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Field leaching and evaluation of theoretical and experimental leaching models in Sistan plain

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Abstract: In arid regions, as in most parts of Iran with low rainfall and high evaporation, the accumulation of salts in the soil surface and profile will be inevitable. Improvement of saline soils is very important from the point of view of optimal protection of soil and water resources, because the presence of excessive soluble salts in the root zone can reduce water uptake by the plant due to reduced osmotic potential of the soil solution. The necessary strategy to deal with this problem is to reduce soil salinity to an optimal level by leaching salts and preventing them from waterlogging. This research was carried out in a part of Mohammadabad lands of Sistan plain as a completely randomized design. Field tests are performed by continuous flooding method using experimental plots with 1 * 1 m arrangement, with five treatments and in four replications. This leaching was performed without using of corrective materials and only with the use of 100 cm of leaching water in four 25 cm intervals. Soil samples were collected before and after leaching and after the application of each irrigation cycle in treatments and at different depths up to 100 cm of soil and the required chemical analysis was performed on the samples. The results showed that the application of 100 cm of water reduces the soil salinity class from S2A2 to S1A1. Experimental and theoretical models were evaluated and according to the results, theoretical models predicted the final salinity better than experimental models. Among all the experimental and theoretical models performed in this study, the single reservoir theoretical model (SRm) was able to predict the final salinity values with a correlation coefficient of 94%.

Keywords: Leaching, Experimental models, Saline soil, Hydraulic conductivity, Sodium adsorption ratio.