BRACKISH WATER FOR IRRIGATION: SAFE LEVELS OF EC_{iw}, SAR_{iw} AND RSC FOR CROPS GROWN ON DIFFERENT SOIL SERIES

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ABSTRACT

The experiments were conducted to calculate safe levels of EC_{iw}, SAR_{iw} and RSC for wheat, rice and sorghum crops during 1992-95. Twenty undisturbed soil columns (76-cm long and 30-cm diameter) were collected in metallic cylinders for the Rasulpur (sandy loam), Bhalike (clay loam) and Bhalwal (silty clay loam) soil series. The same number of packed columns in similar cylinders were also prepared for each soil series. The columns were irrigated with 20 brackish waters having EC, SAR and RSC @ 0.65, 2.0, 4.0, 6.0, 7.35 dS m^{-1}; 3.95, 9.65, 18.0, 26.35 and 32.04 (mmol $L^{-1})^{1/2}$ and 0.65, 2.0, 4.0, 6.0, 7.35 $mmol_c$ L^{-1}, respectively. Crop rotations followed were wheat-sorghum; wheat-rice; wheat-fallow for Raulpur, Bhalike and Bhalwal soil series, respectively for both the undisturbed and disturbed soils. The experiments were laid out following Central Composite Rotatable Second Order design. Control lysimeter results indicated that the safe EC_{iw} for wheat was ≤ 3.53, 3.51 and 2.80 dS m^{-1}, respectively for the undisturbed Rasulpur, Bhalike and Bhalwal soil series. Similarly the safe level of SAR_{iw} was ≤ 11.5, 10.5 and 11.0 (mmol $L^{-1})^{1/2}$ and RSC ≤ 3.43, 3.60 and 1.80 $mmol_c$ L^{-1}, respectively for wheat in the undisturbed Rasulpur, Bhalike and Bhalwal soil series. Wheat yield was better from Rasulpur soil even with comparatively high EC_{iw}, SAR_{iw} and RSC than that of the Bhalike or Bhalwal soil series. It was observed that EC_{iw}, SAR_{iw} and RSC levels for getting maximum predicted dry matter yield of sorghum were 0.64 and 0.64 dS m^{-1}; 3.9 and 4.0; 3.02 and 1.74 $mmol_c$ L^{-1}, respectively for the undisturbed and disturbed Rasulpur soil series (coarse texture). Similarly, the EC_{iw} up to 0.64 and 2.28 dS m^{-1} SAR_{iw} up to 16.0 and 14.0; RSC up to 1.94 and 2.92 $mmol_c$ L^{-1}, respectively were calculated as the safe levels for paddy yield from the undisturbed and disturbed Bhalike soil (medium texture). It was also noted that undisturbed and disturbed soil conditions behaved similarly regarding the effect of EC_{iw}, SAR_{iw} and RSC on crops.