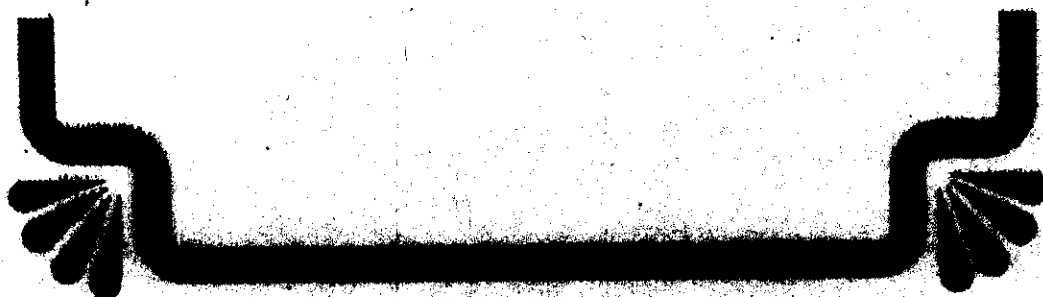


# SUMMARY



## 5. SUMMARY

The purpose of this investigation was to study the effect of applying gypsum and organic compost individually or in combination on the reclamation and improvement of some chemical and physical properties of a non-saline sodic (soil 1) and saline sodic (soil 2). Two column experiments were carried out; the first was to study the effect of applying gypsum (at a rate equaling gypsum requirement) in different application methods. The second was to study the effect of gypsum and organic compost applied singly or in different combination on some physical and chemical characteristics of a non-saline sodic and saline sodic soils. Treatments of experiment 1 were: application on surface, mixing with soil and solution application. The treatments of experiment 2 were: applying gypsum alone at gypsum requirement (GR) amount; applying organic compost at standard dose of manure (SDM); combinations of 75 % of GR + 25 % of SDM; 50 % of GR + 50 % of SDM; and 25 % of GR + 75 % of SDM. GR = 8.5 and 12.3 t (metric ton/fed for soil 1 and 2, respectively); SDM = 30 t/fed.

### **A) Experiment 1: Gypsum application methods:**

1. Application of water and allowing for leaching decreased soil salinity. Applying gypsum caused decreased soil salinity of the saline soil in particular which decreased to as low as 1 dS/m with surface application being the most effective than the other two methods.
2. Gypsum increased soluble Ca, while soluble Na took an opposite trend. Cl and  $\text{HCO}_3$  ions were easily leached out from the soil. On the contrary, opposite trend was observed regarding the concentration of  $\text{SO}_4$  ions.

3. Application of gypsum requirements to the studied soils with different methods markedly decreased the values of pH, especially in the surface layers.
4. The values of ESP in the studied soils were sharply decreased due to gypsum application, especially in surface layer. Applying on the non-saline soil surface decreased ESP than other methods, but applying it mixed with soil the saline sodic soil decreased ESP more than the other methods. better
5. Contents of available N, P and K increased due to gypsum application. The highest was through the surface application.
6. The application of gypsum by different methods had a marked effect on bulk density and total porosity of the studied soils. It decreased soil bulk density and increased total porosity. The highest decrease in soil bulk density was obtained when gypsum was added on the surface soil or mixed with soil.
7. Application of gypsum by different methods to the studied soils markedly increased the values of soil hydraulic conductivity. The improvement in soil hydraulic conductivity was more pronounced when gypsum was applied on the surface soil comparing it with the other two methods.
8. Application of gypsum to the studied soils by different methods increased the values of field capacity, wilting point and available water, especially in the surface layers. Gypsum application to the surface soil was more effective in increasing the available water than the other methods.
9. Water stable aggregates of the studied soils markedly increased with any method of gypsum application. Application of gypsum mixed with soil gave higher values of water stable aggregates than application on the surface or in solution.

## **B) Experiment 2: Gypsum and organic compost application:**

1. Addition of gypsum in combination with organic compost singly or in different ratios showed a decrease in soil salinity which was more marked when compost was alone or combined with gypsum.
2. Application of gypsum and organic compost alone or mixed markedly increased the concentration of soluble Ca, while it sharply decreased the concentrations of Na,  $\text{HCO}_3$  and Cl ions and increased the concentration of  $\text{SO}_4$  ions.
3. Also soil pH decreased and highest decrease was with 50 % of GR + 50 % of SDM.
4. Application of 50 % of GR + 50 % of SDM NC was more effective in decreasing exchangeable Na percentage than the other methods.
5. Available N, P and K increased with application of gypsum or organic compost alone or combined with each other.
6. The highest decrease in soil bulk density and highest increased in total porosity was obtained when organic compost was added alone.
7. Organic compost alone was more effective in increasing hydraulic conductivity than the application of gypsum alone or combined with compost.
8. Organic compost applied alone gave the highest increase of field capacity, wilting point and available water.
9. Gypsum in combination with organic compost at 50 % of GR + 50 % SDM gave highest value of water stable aggregates.