The application of pF-soil water moisture curve to dry-sodic soil reclamation project

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Summary

I. Objectives

In arid and semi-arid region the amount of salt removed by leaching will be changed with the specific character of soil particles. Na ion promotes the dispersion-coagulation resulting impermeable layer of soil particles. The leaching of salt from sodic soil requires an optimum soil moisture management as to eliminate such a impermeable layer. Soil moisture control must be carried out by the pF value adjustment accounting for osmotic effect In this study desalinization tests was proceeded by percolation test in laboratory and the field

II. Methods

(1) Observations for the water stress on the plant growth and wilting point were carried out using pF moisture curve at the several salt concentrations of soil-water. A calculation result after the adsorption model in high range of pF suggested that the thickness of adsorption layer on the particle surface was decreased.

(2) The freshwater was poured to the samples which were adjusted to have a constant porosity in the cylidrical container, then the EC of drain water was continuously measured until the EC decreased down to negligible low level.

(3) The salt effect for dispersion and coagulation of montmorillonite particles in sodic soil was measured to identify the impermeable layers grown by blocking pore spaces between soil particles.

(4) The field test of leaching was carried out.

III. Results and discussion

(1)Plant "KOMATUNA" were used as a test plant for the determination of wilting point which was adjusted by osmotic pressure. pF at wilting point without salt was just comparable to the adjusted pF value by osmotic pressure for the wilting moisture content of sodic soil.

(2) The EC values of drain water were constant until some amount of leaching water percolated in the soils, but Ec decreased sharply to near zero after a limit amount of fresh water. Independent of porosity and texture of the soil, more than 90% desalinization efficiency by leaching can be acquired by the amount of percolation water equal to the same thickness (depth) of concerned layer.