



Australian Government

Australian Centre for  
International Agricultural Research

Climate and Water

# Unravelling the water-energy-food nexus in West Bengal, India:

**Does increased access to groundwater  
irrigation through electricity reforms affect  
equity and sustainability outcomes?**

## Overview

This project is part of the ACIAR SDIP program, and will contribute directly to a better understanding of the food-energy-water nexus in West Bengal. Findings will feed into various parts of the program, in particular to the Foresight work being led by the International Food Policy Research Institute, which seeks to understand the issues and trends affecting food systems in the Eastern Gangetic Plains.

The Indian state of West Bengal is the largest rice and vegetable producing state in India, consisting of 7.1 million farm families of which 96% are small and marginal farmers, with average land holding of only 0.77 ha. In the past 15 years the Government of West Bengal has undertaken two important groundwater policy reforms – universal metering of electric tubewells in 2007; and a change in groundwater law in 2011, which have removed barriers for electrification of groundwater structures. Both these reforms have had multiple impacts, including improved agricultural production; equity in access to irrigation and groundwater resource sustainability impacts.

This project will undertake rigorous evaluation of the impacts of groundwater policy reforms on the agricultural and groundwater sectors, with a special emphasis on sustainability issues, and draw lessons for other states/countries in the eastern Ganges basin.

Additionally, this project will interact with LWR/2018/104 which is working on effective institutional arrangements for inclusive, sustainable food systems, with one focus area being effective institutions to promote access to water for irrigation.



## KEY FACTS

**ACIAR Project No.** WAC/2019/151

**Duration:** June 2019 to April 2020

**Target areas:** India

**Budget:** A\$130,000

### Project Leader

Aditi Mukherji, International Water Management  
Institute

**ACIAR Associate Research Program Manager**

Dr Robyn Johnston



## Objective

**The project aims to document the short and medium-term impacts of changes in electrification of groundwater wells and tubewells in West Bengal on both the agricultural economy and groundwater withdrawals in the state, and create a detailed understanding about how these changes may have affected the functioning of informal markets.**

### Specific objectives include:

- Using secondary data, to chart the changes in numbers of electric tubewells after the change in groundwater law in 2011, and relate it changes in cropping pattern and cropping intensity in the state.
- Using qualitative data collection methods, create a rich narrative about how these and other related changes (such as changes in tariffs) have potentially affected informal groundwater markets in the state.
- Suggest ways in which the policy experience of West Bengal can be replicated or adapted by other states and countries in the EGP, such as Bihar, Bangladesh and the Nepal Terai. This will be particularly valuable for the Bihar Government as they embark on an ambitious rural electrification program in the coming years.

## Expected outcomes

- Provide evidence that better access to groundwater, facilitated by electrification of wells and tubewells, will lead to an increase in irrigation coverage, decrease in the costs of irrigation, and therefore further intensification of irrigated agriculture and cropping intensity.
- Demonstrate that these increases in intensification contribute to better food security through two pathways; an increase in production of food grains, and improvements in incomes for buying nutritious food.
- Improved understanding of the impacts of accelerated groundwater development on groundwater resource conditions to meet objectives of better natural resource management and climate resiliency. Provide answers as to how groundwater resources in an area with rich alluvial aquifer and high rainfall behaves in view of increased intensification of use.
- Directly benefit the state government of West Bengal to allow fine-tuning of their policies and indirectly benefit farm households who derive their livelihood from groundwater-irrigated agriculture.

