

**Land suitability of salt-affected  
soils in the Gorgan region of  
northeastern Iran for cotton  
production**

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## ABSTRACT

Physical land evaluation can provide information on the potentials and constraints for a defined land use type. Land suitability evaluation is the process of assessing the suitability of land for specific kinds of use. Land characteristics or qualities, which determine suitability or limitations and land utilization types, are factors to be considered for suitability assessment. In this study, the land was evaluated for irrigated cotton, as a main annual crop in salt-affected area of the Gorgan region, northeastern Iran. Three sampling areas were selected, viz., Bandar-e-Turkman, Aq-Qala and Voshmgir-Dam). The assessment was carried out by using the criteria from Sys et al. (1993) and implementing the Automated Land Evaluation System (ALES). The soils, in general, are calcareous and have an appreciable reserve in weatherable minerals. CEC, base saturation and organic carbon content are high. Therefore, the soils have no limitations with regard to nutrient availability. The major limiting factors that restrict the use of land for cotton production in the region are soil salinity, alkalinity and poor drainage. Among the soil requirement, absence of salinity, absence of sodicity and available of oxygen were considered as appropriate land qualities, accordingly. These land qualities are determined by specific land characteristics:  $EC_e$  (dS/m), SAR and drainage class, respectively. Each land characteristic was rated for

all the soil map units identified in the sample areas, and compared with the limits set for cotton. The most limiting factor of the soil map unit was considered for assessing the final suitability. The land suitability classes were established by matching the land quality requirements of the crop (irrigated cotton) with the land qualities of the map units. Land suitability classes were distinguished according to the degree of the limitations and their effect on the land productivity. The overall land suitability for irrigated cotton, adapted from Sys et al. (1993), was expressed in four classes: highly suitable, moderately suitable marginally suitable and unsuitable or extremely marginal suitable. The results of the land suitability classification for irrigated cotton at three sample areas show that: in the Bandar-e-Turkman about 7% of the sample area is highly suitable, 14% is moderately suitable, 48% is marginally suitable and the rest is not suitable. In the case of Aq-Qala sample area that has higher salinity and alkalinity levels, about 3% of the area is highly suitable, 12% is moderately suitable, 31% is marginally suitable and the rest is not suitable. The Voshmgir-Dam study area with lower salinity and alkalinity levels and better drainage condition (because of the Voshmgir-Dam irrigation and drainage scheme, established in 1975) has higher land suitability for irrigated cotton than the other sample areas. Accordingly, a considerable area (62%) of the sample area is highly suitable and the remaining area is moderately suitable.

## **1.2 Disease resistance**