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**RECLAMATION OF SALINE SOILS:**

Saline soils have excessive concentration of natural soluble salts, mainly chlorides, sulphates and carbonates of calcium, magnesium and sodium. In such soil Electrical Conductivity (EC) of saturated soil extract is more than 4 ds/m, Exchangeable Sodium Percentage (ESP) is less than 15 and pH is also less than 8.2. Such soils are called “saline soils” or “white alkali” or “solonchack” soils and

**Reclamation of saline soil:**

**Recommended interventions for such soil are listed below:**

 1) Field bunding, land shaping, construction of irrigation channel, construction of peripheral bunds, sluice gate, farm ponds/water harvesting structure, etc.;

2) Construction of surface/sub-surface drainage as per need of the area for lowering the ground water level & also for flashing salt accumulated upper soil layer crop root zone;

3) Green manuring & its mulching into soil for increasing organic carbon in the soil with thrust on use of F.Y.M.;

4) Application of soil test based chemical fertilizers and micro-nutrients to ensure judicious and balance use of such fertilizers;

5) Growing of suitable crops/horticultural/agroforestry species including food, fuel & fodder plantations as per land capabilities depending upon soil and slope conditions for complete one year;

6) Casualty replacement and post planting care, horticulture and agroforestry plantation for about three years; and g) Organization skill development and awareness programme for adoption of recommended package of practices on continuous basis to prevent reoccurrence of problem soils.

7) By lowering the water table 5-6 feet below the surface. In sloppy area, it can be done by making network of 5-6 feet deep trenches at right angles to the slopes. In course of 2 or 3 Successive leaching, harmful salts are removed. A deep ploughing is also helpful in reclamation of saline soil. This also makes the soil loose and thus facilitates the downward movement of salty water in the soil.

8) Salt tolerant crops, e.g., rice, sugar cane, barley and castor gradually remove salts from the soil.

9) In case of saline soils which do not contain calcium salts, the addition of CaSO4 (gypsum) is beneficial. Supply of calcium in the soil can indirectly be maintained by of organic matters which on decomposition produce CO2. The CO2 gas, so produced, combines with insoluble calcium carbonate in moist condition to form soluble calcium bicarbonate. This also reduces alkalinity.

**Special Components for Saline Soils reclamation**

 In areas affected by salinity, water logging and continuous use of imbalance chemical fertilizer and engrossment of sea water mainly results in accumulation of salt in the root zone, therefore, additional interventions could be as under:-

 a) Subsurface drainage:

 If the natural subsurface drainage is insufficient to carry the excess water, dissolved salts in the soil are accumulated near root zone due to rise in groundwater leading to poor root aeration and thereby affects adversely even germination crops. As such, it is necessary to install an artificial drainage system for the control of the groundwater table at a specified safe depth and also for flushing out the dissolved salt of the soil.

 b) Bio-drainage:

 In canal irrigated areas, due to seepage of water from the canal or in low lying areas with frequent flooding, water logging occurs which mainly led to increase in salinity/alkalinity. Mechanical measures to prevent waterlogging through surface and subsurface drainage methods have resulted in lowering water level and reclaiming salinity problem of the areas. Low cost, eco-friendly technology of raising bio-drainage plantations in waterlogged areas has also proved to be very successful in many cases and, therefore, such system need to be adopted in the areas having high salinity especially in the coastal saline areas. The most common tree species recommended for biodrainage in Indian subcontinent and other parts of the world is Eucalyptus due to its high Evapo-Transpiration (ET) demand and adaptability to the varying soil, wet and salinity conditions. Tolerance to salinity and alkalinity with & without water logging provides added advantage for its adoption in establishing bio-drainage belt/ sole plantation crop.

c) Filter materials:

Local filter material is placed around subsurface drains primarily to prevent inflow of soil into drains which may cause failure or to increase effective diameter or area of openings in the drains which increases water inflow rate. Thin sheets such as fibre glass or spun nylon & sand and gravel envelopes or other porous granular are generally used materials.

d) Maintenance of drainage systems:

 A subsurface drainage system normally requires little maintenance, these are properly designed. Outlet ditch should be kept free of the sediment and the tile outlet should be protected against erosion and undermining. Roots of nearby trees can also block subsurface drains for which shrubs and trees growing adjacent to a tile line should be removed. Weed growth must be controlled and the caving in of the sides requires continuous attention in order that entire drainage system continues to work efficiently.