

## **Popular science description of the SaltyBEATS project**

Soil salinisation refers to the accumulation of water-soluble salts in soil over time. This process is caused by both natural (primary) and anthropogenic (secondary salinity) factors such as irrigation with saline groundwater and poor land management practices, climate change and extreme water scarcity. Altogether, this leads to reduced soil fertility and biodiversity, hindering agricultural productivity and crop growth and productivity. While the loss of biodiversity in landscapes affected by secondary salinisation remains poorly addressed, empirical evidence from stakeholders and researchers working in the field highlight that secondary salinisation has major consequences leading to multi-taxon biodiversity collapse.

To address these challenges, SaltyBEATS aims to improve the resilience of saltland ecosystems through saline farming, ecological engineering and by harnessing plant functional diversity. Through a comprehensive approach involving Nature Based Solutions, SaltyBEATS aims to unravel the underlying biological mechanisms that mediate the effects of functional biodiversity in naturally saline landscapes and transfer them in marginal lands affected by secondary salinisation. This will be done via stakeholder empowerment and the development of a saline agriculture supported by monitoring of biodiversity levels and a saltland capability assessment to target plants to landscapes to increase (economic and environmental) sustainability in diverse regions and pedoclimatic contexts. This capability assessment tool will include conventional crops (also based on feedback/synergies with other international initiatives on saline farming) and halophytes addition at different levels (intercropping, crop rotational systems, permanent structures as field-field margins/refugia-landscape).

The achievement of SaltyBEATS objectives relies on the close collaboration of experienced multidisciplinary research groups across 8 partner institutions in 6 countries with a wide range of scientific and technological expertise, from plant physiology, botany and ecology, plant and insect behaviour, microbial diversity, landscape and biodiversity mapping to spatial land use modelling and economics, Information Technology (IT), policy and environmental studies. This multidisciplinary proposal, thanks to co-creation with stakeholders and active community learning, will lead to in-depth analysis of saline agriculture/farming as a Nature Based Solution in marginal landscapes bringing biodiversity and human wellbeing together. SaltyBEATS will foster institutional and policy changes by providing a knowledge base for innovative agricultural landscapes design.