

# Bangladesh

 **A\$2.7** million  
Budgeted funding

 **11**  
Bilateral and regional  
research projects

 **4**  
Small projects and  
activities

Poverty has steadily declined over the past 20 or more years in Bangladesh. However, 47 million people still live in poverty—the highest levels in South Asia—and 28 million of these people are classified as extremely poor, which means they are not able to satisfy their minimum food needs. Another 26 million people are also at risk of falling into poverty. Elimination of extreme poverty is seen by many as one of the greatest challenges facing Bangladesh. A key driver of economic growth in Bangladesh is investment and opportunities created by the private sector, through productivity gains in agriculture, small-scale entrepreneurship and garment export. Agriculture remains the largest employer in Bangladesh with approximately 22.7 million people working in the sector. Australia's support to Bangladesh aligns with the Bangladesh Government's vision for the country, outlined in the 7th Five-Year Plan 2016–2020, in which the Bangladesh Government has committed to boost economic growth and empower citizens as part of the government's long-term vision for eliminating poverty.

An overview of Australia's aid program in Bangladesh is available on the DFAT website.

**Agriculture plays a pivotal role in the Bangladesh economy and in the lives of the vast majority of its population. A key development challenge for Bangladesh is to improve farm incomes within the context of climate change.**

Low-lying areas and rainfed cropping systems in Bangladesh are negatively affected by seasonal climate variability, reduced freshwater river flows and seawater intrusion. The population is projected to grow to about 193 million by 2050, placing further demands on food systems. Climate change has introduced risks from floods, droughts and sea-level rise.

Despite these challenges, Bangladesh has made impressive progress in achieving national food security. Investments in agricultural research have played a pivotal role in driving productivity increases of major crops, which account for more than half of agricultural GDP. Poverty is steadily declining, but many people still live below the poverty line.

Climate change is the most pressing issue, with varying levels of vulnerability and impacts across the country. Coastal areas are prone to salinity intrusion and tropical cyclones, the floodplains in the central areas are prone to floods, the north-western region is prone to drought, the north-eastern region is prone to flash floods and the hilly regions are prone to erosion and landslides.

Bangladesh is an active participant in the global effort to combat climate change and needs to develop adequate adaptive capacity to protect its people and economy against the impacts of climate change. In view of the substantial long-term challenges presented by climate change, the government has developed a long-term Bangladesh Delta Plan 2100 that focuses on developing approaches to sustainable management of water, environment and land resources.

The key challenges identified in the National Agriculture Policy 2018 are:

- » diversification of crops including production of high-value crops
- » development and promotion of stress-tolerant crop varieties and production technology
- » development of modern techniques including biotechnology and disease-resistant and nutritious crop varieties
- » improvement of crop production systems for market-oriented agriculture
- » emphasising the importance of innovation and extension of technology to increase overall productivity growth and reduce the difference between research farm and field-level yield
- » identification of opportunities for improving living standards of coastal population by accumulation of marine resources—in addition to fisheries, there are prospects for seaweed cultivation including production of plankton in the oceans, rivers and wetlands.

The Bangladesh Climate Change Strategy and Action Plan is the de facto policy document that provides strategic direction for work on climate-change related issues. Many elements of climate-change adaptation in the country are also being addressed through specific sectoral policies. Recent consultations with Bangladesh highlighted that the 'consequences of climate change on rural livelihoods' is the most pressing issue facing Bangladesh and is likely to drive thinking about future priorities for research collaboration with ACIAR.

The Australian aid program supports regional approaches to assisting Bangladesh, including in the areas of natural resource management, improving trade connectivity and encouraging investments to empower women to participate in cross-regional trade opportunities.

