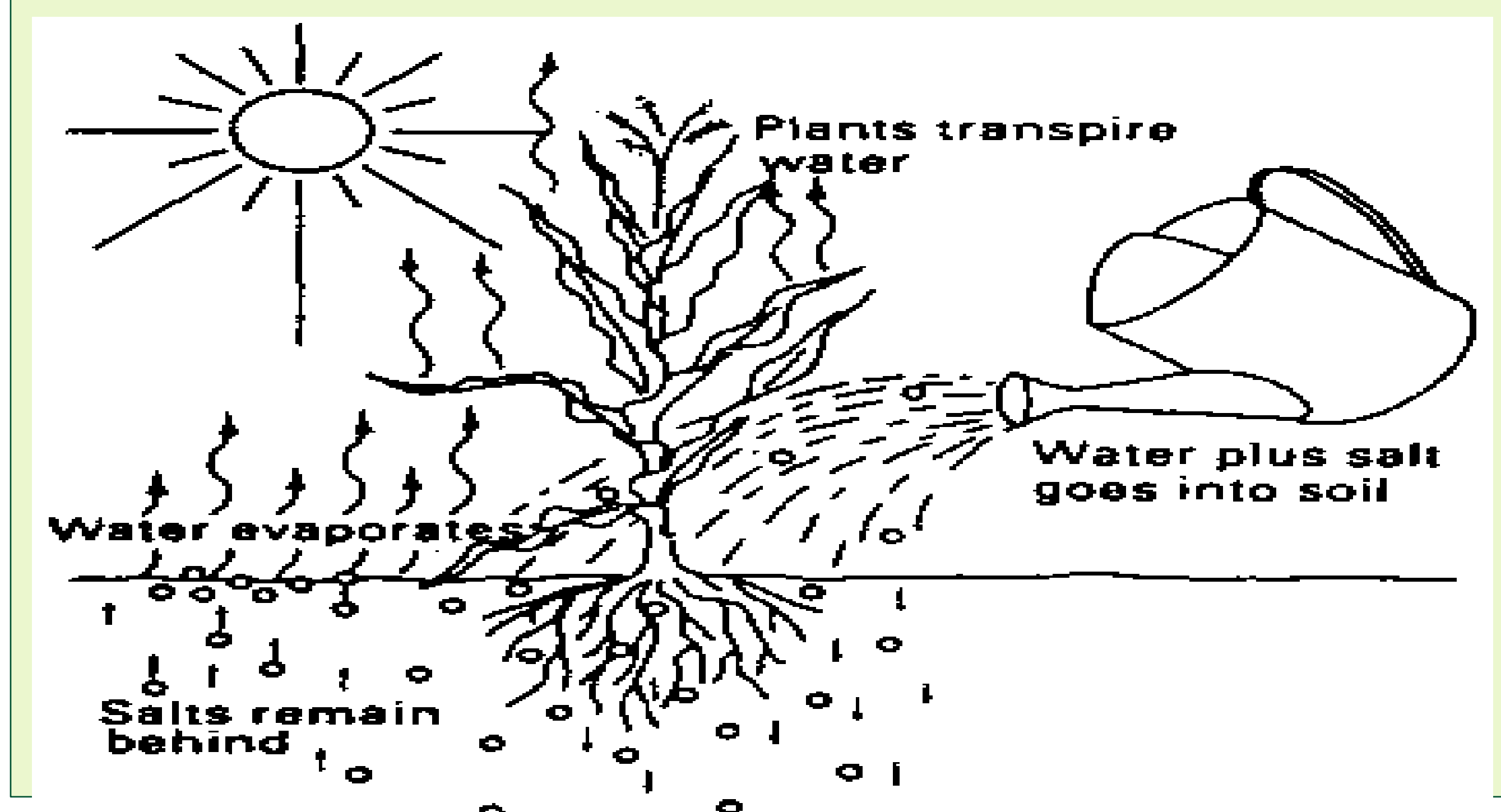


WHAT IS SOIL SALINISATION?

- **Salinisation** is the process that leads to an excessive increase of water-soluble salts in the soil. The accumulated salts include sodium, potassium, magnesium and calcium, chloride, sulphate, carbonate and bicarbonate (mainly sodium chloride and sodium sulphate).
- **Primary salinisation** involves salt accumulation through natural processes due to a high salt content of the parent material or in groundwater.
- **Secondary salinization** is caused by human interventions such as inappropriate irrigation practices, e.g. with salt-rich irrigation water and/or insufficient drainage.
- Soils with sufficiently elevated salinity levels have adverse effect on long-term sustainability of either the soil or plant resource

Salty groundwater contribute to salinization. When the water table rises (e.g. following irrigation in the absence of proper drainage)



