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המחלקה לאנרגית השמש ופיסיקה של הסביבה
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MANAGEMENT REPORT

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Assessing and Monitoring Land Degradation Due to Salinization in Turkmenistan and Examining New Phytoremediation Methods

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Grantee Institution: Ben-Gurion University of the Negev, Israel

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Dr. Bogdan Ivakhov

Institution: National Institute of the Deserts, Flora and Fauna, Ministry of Environment, Turkmenistan

Project Number: CA20-048

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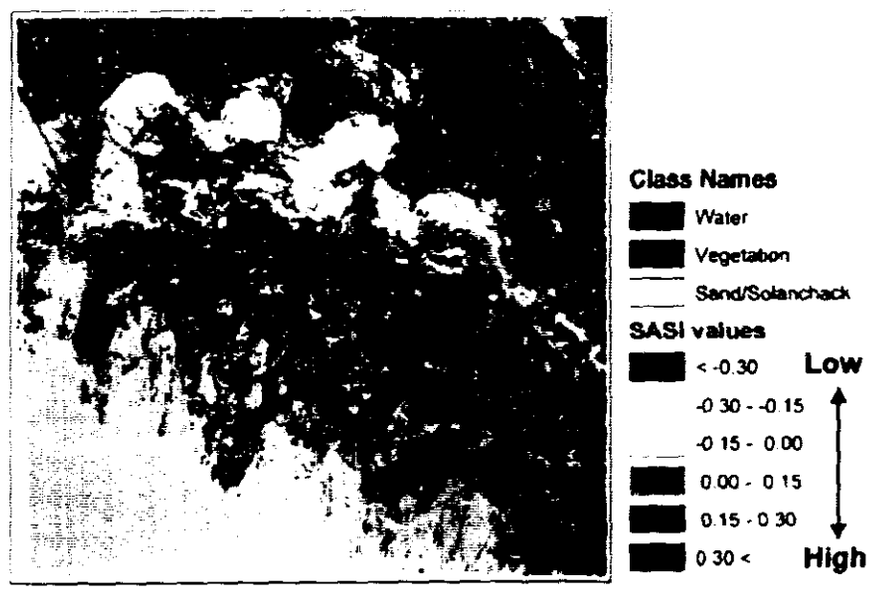
Grant Project Officer: William H. Crane,
American Embassy, Tel-Aviv

Project Duration: June 1, 2001 – May 31, 2004

1. SCIENTIFIC SUMMARY

The main objective of the proposed research is to assess the spatial distribution and temporal changes of the lands, affected by secondary salinization, in the areas of intensive irrigation of the delta plains of Turkmenistan, and to examine the technology of their rehabilitation. In framework of this project, the following activities were conducted: (1) Salinity map for 1988 of the study area at Dashoguz oasis was digitized into a geographic information system (GIS), containing three levels of soil salinity along with other ground features (sub urban, water, vegetation, solanchack, and bare sands); (2) A Landsat-TM image of summer 1988, covering the entire Dashoguz territory was analyzed; (3) The GIS layers were overlapped on top the Landsat image; (4) Typical spectral signatures of each ground feature were extracted; (5) The image was classified, based on spectral criteria in order to distinguish between salt affected bare soils and other features (water, vegetation, sands, and solanchacks); (6) Salt Affected Soil Index (SASI) was developed and applied to the satellite image. 6 categories of salinity were mapped. In addition, an intensive activity was conducted in Turkmenistan in developing phytoremediation methods.



2. SCIENTIFIC ISSUES

In order to ensure high quality research and to complete our scientific objectives, we wish to conduct three more activities: (1) to purchase and process a new Landsat

image of summer 2004 in the same way described above; (2) to apply a change detection algorithm in order to assess the difference in salinity levels between 2004 and 1988; and finally (3) to conduct a fieldwork in order to validate the GIS/image processing results. The significance of these activities is in showing the change of the salinity levels between 2004 and 1988, which means demonstrating the improvement or deterioration of the environmental conditions.

3. MANAGERIAL ISSUES

Some delays in the original work plan were caused by political situations in Turkmenistan and Israel. Especially, it was not possible for the Israeli partners to receive a visa to Turkmenistan. Also, it lasted almost a year for the Turkman partner (Dr. Bogdan Ivakhov) to receive a visa to Israel. The latter partner visited Israel eventually (see section 5 bellow).

4. SPECIAL CONCERNS

Due to the above-mentioned circumstances, we would like to ask to extend the project by one year (with no additional cost) and to modify the budget items.

5. COLLABORATION, TRAVEL, TRAINING AND PUBLICATIONS

Dr. Bogdan Ivakhov, of the National Institute of Department of Cartography, State Committee of Cartography and Geodesy, Ashgabat, Turkmenistan visited the Remote Sensing Laboratory of Ben Gurion University between Feb. 3, 2003 and May 2, 2003 and accomplished the above-mentioned GIS work (Section 1).

6. REQUEST FOR AMERICAN EMBASSY TEL-AVIV OR A.I.D. ACTIONS

Our requests are: (1) no cost extension of the project for another year (i.e. May 31, 2005); (2) Reassign the Travel Money ($18,343) and the Consultation Money ($14,400) that we can not use due to the political limitations, to salaries. This will enable us to continue hire students in order to complete the above-mentioned assignments (Section 1).