## Country priorities

Bangladesh has been an ACIAR partner country since the mid-1990s. With time, the ACIAR program has shifted towards a farming systems approach supporting broader food security aspects, improved production and diversification of the rice-based farming systems and adaptation to climate change. This approach includes research on short duration varieties of pulses to fit the farming system, conservation agriculture-based technologies and related mechanisation, saline land management and adaptation to climate change. ACIAR-supported programs in Bangladesh have focused on the undulating lands of north and north-west and the coastal region (which is the poorest and most vulnerable region in the country). Bangladesh's ability to maintain food security given its high vulnerability to the impacts of climate change underpins the priorities for ACIAR support.

Key agricultural production challenges are common to many countries of South Asia, and ACIAR plays a role in strengthening research linkages between Bangladesh and other countries, particularly India (Bihar and West Bengal states) and Nepal (eastern Terai region).

Consultation with key research and development stakeholders in Bangladesh and Australia confirmed the following priorities as the focus of research collaboration between ACIAR and Bangladesh for the 2019-28 period:

- » crop improvement, with a focus on wheat, maize and pulses
- » improved farming systems, with a focus on cropping systems and diversification
- » water management, with a focus on managing both quantity (scarcity, groundwater and waterlogging) and quality (salinity)
- » soil fertility and soil management
- » markets, diversification and agricultural value chains.

The Krishi Gobeshona Foundation is a strategic partner of ACIAR in Bangladesh. It is an agricultural research funding organisation that has made major investments in funding research and capacity building in ACIAR-supported projects. As a major partner and co-investor, ACIAR will seek to refresh and then renew the partnership in 2020-21.





Projects in the Sustainable Development Investment Portfolio (SDIP) program have a common theme of optimising the management of natural resources and adopting new practices to increase productivity and sustainability on the Eastern Gangetic Plains in Bangladesh, India and Nepal. Photo: Conor Ashleigh. ACIAR projects: see page 132.

## 2020–21 research program

ACIAR supports 15 projects in Bangladesh, three of which are specific to this country. The remainder are part of regional projects. The projects address our high-level objectives, as outlined in the 10-Year Strategy 2018–2027, as well as specific issues and opportunities identified by ACIAR and partner organisations.

The following sections briefly describe individual ACIAR-supported projects and anticipated outputs in Bangladesh. The projects are grouped according to research program. Each project description is referenced in a list at the end of this section, which provides the project title and code.

### Agribusiness

Success in rural transformation is not only measured by income growth of the rural population, but also by the degree of inclusiveness in society. A project in China, Bangladesh, Indonesia and Pakistan, led by Dr Chunlai Chen of the Australian National University, endeavours to understand the nature and drivers of rural transformation in order to provide better policy advice to underpin the success of transformation. In 2020–21, the project will select study regions and collect data to understand the components of success.<sup>1</sup>

### Crops

The Sustainable and Resilient Farming Systems Intensification project is a large collaborative venture between ACIAR, the International Maize and Wheat Improvement Center (CIMMYT) and more than 20 partners from the research, development and educational sectors. The project aims to reduce poverty in the Eastern Gangetic Plains by making smallholder agriculture more productive, profitable and sustainable, while safeguarding the environment and involving women. Dr Brendan Brown of CIMMYT will lead the project in its final year to consolidate capacity development and credible pathways to scale out and support the widespread adoption of conservation agriculture for sustainable intensification methods, designed and validated by the project over the past six years.<sup>2</sup> This project is part of the SDIP, facilitated in the region by the Australian Government (see page 132).

Supporting the Sustainable and Resilient Farming Systems Intensification project, a small research activity led by Dr Neal Menzies of the University of Queensland, will identify future soil health research needs, focusing on soil acidification in areas where nitrogen fertiliser use has increased, the potential for zinc fertiliser to increase rice yields, changes in soil structure under conservation tillage practice and understanding system sustainability through partial nutrient budgets.<sup>3</sup>

In South Asia, adoption and adaptation of many farming system innovations are variable and low outside project areas, particularly for conservation agriculture-based sustainable intensification. A project, led by Dr Fay Rola-Rubzen of the University of Western Australia, will complete its research on understanding decision-making behaviour of farm households using a behavioural economics framework. The project will test interventions on agricultural extension, input provision and service delivery, which are designed to encourage smallholder farmers' uptake of innovations. The project, which is also part of SDIP, will also strengthen organisational and institutional capacity to better target interventions in the Eastern Gangetic Plains.<sup>4</sup>

