, Fujairah, Sharjah, Ras Al Khaima and Umm Al Quwain, UAE University were trained on various aspects of the project. Soils of the emirate were mapped and areas most suitable for agriculture were identified. Furthermore a series of maps illustrating soil, salinity, vegetation, current land use, suitability for irrigated agriculture, rangelands, wildlife habitats, forestry, landfills; sources for gypsum, gravels, sand, carbonates and a water table were produced to assist in planning, development and decision-making. A huge amount of soil



A new soil (anhydrite) was discovered in the Abu Dhabi emirate marking a considerable improvement in soil taxonomy.

information concerning land-use planning and general land management was generated through the survey under both phases. This information is of immense value to potential land users to address soil, water, and related natural resources concerns on their lands in an environmentally beneficial and cost-effective manner. More specifically the survey provided an orderly, on-the-ground, scientific inventory of soil resources. This includes maps indicating soil locations and extension; data relating to physical and chemical soil properties; and detailed information derived from that data about potentials and problems of each type of soil to meet reasonable needs for potential land users.

Using a GIS environment, the project designed the Abu Dhabi Soil Information System (ADSIS) which can provide potential users with easy access to data on soil at a specific location. The ADSIS also supports field operations and data analysis for producing outputs of the survey.

During May 2010, ICBA joined EAD in organizing an International Conference “Soil Classification and Reclamation of Degraded Lands in Arid Environments”

held in Abu Dhabi also marking the launch of the Abu Dhabi Soil Survey Report. One component of this conference was a workshop whereby the soil survey results were shared with the international scientific community with the aim to have opinions for future uses of soil survey results. Selected papers from the conference after peer review were published by International Publisher Springer in two independent books: *Developments in Soil Salinity Assessment and Reclamation*; and *Developments in Soil Classification, Land Use Planning and Policy Implications*.

In recognition to the value of the soil survey of Abu Dhabi emirate, EAD approached ICBA to develop a proposal “Soil Survey of the Northern Emirates” for implementation (2010-2012). With this completion the entire UAE was surveyed, a National Soil map prepared, and ADSIS was upgraded to the United Arab Emirates Soil Information System (UAESIS). UAESIS is a secure web-enabled GIS-based application that allows users to store, retrieve and view soil and associated data in an easy to use interface. In the broader perspective, the merit of the soil survey includes transfer of technology, a database on soil resources for policy and recommendations for the rational utilization of the soil resources of United Arab Emirates.

Future Directions

Information from the soil survey is available for use by various groups of users, for example, the agricultural farming community, policy makers and land use planners, officials, decision makers, engineers, and environmental impact assessors, to select sites for specific uses. Conservationists and specialists in recreation, wildlife management, waste disposal, and pollution control will also use the soil information to help them understand, protect, and enhance the environment. ICBA aims to conduct further soil surveys through knowledge sharing and capacity building in other countries of the region. UAESIS is one of the features that will be on display in the Soil Museum at ICBA headquarters scheduled to open in 2015.



Agriculture practices in marginal sandy soils are limited and require special management for productive cultivation.