

# Improving water use for dry season agriculture by marginal and tenant farmers in the Eastern Gangetic Plains



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## Overview

The Eastern Gangetic Plains, which include the Nepal Tarai, Bihar and West Bengal regions, is one of the most densely populated and poverty-stricken belts in South Asia. Behind this persisting poverty are deeply entrenched social structures of class and caste, with a high incidence of inequitable landlord-tenant relations. This is combined with poor access to irrigation water in the dry season, limited irrigation capacity and low agricultural innovation.

There are strong linkages between poverty and access to water. At present technical, social and economic constraints have limited the effective use of groundwater and ponds for irrigation, and large areas of land remain fallow during the dry months. Access to year-round water for irrigation would significantly promote the productivity of agriculture, improving incomes and food security.

This project is improving the livelihoods for woman, marginal and tenant farmers in the Eastern Gangetic Plains through improved dry season irrigated agriculture. The project is funded by the Australian Centre for International Agricultural Research (ACIAR).



*Woman collective farmer group tending chili crop under drip irrigation in Saptari, Nepal – photo Conor Ashleigh*

## Progress Summary

The project is improving dry season irrigated agriculture by marginal farmers across 30 sites and 10 villages in India (Madhubani and West Bengal), Nepal (Saptari) and NW Bangladesh.

Sites typically comprise 20-30 plots where a variety of crops and irrigation technologies and management practices are demonstrated. Collective farming occurs in all villages in India and Nepal. Successful expansion of irrigated vegetable production into adjacent areas has occurred and a number of new collectives established. Cropping intensity has increased at all sites with diversification into dry season vegetables using improved crop and irrigation management practices. Models for collective farming vary in terms of level of cooperation, land arrangement, and labour and input allocation. Key aspects for collective sustainability include land access, labour allocation, profitability and leadership to resolve issues.

The project, which commenced in September 2014 will conclude in June 2019 and is a partnership between twelve organisations representing research and government agencies and NGO's.

## Research Focus

The four key project objectives are:

- To determine existing water resources and sustainable utilisation for irrigation from tanks and groundwater.
- To determine the socio-economic, structural and institutional constraints to sustainable water use.
- To determine and evaluate approaches for access to water for irrigation focusing on using renewable technologies and alternate approaches to land tenure and their impact on livelihoods and resilience.
- To facilitate long term up-scaling and out-scaling of approaches and alternative opportunities



## Key Achievements:

- Engagement in thirty pilot sites across ten villages in Saptari (Nepal), Madhubani and Cooch Behar (India) and NW Bangladesh.
- Seventeen farming collectives established in Nepal and India practicing new dry season cropping systems and irrigation practices.
- Capacity development of local communities through training events, farmer group and stakeholder meetings.
- Changes in community knowledge, attitude and skills with regards improved irrigation management and collective farming arrangements.
- Adoption of a range of models providing farmers with a greater capacity to work collectively at various levels.
- Adoption of new agricultural, water and technological management practices moving participants from predominantly rice based cropping systems to multi crop systems, including vegetables.
- Improved confidence in water management approaches and irrigation practice change.
- Demonstrated increase in income from new cropping systems and irrigation practices, and increased food security.
- Strong participation by woman who are now making decisions about farming, asking about finances and accounts and are marketing vegetables themselves.
- Engagement with higher-level government and private sector agencies creating opportunities to link with government programs.
- Implementation of interdisciplinary and cross-institutional scientific program across twelve partner organisations and three countries.



*Collecting market data from farmer to share pricing information to farming communities on App – photo Erik Schmidt.*

## Recent Activities and Outputs

Key activities and outputs over the last twelve months:

1. To determine existing water resources and sustainable utilisation for irrigation from tanks and groundwater.
  - Weekly biophysical monitoring, including groundwater and pond water levels, rainfall and water quality. Mobile friendly applets used in the field to improve accuracy and timeliness of reporting.
  - Seasonal irrigation demand determined for pilot sites, using detailed field and crop records and FAO56 based modelling.
  - Pumping and infield efficiency assessments completed for selected irrigation systems.
2. To determine the socio-economic, structural and institutional constraints to sustainable water use.
  - Analysis of land tenure/relations and other social structures, livelihood strategies and water access/demand.
  - Documentation of socio-economic context and institutional constraints to sustainable water use.
  - Analysis completed of gender relations, migration and irrigation access, and how feminization of agriculture changes agriculture.
3. To determine and evaluate approaches for access to water for irrigation, focusing on using renewable technologies and alternate approaches to land tenure and their impact on livelihoods and resilience.



