

Wind, salt and water are leading indicators of land degradation in Abu Dhabi

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Desert environments are characterized by poor vegetative cover, strong winds, dry, non-cohesive sandy soils, and hyper-arid conditions. In this context, the land resources of Abu Dhabi Emirate in the United Arab Emirates are subjected to various land degradation stresses, including wind erosion, salinization, waterlogging, landfilling, and overgrazing. To sustain the land resources of Abu Dhabi Emirate, land degradation is a matter of urgency and must be accorded greater significance on the environmental agenda.

Mahmoud Ali Abdelfattah, Environment Agency Abu Dhabi, studied representative samples from degraded soils and analyzed them for selected parameters relevant to specific indicators. He characterizes the major land degradation indicators in Abu Dhabi Emirate and suggests better conservation strategies and management options in a recent article in *Soil Survey Horizons*.

The study found that, among natural forces of land degradation, wind has a major role in moving soil from loose surfaces, and mainly in dune areas. Wind is the main cause of irreversible land degradation in the arid environment of Abu Dhabi. Wind erosion indicators are formation of fall dunes, blocking of highways, dust storms, nebkha features, reduction of waterways capacity due to deposition of sand, exposure of hardpans at the surface, and gravel lag. Nebkha dunes, formed from sediment accumulations around shrubs, have been considered a reliable indicator of rapid dryland degradation. As a preventive action, afforestation has been practiced on about 330,000 ha in Abu Dhabi Emirate. In addition,

many green belts in urban areas and along roads have been established. Forestry plantations are an important effort in combating wind erosion and offer multiple benefits, such as hydrological balance, enhancement of environmental quality, habitat restoration, and improved aesthetic value.

Soil salinity is also a threat to agricultural farms and coastal areas. Due to the prevailing hyper-arid conditions in Abu Dhabi Emirate, the soil receives inadequate precipitation to effectively leach salts from the soil profile. Irrigation water is the primary source of salts. The suggested prerequisite research for this problem in Abu Dhabi Emirate includes characterization, mapping, and monitoring of salt-affected soils, as well as work to better understand the sources of salts, proper leaching requirements and efficient drainage systems, how to ensure good quality irrigation water, and optimal crops.

The study also identified waterlogging as a serious problem in many of the agricultural farms. The causes of waterlogging are poor drainage conditions due to the presence of hardpans, excessive use of irrigation water, and seawater intrusion. Landfilling for urban development and construction purposes is another unique land degradation feature in the Emirate. A traditional landfilling practice commonly used in Abu Dhabi Emirate is to bring material from the desert area and dump it into the saline areas. This practice is being applied for landscaping as well as agricultural purposes and is often performed in areas close to cities, around roads, palaces, farms, gardens, parks, etc. However, this excavation harms the areas from which the soil is removed, sometimes resulting in stagnation of water. Other land degradation types presented and discussed are loss of vegetation, water erosion in uplands, compaction, sealing, crusting, and mining. The author recommends that an emirate-wide action plan needs to be developed and implemented to manage and combat all types of degradation.

The study was also presented at the International Conference on Soil Degradation, Riga, Latvia 17-19 February 2009. The study was part of the ongoing research on the soil inventory of Abu Dhabi Emirate that commenced in 2002 and is funded by the Environment Agency Abu Dhabi.

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