

MANAGEMENT OF BRACKISH WATER : IMPACT ON SOIL AND CROPS

Muhammad Ramzan Chaudhry, Muhammad Iqbal and K.M. Subhani*

ABSTRACT

A study was conducted in Fordwah Eastern Sadiqia South during the year 1998-99 and 1999-2000 with the objective to evaluate the impact of different irrigation treatments on soil and crops yield. The experiment was conducted on farmer's field. The initial soil pH was about 8.0 while EC_e and SAR ranged between 2.0 to 4.1 dS m⁻¹ and 3.5 to 5.6 (mmol. L⁻¹)^{1/2}, respectively with sandy loam texture. The brackish water used for irrigation had EC_e, SAR and RSC between 5.6 to 6.7 dS m⁻¹, 15.1 to 16.4 (mmol. L⁻¹)^{1/2} and 1.52 to 1.64 mmol. L⁻¹. The crops tested were wheat during Rabi and cotton during Kharif season. The treatments tested were: all irrigations with canal water(T₁), canal water during Rabi and drainage water during Kharif(T₂), drainage water for two years and canal water for one season(T₃); and drainage water for three years + application of gypsum @ 25% of CWR and thereafter canal water for one season(T₄). The soil samples were taken before sowing and at harvesting of each crop to monitor changes in soil salinity/sodicity. Fertilizers were applied @ 120-60-50 N, P₂O₅ and K₂O kg ha⁻¹, respectively in the form of urea, di-ammonium phosphate and sulphate of potash. It was observed that crop yields were considerably higher with canal water irrigation. Crops irrigated with drainage water visualized yield reduction depending upon the share of drainage water in the irrigation delta. Application of gypsum provided reasonable check against salinity buildup with brackish water irrigation besides a nominal boost in crop yield over comparable treatment of year-round brackish water irrigation lacking gypsum application. Drainage water in alternate arrangement of seasonal application was better than year-round application. Irrigation with canal water had higher soil infiltration rate whereas drainage water had some adverse effect on soil permeability. Soil EC_e and SAR increased with the use of drainage water while irrigation with canal water resulted decrease in soil salinity and sodicity to some extent. The results advocate that where there is acute shortage of canal water, drainage water can be used for crop production by adopting appropriate irrigation schedule or application of gypsum on water quality basis.