*Solar irrigation at Site 1 Madhubani, Bihar – photo Erik Schmidt*



- Evaluation of the economic costs and benefits from various social and biophysical interventions.
- In NW Bangladesh, assessment of different models of groundwater provision and implications on crop selection, production and economics.
- There has been substantial support of farmers in selection and management of cropping systems and irrigation practices and infrastructure. This has included annual evaluation of performance through season biophysical/economic assessment and irrigation system technical performance.
- A range of software applets, developed by the project, used by project staff and in some cases farmers for data collection and information sharing.
- Networks established, primarily through stakeholder meetings and discussions, to strengthen links between public, private and village institutions.
- Pilot sites monitored in terms of technical and economic performance and social and institutional engagement.

4. Facilitating long term up-scaling and out-scaling of approaches and alternative opportunities.

- A number of multi stakeholder workshops hosted resulting in a range of support initiatives by local and state government to extend project impacts.
- Informal training to farmers outside pilot sites has resulted in out-scaling of a range of interventions and establishment of new collectives.
- Thirty-seven case studies compiled for three seasons of cropping and key lessons identified using a range of cross cutting themes for evaluation.
- Models for sustainable collectives assessed.



*Farmer monitoring groundwater levels in Dinajpur NW Bangladesh – photo Erik Schmidt*

## Summary

The project is focussing on completing analysis of results and writing up progress and findings.

Regular communication between partners is of critical importance. We have established a range of avenues to allow for sharing of data, ideas, photos and stories. Please see the links in the box below. This newsletter and a range of other project information is available on the DSI4MTF website. Please email [dsi4mtf@usq.edu.au](mailto:dsi4mtf@usq.edu.au) if you would like further information.



*Collective rice farming in Saptari, Nepal – photo Conor Ashleigh*

## How we connect

Online: <http://dsi4mtf.usq.edu.au>  
 Email: [dsi4mtf@usq.edu.au](mailto:dsi4mtf@usq.edu.au)  
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 Twitter: @DSI4MTF #dsi4mtf  
 Whatsapp: email above with your number



## Impact Story 1

Dhologuri village is located in the Cooch Behar district of West Bengal, India and is dominated by lower caste marginal and tenant farmers. At the site Karjeepara, the project is working with a collective farmer group comprising eight members, including three landless women. The project has supported installation of a shallow tube well, 4HP diesel pump, solar irrigation pump, and drip irrigation in a protected structure.

Farmers have assisted in crop planning and management and through community mobilization their wellbeing has been transformed. Previously only rainfed paddy and some winter potato was cultivated, with most land fallow in the dry season. Cropping intensity has increased with introduction of more than ten irrigated vegetable crops.

Farmers have been empowered socially and economically. For example, the benefits of cooperative farming are now visible to woman landless group member Jharna Karjee who is now jointly responsible for managing finances and crop management. Increased productivity and appropriate market linkages has seen her income increase.

Access to land and water affects farming success, and the project has positively influenced outcomes for farmers like Jharna Karjee. Successful cooperative farming approaches have built the confidence of group members, augmented livelihoods, generated cohesiveness and are supporting a sustainable community.



*Collective farmers inspect irrigated vegetable production at the Karjeepara site, Dholaguri Village, Cooch Behar, West Bengal – photo Erik Schmidt.*

## Impact Story 2

Sundari Devi Chaudhary is from Kanakpatti, Saptari. She is part of the 8 member all woman collective farming group called Rajaji Krisak Samuha. They cultivate monsoon paddy, winter wheat and irrigated vegetables in the dry season.

The group jointly lease previously virgin land, hire a tractor for land preparation and share inputs, including labour. Working collectively has brought economic benefits. “I am very pleased with the income I made from vegetables. I am excited about the return”. Using the profits Sundari has repaid a loan for her daughter’s school expenses.

Sundari is excited about learning new agricultural skills and having access to land and irrigation equipment. The group share an irrigation pump and use drip irrigation for vegetable production. Drip irrigation directly waters the plant roots she says, with less weed growth. It is easy to use and saves labour. Farmers have already started installing additional drip irrigation for the summer of 2017.

As part of the collective, Sundari has started participating in training activities and exposure visits. Her confidence has grown and she now participates actively in group meetings with the landlord.

Despite higher returns from vegetable crops, fluctuations in market price is a risk. She is looking at new strategies for early cultivation of winter vegetables to secure better prices.

Sundari says experience is the biggest teacher and neighbouring farmers are beginning to follow her groups lead. For the farmers of Rajaji Krisak Samuha, collective farming is providing new opportunities. They are learning continuously and Sundari sees success not as a final destination but a continuous process.



*Sundari Devi Chaudhary selling vegetables at Traffic Chowk weekly market - Photo M Raut*

