

Applications of Space Photography to Desert Development

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Observations from space are suitable for the evaluation of the development potential of desert regions because: (1) each vista encompasses large areas allowing the understanding of regional environmental parameters; (2) the lack or scarcity of vegetation allows the study of exposed rock and soil, which is not the case in humid regions; and (3) the variations in spectral reflectance of surface materials allow correlation with their chemical and physical properties.

The first application of these factors is the potential of distinguishing large exposures of fertile soil based on the content of clay minerals. This was successfully done through photography of the area west of the Nile Delta as well as by using a multispectral sensor over the Kharga Depression in the Western Desert of Egypt.

The second and most important use of the space-borne data is to monitor water resources and search for groundwater along ancient stream beds and in major fracture zones. Monitoring of water resources is significant because of the cyclical nature of droughts. For example, Space Shuttle Large Format Camera photographs taken in October 1984 helped monitor the decrease in the level of Lake Nasser behind the High Dam south

of Aswan, which resulted from the four-year drought at the sources of the Nile, particularly in Ethiopia.

The search of groundwater along ancient rivers is exemplified by the Shuttle radar images. The radar penetrated the sand cover and revealed numerous buried channels in an area that proved to contain a vast reservoir of water. Similarly, the search for groundwater along major fracture zones is exemplified by cases in the Sinai, in Southern Jordan and in northern Somalia, as assisted by high resolution, stereo photographs from space.