In the coastal regions of southern Bangladesh, agriculture centres on the annual cropping of rice in the monsoon season and other crops in the dry (rabi) season. While the system is profitable, it is limited by topography, soil salinity and irrigation availability. Salinity varies spatially and temporally and there are opportunities for more profitable dry-season cropping on fallow land between rice crops. In its final year, a project led by Professor William Erskine of the University of Western Australia will identify cropping practices and germplasm for salt-tolerant wheat, pulses and forages, which are adapted to southern Bangladesh and have the potential to lift productivity and profitability.<sup>5</sup>

Wheat blast is a serious threat to smallholder farmers in South Asia, a region where 300 million people are undernourished and the population consumes over 100 million tonnes of wheat each year. Dr Pawan Singh of CIMMYT leads a project to reduce the threat of the disease by identifying new sources of genetic resistance. The project is supporting the operation by Bangladesh Wheat and Maize Research Institute of the wheat blast phenotyping platform, an international public-good facility for screening global germplasm. Ultimately, the project will enable the development and release of agronomically superior wheat blast resistant varieties with appropriate maturity and other traits critical for the Bangladesh environment.<sup>6</sup>

Mungbean is an ideal rotation crop for smallholder farmers. The International Mungbean Improvement Network, established through an ACIAR-supported project led by Dr Ramakrishnan Nair of the World Vegetable Center, helped realise the potential of mungbean to improve cropping system productivity and livelihoods by improving researchers' access to genetic material, and coordinating and providing technical support to variety development work in Bangladesh, India, Myanmar and Australia.<sup>7</sup> Phase 2 of the network commences in July 2020, continuing variety development for another five years and extending the network to Kenya and Indonesia, providing access to new genetic material and improved cropping options for smallholder farmers in eastern Africa and South-East Asia.<sup>8</sup>



ACIAR supports a project led by CIMMYT to identify sources of resistance to wheat blast and their deployment in wheat varieties adapted to Bangladesh. Photo: Conor Ashleigh. ACIAR project: CIM/2016/219.

High labour costs and labour shortages at harvest time constrain mungbean production in Bangladesh, Myanmar and Pakistan. A project led by Dr Ramakrishnan Nair aims to establish and validate a practical and economically viable system for smallholders to mechanically harvest mungbean. During 2020–21, final evaluations of combine harvesters adapted for local conditions and farming systems will occur, as well as final research to understand the current role of women in mungbean harvesting and the likely impacts of mechanical harvesting on their livelihoods.<sup>9</sup>

## Water

About 65% of people living in the coastal zones of Bangladesh and West Bengal in India live below the poverty line. Owners of marginal land, those without land, tribal people, women and those who rely on ecosystem services (such as fishing communities) often do not benefit from agricultural development. A project led by Dr Christian Roth of CSIRO Agriculture and Food has investigated ways to provide more equitable and less-risky development pathways for marginalised communities. During 2020–21, this research will support the design and delivery of agricultural intensification programs that are more socially inclusive.<sup>10</sup>

In the same region, a project conducted over the past five years clearly demonstrated that improved crop, water and salt management strategies can lift agricultural productivity and rural welfare when projects engage with farmers to understand their needs and priorities. A second phase of this work, led by Dr Mohammed Mainuddin of CSIRO Agriculture and Food, will use predictive modelling techniques, field trials and targeted demonstration to identify and implement packages of technologies, such as new cropping systems and improved water management that are tailored to the characteristics of different parts of the Ganges delta region. Key to process will be identification of risks to adoption due to variable climate and variable environments. The outputs of this project will provide information to support implementation of the Bangladesh Delta Plan 2100.<sup>11</sup>

