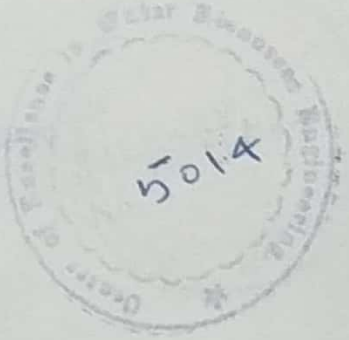
CALIBRATION OF SALTMOD TO PREDICT HYDROSALINITY STATUS FOR LOCAL CONDITIONS



BY

ENGR. NASIR MAHMOOD KHAN
(90-PG-WRM-06)

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ABSTRACT

In the Fourth Drainage Project area near Faisalabad large areas are severely affected with the twin problem of waterlogging and salinity. A salt and water balance study was carried out for a representative area of SIB-9 drainage unit using the hydrosalinity model "SALTMOD". This study was initiated with the aim to see, whether the model SALTMOD could be applied to the local conditions and as well as to check the performance evaluation of the artificial drainage system (SIB-9 drainage unit). So that it could be applied for some other SCRAP schemes in future to predict the long term effects of these projects.

The SALTMOD is a computation method for the prediction of soil and water salinities and water table depth in agricultural land under different hydrological conditions and analysing different water management scenarios. The model SALTMOD is based on seasonal water balance of agricultural lands (with and without sub-surface drainage system).

Calibration of the model was carried out against the four factors of the area: the watertable fluctuations, the soil salinity, drainage water quality and the drain discharge of the system. The input data was used as an average in two seasons, Rabi and Kharif, for the period of 1989-92. The match of the data was obtained by varying the leaching efficiencies and the natural drainage to the aquifer until the

best possible agreement was found. In general the simulated results for all these calibration parameters were found in closed agreement (except for few exceptions) when compared with the observed data for the entire calibrated period. The application reliability of the model has been also evaluated using the statistical analysis criteria by the model.

After the calibration, the model was applied for the prediction of hydrosalinity status of the area for 10 years period. The predicted results indicated satisfactory performance of the drainage system installed in the area through continuous reduction in the soil and water salinity levels.

The method was also used to simulate the impact of alternative water management options, like different drain depths on various water and salt balance factors. The effects of different leaching efficiencies of rootzone and natural drainage to the aquifer were also simulated. The model was also improved to some extent by adding some subroutines for conducting the statistical analysis and to make the model results compatible to any spread sheet program like LOTUS to see the initial trends graphically.

Calibration and application results showed that the model SALTMOD holds good for further practical application to different SCRAP schemes to evaluate different preventive measures for the areas prone to waterlogging and salinity lands.