

# ADVANCES IN THE EVALUATION AND DIAGNOSIS OF SOIL SALINIZATION AND SODIFICATION UNDER DRYLAND AND IRRIGATED CONDITIONS

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## ABSTRACT

The development of salt-affected soils, saline and sodic, is increasing World-wide, both under dryland and irrigated conditions, with negative consequences in the environment, in crop production and in the human and animal health. Taking into consideration the great investment required for the development of irrigated agriculture, the high contribution of that kind of agriculture to the World's food production and the increasing scarcity and cost of the good quality available water resources, the degradation of irrigated lands through soil salinization and sodification becomes very important from the economical, social and environmental points of view. Both the addition of irrigation water and the changes in the depth and composition of ground-waters may cause drastic changes in the water and solute balances in the soil profile. Modeling may be very useful for the evaluation and diagnosis of such changes, and in the selection of the best practices and systems of irrigation and drainage for a more efficient use of irrigation water and for reducing the losses and contamination of surface and ground-waters, and for controlling the soil salinization and sodification. In this contribution there are presented recent modeling approaches developed by the author, and their application under different dryland and irrigated conditions, based on the balance of water and soluble components of both irrigation and ground waters under different water and land management conditions, and climate changes. They may be used for the evaluation and diagnosis of the different processes and problems of soil salinization and sodification, and for the selection of alternatives for their prevention and amelioration.