Salt-affected soils at the farm scale: successful experiences and innovation needs

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Irrigation scheduling

Problem:

- Fulfilling crop water requirements,
- Promoting salt leaching from the root zone
- Controlling the ground water level
- Dealing with limited water availability

Goal:

- Salts stored in upper soil layers, but beyond the root's zone of active uptake

Innovative solutions:

- Developing and using simulation models and Decision Support Systems to define adequate volumes of water and irrigation frequency

Chemical amendments

Problem:

- Sodicity

Goal:

- To substitute Na on the CEC and then leach it

Innovative solutions:

- Testing of mined-gypsum, coalgypsum, lactogypsum, in comparison with sulfuric acid
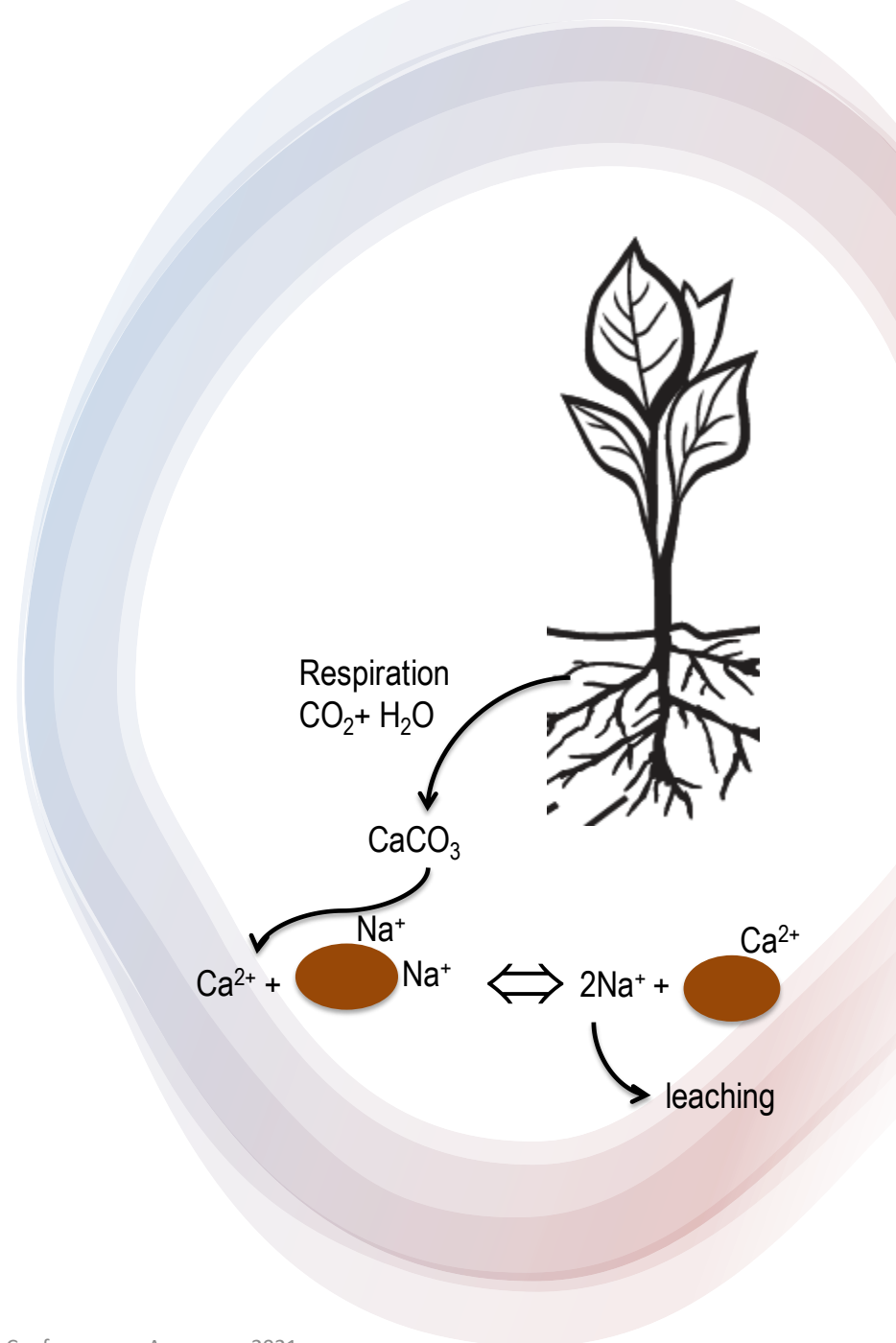
Phytoremediation

Problem:

- Salinity and sodicity

Goal:

- To remove Na in depth

Innovative solutions:

- Testing phytoremediation for low to medium sodicity
- Cheaper and more sustainable than chemical remediation
- Improving carbon sequestration in soil.

Respiration
$CO_2 + H_2O$

$CaCO_3$

Na^+

$Ca^{2+} +$ Na^+ $\Longleftrightarrow$ $2Na^+ +$ Ca^{2+}

leaching

Plant selection and crop rotation
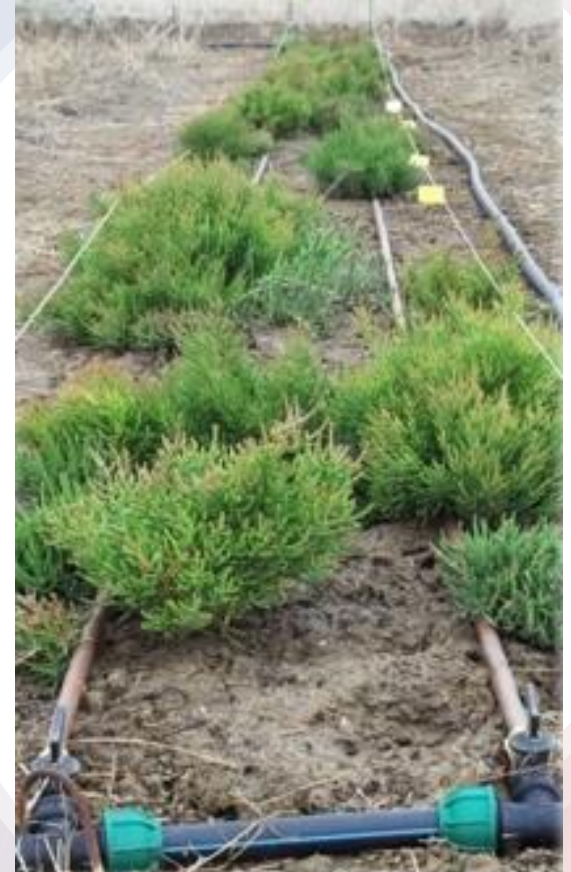
Problem:

- Pressure increase on crops

Goal:

- Adapted varieties and crop systems

Innovative solutions:

- Genetic development
- Grafting
- Cover crops
- Improved rotations, according to sensitivity to drought

Microbial management

Problem:

- Reclamation and increase on crops

Goal:

- To promote and enhance sal tolerance in plants

Innovative solutions:

- Selection and use of bioinoculants for plants and soils

Land-use change

Problem:

- Unfeasible agronomic solutions

Goal:

- Implementing soil ecosystem services beyond food production

Innovative solutions:

- Land-use planning through conversion to recreation and ecotourism, cultural heritage, or natural protection areas.

Thank you for your attention !