Soil Museum

ICBA's Soil Museum covers outdoor (top) and indoor exhibits (bottom) providing visitors with a unique learning experience demonstrating how the quality of native sandy soils can be improved through using organic and inorganic amendments to become productive.

Thematic Area: Assessment of Natural Resources in Marginal Environments.

Purpose: Provide a better understanding of the value of soil for informational and educational purposes through the display of monoliths of key soils and online access to UAE Soil Information System. Initially to cover soils of the UAE and later expand to include the soils of all GCC countries.

Geographic Scope: UAE

Timeline: 2010 - Present

Partners:
- Environment Agency – Abu Dhabi, UAE
- Ministry of Environment and Water, UAE

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With the rising global threat of food security, the importance of soil in agriculture and how soil responds to changing environments is crucial, especially in marginal environments such as the United Arab Emirates (UAE). What happens underground? How this is changing? What are the impacts? These questions are worth answering and exploring.

The sandy soils that cover close to 75% of the UAE require special management practices for productive cultivation. Due to the specific desert and hot eco-environment in which they are found, UAE soils are prone to severe land degradation reducing their productive capacity. Yet, the UAE deserts are dynamic and there is a need to have a record of them. Usually soils are preserved in natural history museums but there are very few soil museums in the world and none in the Arab region.

In response to this, the International Center for Biosaline Agriculture (ICBA) in collaboration with the Environment Agency - Abu Dhabi (EAD) and the Ministry of Environment and Water (MoEW), agreed on the need to establish a Soil Museum. The goal of this museum is to become an educational hub for various visitor groups seeking soil information, as well as to raise awareness and foster appreciation and understanding about the importance of soils for national development and food security.

Activities and Outcomes

During the design phase, ICBA took special care to include different soil education modules that cater to the needs and demands of a diverse range of visitors from school children, to university students, researchers, professionals and scientists, environmentalists, professional contractors, land use planners, decision makers and policy developers. The design aimed to ensure that the museum serves as a place where soil information seekers are able to access soil information and learn the values of soils and their conservation for sustainable soil services and environmental protection. Furthermore, new digital technologies and interactive learning modules and displays will be developed to engage visitors in a playful, yet educational way.

The Soil Museum, located at ICBA headquarters in Dubai Academic City is divided into various sections, each serving a specific function. It showcases landscapes and soil diversity; soils and environment; soils and climate change; and soils and desertification.

The Central Display exhibits an introduction to the components, importance, basics and history of soil science. It features soil

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The Water Infiltration Simulation Unit demonstrates how sizes of soil particles (sand, silt, clay) in soil influence infiltration rate.

colors, texture, structure, agriculture soil, organic and chemical fertilizers, coastal mineral resources, signs of global warming, soils and rocks forming minerals and pottery.

The Soil Monoliths section displays the range of soils present in United Arab Emirates. This section conveniently showcases, represents and compares the soil profile in an indoor environment while simultaneously demonstrating soil suitability for irrigated agriculture.

Hues of UAE portray naturally different sand colors depending upon their unique compositions. This can be seen in the Seven Sands Color Concept which also dispels the myth of there being a color code for each emirate. The world's First Discovery of Anhydrite soil in the United Arab Emirates introduces the classification of local soil according to US soil taxonomy while also providing an understanding of how minerals are formed and stabilized in arid conditions, while Rocks and Minerals section is devoted to the geological feature of rocks and minerals found in the mountainous ranges of the UAE.

At the Sand Dune Simulator visitors can experience the motion of sand which makes wavy features in the desert to create dunes. Another unique demonstration found at the museum is the Water Infiltration Simulation unit which helps visitors to understand how fast water infiltrates in sandy soils and thus the need to improve soil properties for more efficient use of water and nutrients.

The Essential Soil Investigation Equipment exhibit provides hands-on knowledge about essential soil investigation tools and equipment (manual as well as digital) used for on-sites soil investigation including in depth auguring, cutting, sampling, and testing, etc.

The **United Arab Emirates Soil Information System** (UAESIS) is a secure web-enabled GIS-based application which allows users to store, retrieve and view soils and associated data in an easy to use interface.

The museum also includes an electronic UAE Soil Information System (UAESIS), Video Displays, and a Soil Library with various books, atlases and literature about the soils of the Gulf Cooperation Council Countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates). Further in-depth information consisting of maps, summarized data, and a connection to a water resources database is found via the unique electronic soil information system.

Future Directions

ICBA aspires to expand the museum to display the soils of all GCC Countries and later other Arab countries. In the future, it can serve as a regional interactive educational hub. Displays with interactive games, animations, and movies will be on site to engage students. Interactive applications will be available for students to download on their ipads and mobiles. In parallel, ICBA is pursing to establish an online virtual museum which will expand the educational benefits and reach more information seekers.

An outlook of the soil museum's interior showing features of diversified soils. At the launching, the Museum will be retrofitted in a manner that will provide visitors with the aura of being underground.