A project underway in the coastal zone of Bangladesh, led by Professor Richard Bell of Murdoch University, aims to increase the profitability and sustainability of intensive and emerging cropping systems through improved nutrient management. During 2020–21, the project will conduct activities to scale out the use of tools developed by the project and inform the development of fertiliser policies to advance practice change, as well as activities to improve the knowledge of soil resources and capability for nutrient management by farmers, research partners and key stakeholders.<sup>12</sup>

A suite of projects with a common theme of optimising the management of natural resources and adopting new practices to increase productivity and sustainability will operate on the Eastern Gangetic Plains in Bangladesh, India and Nepal during 2020–21. These projects ultimately aim to improve the livelihoods of the many and varied communities of the plains and are part of the SDIP program (see page 132).

The traditional concept of a physiological crop yield gap is considered useful in national food security planning but, across the Indo-Gangetic Plains, socioeconomic constraints often limit production and overexploitation of regional water resources causes environmental problems. A project led by Dr Donald Gaydon of CSIRO Agriculture and Food will determine if there are feasible alternatives to quantify yield gaps in terms of economics and water use sustainability. The project will make a preliminary assessment of the effects of conservation agriculture and sustainable intensification, future climate scenarios and some economic variables on food production capacity.<sup>13</sup>

A small project was developed to encourage and support a core team of local partners in Bangladesh, India and Nepal to undertake participatory 'foresight for food' exercises in their respective domains using scenario-based approaches and systems thinking. Dr Avinash Kishore of the International Food Policy Research Institute leads the project, which continues to build the capacity of national partner institutions and support young farmers to communicate their aspirations and concerns to policymakers and other stakeholders in the regional food systems.<sup>14</sup> The project will be extended until the end of the 2020–21 year, to allow time to consider the impact of the COVID-19 pandemic on regional food systems.<sup>15</sup>

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See page 209 for contact details

## Current and proposed projects

1. Understanding the drivers of successful and inclusive rural regional transformation: sharing experiences and policy advice in Bangladesh, China, Indonesia and Pakistan (ADP/2017/024)
2. Sustainable and resilient farming systems intensification in the Eastern Gangetic Plains (SRFSI) (SDIP) [Bangladesh, India, Nepal] (CSE/2011/077)
3. Identifying soil constraints in the Eastern Gangetic Plains (SDIP) [Bangladesh, India, Nepal] (CROP/2018/210)
4. Enhancing farm-household management decision-making for increased productivity in the Eastern Gangetic Plains (SDIP) [Bangladesh, India, Nepal] (CSE/2012/108)
5. Incorporating salt-tolerant wheat and pulses into smallholder farming systems in southern Bangladesh (CIM/2014/076)
6. Identification of sources of resistance to wheat blast and their deployment in wheat varieties adapted to Bangladesh (CIM/2016/219)
7. Establishing the International Mungbean Improvement Network [Bangladesh, India, Myanmar] (CIM/2014/079)
8. International Mungbean Improvement Network – phase 2 [Bangladesh, India, Indonesia, Kenya, Myanmar] (CROP/2019/144)
9. Improved mungbean harvesting and seed production systems for Bangladesh, Myanmar and Pakistan (CIM/2016/174)
10. Promoting socially inclusive and sustainable agricultural intensification in West Bengal, India and Bangladesh (LWR/2014/072)
11. Mitigating risk and scaling-out profitable cropping system intensification practices in the salt-affected coastal zones of the Ganges Delta [Bangladesh, India] (WAC/2019/134)
12. Nutrient management for diversified cropping in Bangladesh (LWR/2016/136)
13. Quantifying crop yield gaps across the Indo-Gangetic Plain from new perspectives – production, farmer profit and sustainability of water use (SDIP) [Bangladesh, India, Nepal] (WAC/2018/169)
14. Regional foresight for food systems in the Eastern Gangetic Plains (SDIP) [Bangladesh, India, Nepal] (WAC/2019/136)
15. Food futures for the food systems in the Eastern Gangetic Plains (SDIP) [Bangladesh, India, Nepal] (WAC/2020/158)