Muvumba irrigation scheme

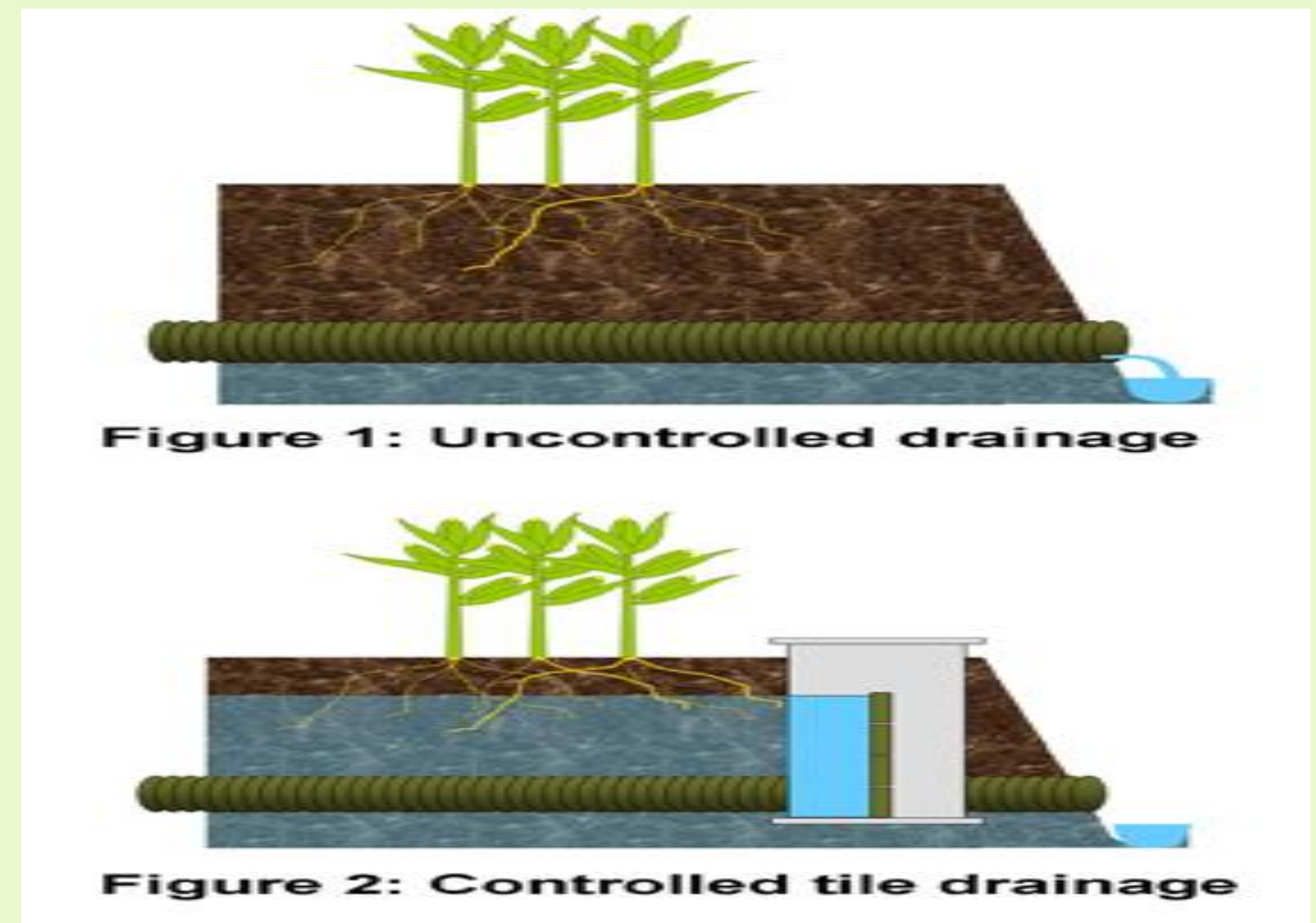
- ✓ Muvumba irrigation scheme is located in semi-arid zone of Rwanda.
- ✓ Salinity problem has been reported in irrigated soils of this scheme and the rice yield has been depleting over the past years.
- ✓ Moreover, driven by observations of white crystals on the soil surface, it is hypothesized that salinity is the main cause of declining rice yields in some parts of Muvumba marshland.
- ✓ However, this problem has not been scientifically treated and its mitigation strategies are not applied in the scheme.

White salt crystal within the paddy plots in Muvumba



- ✓ The aim of the proposed research is to develop strategies for irrigation and drainage aimed to manage salinity and nitrogen in rice production in salt-affected soils of the Muvumba irrigation scheme, in Rwanda.
- ✓ The field experiment will be laid out as a factorial experiment in a randomized complete block design (RCBD). The experiment will comprise combinations of drainage intensity with three levels (80cm, 120cm in open ditches and 120cm_regulated/controlled) with two fertilizers types (slow and quick release nitrogen fertilizers).
- ✓ The results of this study will allow identifying the best water and nutrient management practices for improved rice production in the Muvumba irrigation scheme as well contributing to the protection of groundwater in Rwanda and the environment at large.

Controlled drainage vs Uncontrolled drainage



SUSTAINABILITY OF CROP PRODUCTION IN SALINE CONDITIONS

- ✓ The soil being irrigated must be well-drained
- ✓ Salt tolerant crops should be the primary grown crops
- ✓ Salts should be leached out of the soil
- ✓ In periods of prolonged water use and throughout irrigation season, the volume of irrigation water applied should be progressively increased when the salinity of soil solution increases

Schematic illustration of the flow of water through soil with respect to salt leaching and root zone

