Salinity: The major solutes comprising the dissolved salts are the cations (ions with a positive charge) of calcium, magnesium & sodium (potassium exist in very small amounts). The anions (ions with a negative charge) include sulfate, chloride, & bicarbonate (minor amounts of anions include: carbonate, nitrate, fluoride, phosphate, borate & silicate). All combined, the proportion of each of these dissolved mineral solute determines the suitability of water for irrigation.

<table>
<thead>
<tr>
<th>There are four rules regarding irrigation and salinity that need to be understood$^1$</th>
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</thead>
<tbody>
<tr>
<td>Rule #1: All waters used for irrigation contain salts of some kind in some varying amounts</td>
<td>Rule #2: Salinization of soil and water is inevitable to some extent</td>
<td>Rule #3: An irrigated agroecosystem cannot be sustained without some drainage, either natural or artificial</td>
</tr>
<tr>
<td>Rule #4: Rules 1 though 3 can’t be changed</td>
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</tbody>
</table>

Major reasons & strategies for salinity management:

- Sustainability of irrigated agriculture
- Protect surface and ground water quality
- Water conservation requires it
- Increased energy cost to pump water requires efficient irrigation systems that can leach salts to acceptable levels
- To prevent salinization

- Increased costs of soil amendments demand their judicious use
- Water resources (quantity and quality) are becoming more limited
- Increased irrigation efficiencies require greater salt management
- To prevent soil erosion and protect and improve soil quality
- Significant portions of the world’s irrigated land are affected by salinity
- Lands degraded by salinity must be restored and reclaimed in order to increase crop productivity & quality
- Is a major component of an IWM Plan (i.e., leaching requirement)
- Salinity levels must be monitored to ensure that IWM practices are providing an optimal crop growing environment
- Planting & tillage strategies can be developed to prevent excessive salinity accumulation in the root zone
- Crops are most affected at the germinate and young seedling stage (Critical to manage at this stage)

- Depending on water quality, foliar injury (salt burn) is caused by leaf absorption of excess concentrations of sodium and chloride
- Needed to plan, design and manage irrigation systems to meet crop consumptive use & salinity leaching requirements
- IWM Plan must account for the crops unique salt tolerance
- To use appropriate reclamation strategies & amendments for reclaiming Saline, Sodic & Saline-Sodic soils
- To select suitable salt tolerant crops that are appropriate for existing water quality/quantity and irrigation systems
- To ensure a suitable drainage requirement for given water quality, crop salt tolerance and leaching requirement (e.g., depth to water table, soil texture/structure, etc.)
- To ensure that leaching is not required until accumulated soil salinity surpasses the salt tolerance threshold for the crop

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$^1$ NRCS Salinity Management for Soil & Water (pg. 1.28); Additional Ref.: NRCS Conservation Practice (610): Toxic salt reduction


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