



Water

Adapting to salinity in the Southern Indus Basin

Overview

Australia and Pakistan share the challenges of developing agriculture within water-scare, salinity-affected landscapes. As with Australia's Murray-Darling Basin, salinity in the Indus Basin can be categorised as both primary (a natural phenomenon) and secondary (human-induced salinity/waterlogging from irrigation).

Pakistan's secondary salinisation is primarily the result of irrigated agriculture, which adds approximately 15 million tonnes of salt to the Indus Basin every year. At least 4.5 million hectares across Pakistan, and 54% of the lower Indus Basin, are affected by salinity.

In the southern Indus Basin, secondary salinisation is driven by seepage from canals, water courses, over-irrigated fields and floods, and the associated rise of groundwater; continual addition of salt on irrigated landscapes, especially where there is increased reliance on groundwater; and seawater intrusion into the Indus Delta, especially along old distributaries of the ancient delta.

Salinity is a complex issue for both Australia and Pakistan, and a solution cannot be simply engineered. Management strategies that enable affected communities to identify and pursue productive and sustainable ways of living with salinity, while also adapting to climate change, changing water availability and other future uncertainties, are recommended.



KEY FACTS

ACIAR Project No. LWR/2017/027

Duration: October 2020 to September 2023 (3 years)

Target areas: Pakistan

Budget: A\$2,312,000

Project Leader

Dr Michael Mitchell, Charles Sturt University

Key partners

- CSIRO
- Murdoch University
- University of Canberra
- International Centre for Biosaline Agriculture
- International Union for Conservation of Nature
- Mehran University of Engineering and Technology
- Muhammad Nawaz Shareef University of Agriculture
- Multan and Society of Facilitators and Trainers

ACIAR Research Program Manager

Dr Robyn Johnston

Objective

The project's aim is to develop and instigate adaptation options and strategies with people managing and living in salinity-affected agricultural landscapes in the southern Indus Basin in Sindh and southern Punjab.

The objectives are to:

- Build scientific and policy capacity within Pakistan around salinity and land and water resources.
- Improved management of land and water resources to produce food more sustainably, while adapting to climate variability and mitigating the impacts of climate change.
- Improve food security and reduce poverty among smallholders and rural communities.

Expected scientific results

- More explicit and quantitative incorporation of salinity into water management, including through systematic salt balances to complement water balances at the canal command scale.
- Improved understanding of the types and range of landscapes affected by salinity across the southern Indus Basin through mapping, modelling and management scenarios for more effective targeting of adaptation interventions across the range of contexts.
- Improved understanding of the impacts of seawater intrusion from monitoring, mapping, modelling, the design of management scenarios, and from selected interventions.
- Improved management and use of marginal quality groundwater for irrigated agriculture and for salt tolerant fodder and crops, and other uses.
- Improved local understanding of salinity measurement in relation to its impacts on crop and fodder productivity.
- New models for institutional arrangements that empower communities to plan for the future in adverse conditions.
- New insights into the benefits and constraints of undertaking multidisciplinary and transdisciplinary applied research, and how research outputs and outcomes can be co-produced through integrated efforts, including the co-creation of futures and planning strategies.

Expected impact/outcomes

- Newly developed and existing knowledge about salinity in the southern Indus Basin of Pakistan available to Pakistan-based projects, programs and organisations relevant to agricultural development.
- Improved understanding of the opportunities for, and constraints to, current opportunities for adapting to salinity among community members and their institutional support networks.
- Increased capacity among individuals and groups (including women and youth) to plan their own futures for adapting well to salinity.
- Engagement between relevant government departments, policy makers, donors and other institutions, and support for locally and collaboratively determined adaptation planning and action, including through co-development of future research projects.

