Abstracts of Ph. D. Thesis

Studies on Characterization and Amelioration of Salt Affected Soils of North West Agroclimatic Zone of Gujarat

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In present study, an attempt was made to characterize the salt affected soils of North-West agroclimatic arid zone by collecting 440 surface soil samples from the salt affected but cultivated fields of the zone. In addition to this, a pot experiment was conducted on saline-sodic soil (EC_e : 11.9 dSm^{-1}, ESP : 28.0) with 30 treatment combinations comprising three levels of leaching (L_1 : 50 to 100% WHC, L_2 : 50 to 150% WHC and L_3 : 50 to 200% WHC), two levels of FYM (F_0 : 0 and F_1 : 25 t/ha) and five levels of gypsum application (G_0 : no gypsum G_1 : 25% GR, G_2 : 50% GR, G_3 : 75% GR and G_4 : 100% GR) in a factorial completely randomized design with three replication by growing wheat (Rabi, 1992-93) and fodder sorghum (summer, 1993) in sequence as test crop.

The results of characterization study showed that out of 308 samples analysed, 49.1, 31.2 and 19.1 per cent samples were of saline, saline-sodic and sodic soils, respectively. Thus, saline and saline-sodic soils were extensive.

The results of the pot experiment are showed that the germination percentage, plant height, grain and straw yields of both crops as well as nutrient uptake were found to increase significantly with increase in levels of leaching (L), FYM (F) and gypsum (G). The content of N, P, K, Ca, Mg, S, Fe, Mn, Zn and Cu was increased and that of Na decreased in wheat grain and fodder of both the crops due to main effect of L, F and G. Interaction effects of L x G and F x G was significant on growth, yields and nutrient uptake by both the crop.

In general, EC, pH and ESP of the soil were found to decrease considerably with the increase in the levels of leaching, FYM and gypsum at all the sampling during both the crop growth periods. The periodical analysis of soils and leachate substantiated the effects of leaching, FYM and gypsum.

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