The maintenance of a high degree of soil aggregation is one of the MOST important goals of soil management. A healthy soil will have a rapid infiltration rate. Saline conditions force the plant to divert some of the energy expended for growth into increased root cellular maintenance.

**Exchangeable Cations**

- Calcium (Ca)
- Magnesium (Mg)
- Potassium (K)
- Sodium (Na)
- Sulfate (SO₄)
- Chloride (Cl)
- Bicarbonate (HCO₃)
- Carbonate (CO₃)
- Nitrate (NO₃)
- Ammonium (NH₄)

**Soil Solution**

The free ions & ion pairs are subject to transport by diffusion & water movement. Salinity may reduce the yields of crops by as much as 25% without visible symptoms.

**Soil Solution (Soil Chemistry/Soluble Salts)**

- pH
- Calcium (Ca)
- Magnesium (Mg)
- Potassium (K)
- Sodium (Na)
- Sulfate (SO₄)
- Chloride (Cl)
- Bicarbonate (HCO₃)
- Carbonate (CO₃)
- Nitrate (NO₃)
- Ammonium (NH₄)

**Tensiometer**

A tensiometer is a device for measuring soil water tension (i.e. matric potential). This tells us how hard your plant roots are working to draw adequate water from the soil; the higher the reading is in centibars (cb), the drier the soil.

**Plant water potential = Osmotic potential + Matric potential**

(i.e., the matric potential and osmotic potential components are the most relevant to plant water availability).

Osmotic Potential (Soluble Salts), bars \( \approx -0.36 \) (EC).

The negative factor indicates that osmotic pressure exerts a suction force on the root.

**Soils ECₑ (dS/m) ESP pH**

<table>
<thead>
<tr>
<th>Soils</th>
<th>ECₑ (dS/m)</th>
<th>ESP</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saline</td>
<td>&gt; 4.0</td>
<td>&lt; 15 or SAR &lt; 13</td>
<td>&lt; 8.5</td>
</tr>
<tr>
<td>Saline-Sodic</td>
<td>&gt; 4.0</td>
<td>&gt; 15 or SAR &gt; 13</td>
<td>&lt; 8.5</td>
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</tr>
</tbody>
</table>

ECₑ = Electrical Conductivity of the saturation extract
ESP = Exchangeable Sodium Percent
SAR = Sodium Adsorption Ratio

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