Developing approaches to enhance farmer water management skills in Balochistan, Punjab and Sindh in Pakistan

Overview

Irrigation is critical to Pakistan's food security, poverty reduction and economic development. Irrigation profitability in Pakistan is amongst the lowest in the world. Irrigation profitability is essential for reducing poverty, as there are strong links between irrigation, crop productivity and poverty alleviation.

The use of conventional irrigation methods and poor agronomic practices leads to overuse of water. Farmers believe that using more water on their crops results in higher yields. Several studies have found improved irrigation profitability through improved irrigation systems and management practices. Farmers with small to medium holdings have had little access to technologies for irrigation, as affordable and accessible tools are neither produced nor widely distributed in Pakistan.

The main extension challenge is how to scale out existing and new technologies over the vast irrigated areas of Pakistan. The development of skills and capacity among farmers to manage and maintain irrigation is critical to Pakistan's continued economic growth and food security. Extension approaches to farming in Pakistan occur in two ways: the traditional top-down, expert-to-farmer approach; and the interactive Farmer Field School (FFS) approach.

FFS programs are used to transfer specialist knowledge, promote skills and empower farmers. To date water and irrigation management has not been a specific focus of either extension services or FFS.

ACIAR project number	LWR/ 2014/074
Start date and duration (years)	December 2016 4 years
Location	Pakistan
Budget	AUD $2,275,000

Project leader(s) and Commissioned Organization

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Partner country project leaders and their institutions

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Research

This project aims to develop and scale out tools and approaches for increasing farmers' irrigation management skills, and hence their livelihoods, on small- and middle-sized irrigated farms.

The objectives are to:

1. Determine the successful elements of existing on-farm irrigation water management initiatives and farmer training models in Pakistan.
2. Develop and test farmer tools for on-farm soil water, nutrient-monitoring and supply chains, together with a system for collecting and collating the data for collaborative, problem- based learning.
3. Develop and test effective, efficient and scalable approaches to improving farmers' irrigation water and nutrient management skills.
4. Identify the effects of improving farmers' irrigation skills on irrigation profitability, labour, water and energy efficiency and social capital of farming households.

Achievements

The project now has a total of 49 sites in six districts: Nawab Shah and Tandojam in Sindh; Quetta in Balochistan; and Bahawalpur, Sargodha and Faisalabad in Punjab.

Each village has one learning model employed – either Discovery Learning, Value Management or Collaborative Problem Solving. The learning approaches in this project have successfully engaged women and youth, once considered inactive in project activities.

Baseline data from 40 sites has been collected through Commcare App. to determine the impact analysis on farmers' livelihoods. Midline surveys will commence from June, 2019. Approached a total of 700 farmer families at 49 project sites and installed/monitored water and nutrient management tools. At present 55 farms are created on VIA web page, 250 sensors, tensiometers and 133 FULLSTOP are installed. Training of 121 facilitators and field assistants on water management technologies. Manuals for learning models and tool use were also developed both in Urdu and English languages. Now, farmers are able to understand that over irrigation flushes the nutrients out of rootzone, thereby wasting their money and inputs. Farmers have saved 1-3 irrigations while increasing the yield by 2-6 monds per acre (1 mond = 37kg) on some project sites.

A two-day event celebrating International World Water Day 2019 on "Leaving No one Behind: Small Farmers in Pakistan Leading the Way" was held in Sindh. Some 32 farmers, including 12 women, attended along with other ACIAR project teams and provincial government organizations.

To enhance the academic outreach of the project, 4 Research Students from universities near to project sites in Sindh and Punjab province have been engaged as a part of their MSc research work. Established Stakeholder Forums at district level to broadcast project learning with relevant stakeholders.

Impact story

Although impact analysis in any depth has not yet been achieved, the stories of farmers tell how they feel empowered and are saving money after involvement in the project.

Mumtaz Bibi is a farmer of Collaborative Problem-Solving Village site having years long experience of practical agriculture. She demonstrated her experience of managing irrigation using Chameleon, *"We learnt that crop does not need irrigation whilst our peers were irrigating on their turn"*

Khan Mohammad is a young farmer from Value Management model site who has installed Chameleon moisture sensor and FULLSTOP in his Banana crop. He grasped the concept of combined management of fertilizer and irrigation when he observed his prevailing irrigation practice flushed fertilizer beyond the reach of banana crop. So he managed his irrigation quantity; "*I reduced irrigation time from one to half hour to fill the field reducing irrigation depth. After few days data from FULLSTOP showed that fertilizer is available to roots*"

Mr. Khan Mohammad also track the progress of his crop on VIA web page tracking his irrigation history throughout the season.
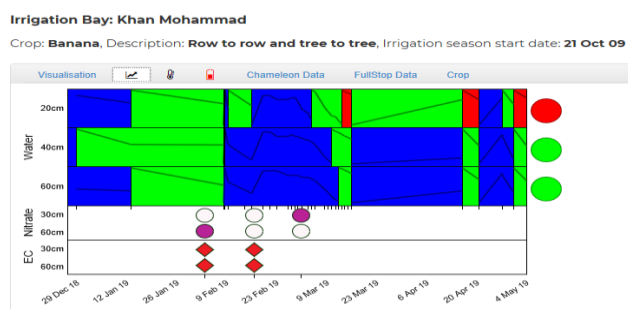
Irrigation pattern of Khan Mohammad's field (Blue; field is saturated, Green; sufficient moisture, Red; Plan irrigation, Purple circle; high nitrogen, light circle; less nitrogen)

Chameleon EC meter is another VIA tool that has helped farmers to understand the importance of salt in soil and irrigation water. Farmers and their youth very keenly experiment on various water sources, whether used for irrigation or drinking. Similarly, this tool has helped farmers in learning role of salinity in managing their irrigation.

Analyzing salts through FULLSTOP sample using EC meter