



Improving groundwater management to enhance agriculture and farming livelihoods in Pakistan

Overview

Pakistan's population of over 200 million relies heavily on agriculture, which contributes around 20 percent of the country's Gross Domestic Product and more than 40 percent of its employment. Over 90 percent of the country's water consumption is used for agriculture. With development, climate change and increasing population growth the pressure on water availability is increasing.

Surface water supply is highly variable, particularly for farmers in Balochistan and those at the tail end of canals in Sindh and Punjab. In these provinces dependence on groundwater has rapidly increased. Continuous decline in groundwater levels is undermining livelihoods, especially of poor smallholder farming families. Low general awareness of groundwater issues is coupled with minimal capacity for monitoring, modelling and management of groundwater in water agencies. Collaboration among people with an interest in water, agriculture and human dignity is needed to rapidly address the challenge of pursuing productive and sustainable groundwater use.

This project encourages and enables collaboration to address the complexity of achieving effective and fair groundwater management. Through a focus on partnerships it is building capacity of researchers, farmers, farming communities and relevant government and non-government agencies. Building capacity means building skills, knowledge, networks and confidence, and providing relevant tools and processes to improve groundwater management in ways that enhance farming family livelihoods in Pakistan.

ACIAR project number	LWR-2015-036
Start date and duration (years)	July 2016 4 years
Location	Pakistan
Budget	AUD \$2,050,000

Project leader(s) and Commissioned Organisation

Prof Max Finlayson (Project Director) Dr Jay Punthakey (Project Leader)
 Drs Michael Mitchell, Catherine Allan and Richard Culas, Charles Sturt University

Partner country project leaders and their institutions

Engr Faizan ul Hasan, Pakistan Council of Research in Water Resources
 Prof Dr Md Ashfaq, University of Agriculture, Faisalabad Dr Syed Khair, Balochistan University of Information Technology, Engineering & Management Sciences
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Research

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The project is designed to provide an enabling environment for communities to participate in the research process and to develop socially acceptable solutions.

The objectives are to:

- » Develop and articulate a shared understanding of sustainable groundwater use for agriculture and the need for improved management in Balochistan, Punjab and Sindh provinces.
- » Develop, with collaborating stakeholders in each case study, groundwater management tools and options that have the potential to enhance livelihoods of farming families.
- » Enhance capacity and institutional arrangements for post project adoption of tools and options developed in objective two by collaborating with stakeholder organisations.

The project's three case study areas comprise different agro-ecological settings across three provinces:

- » Pishin Lora Basin in Balochistan, with two sub-basins selected as case studies.
- » The Lower Bari Doab Command area in Punjab, with two distributaries selected as case studies.
- » the Shaheed Benazirabad (formerly Nawabshah) and Naushahro Feroze Districts of Sindh, with a distributary selected for each of the two districts.

Key outcomes by the end of the four-year project include:

- » Farmers, farming organisations and partner non-government organisations have started introducing improved groundwater management practices.
- » Government agencies in Pakistan have started developing/ demonstrating improved groundwater-related planning, monitoring, management strategies, options and policies.
- » Relevant provincial-level government agencies, non-government organisations and farming organisations have developed effective partnerships for ongoing discussion on groundwater management issues and solutions.

The research is part of the Australia Water Program in Pakistan that includes two other ACIAR projects:

- » Developing approaches to enhance farmer water management skills in Balochistan, Punjab and Sindh, led by Dr Sandra Heaney Mustafa (University of Canberra).
- » Efficient participatory irrigation institutions to support productive and sustainable agriculture in south Asia, led by Prof. Lin Crase (University of South Australia).

Achievements

1. Partnerships are consolidating

- » Provincial agencies, universities and other partners are collaborating to study social, economic and technical aspects of groundwater management in each case study.
- » Stakeholder forums are established in all six case study communities, with representation from government and non-government organisations, farmers' organisations and progressive farmers. The stakeholder forums are beginning to comment on outputs and guide future activities.

2. Partners' capacities are being developed

- »  New piezometers (observation wells) with continuous logging are installed in community spaces in all case study areas. They are generating quality data for modelling, and provide a focal point for local capacity building re groundwater.

- » Four groundwater models have been developed to enable the consequences of alternate climate and management futures to be considered. With this activity substantial technical capacity and 'ownership' is being built within the Pakistan agencies and universities involved.

- » The household socioeconomic surveys undertaken by team members in each province used newly acquired skills in Mobile Acquired Data. The analyses of the survey data will inform future activities and modelling by all partners.



- » A mobile phone app, Apna Pani, has been developed to enable farmers and agency staff to easily record and map water depth and quality. Apna Farm is also under development; it will allow extension staff access to information on crop water use and productivity at the farm level.
- » Booklets and leaflets on groundwater and its management have been developed and shared. There are short and more detailed versions for farmers and advisers respectively. These are highly visual, and available in Urdu, Sindhi, Punjabi, English and soon also in Pushto.
- » Opportunities for collaboration among female and younger stakeholders are included in stakeholder forums and outreach activities.
- » Partners are building their capacities in literature reviews, software, and academic publications.
- » For more examples visit our [website](#)