



Australian Government
Australian Centre for
International Agricultural Research

ACIAR–Bangladesh **10-year** Collaboration Strategy 2021–2030

Supporting rural livelihoods
through international agricultural
research collaboration



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ACIAR–Bangladesh Collaboration Strategy 2021–2030

This Strategy is available at aciar.gov.au or as hardcopy by request to aciar@aciar.gov.au

Enquiries about this Strategy are welcome and should be directed to:

Dr. Pratibha Singh, Regional Manager, South Asia
Phone: +91 93110 90750
Email: aciar@aciar.gov.au

Cover: A Bangladeshi farmer in his wheat field. © ACIAR/Conor Ashleigh 2019.

ACIAR–Bangladesh Collaboration Strategy 2021–2030

Agriculture plays a pivotal role in the Bangladesh economy and in the lives of the vast majority of its population. The agriculture sector accounts for more than half of employment in Bangladesh.

Rice, maize, jute, sugarcane, potato, pulses, oil seeds, wheat, spices, tea and tobacco are the principal crops of Bangladesh. Of these, rice covers 75% of cropped areas and accounts for 70% of the value of crop output. The production of rice has scaled up from 10 million MT in 1971 to 39 million MT in 2019-20, leading to net rice self-sufficiency.

Notwithstanding its transformation from a country of chronic food shortages to one of net food grain self-sufficiency, Bangladesh still faces very substantial food security challenges. It is the eighth most populous nation in the world. Around 60% of the population is rural, making a living on small to very small farms and spending up to 60% of household income on food. There are very specific challenges associated with this demographic reality, especially degrading natural resources, declining rural labour availability pushing a need for accelerated mechanisation, limited access to reliable knowledge, capital and inputs and increasing burdens of pests and diseases¹.

The challenge to improve rural incomes is complicated by the context of climate change. Low-lying areas and rainfed cropping systems are being adversely impacted by increasing seasonal climate variability, reduced freshwater river flows and seawater intrusion. Bangladesh is an active participant in global efforts to combat climate change recognising it needs to develop adequate capacity to protect its people and economy against the impacts of climate change.



1. M. Akkas Ali, M. Robiul Alam, M. S. H. Molla & S. M. Bokhtiar (2019) "Agricultural Research and Development: Policy and Program Priorities in Bangladesh" In SAARC Regional Expert Consultation Meeting 16-18 July 2019, Dhaka, Bangladesh (APAARI, 2019)

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. Agricultural research and development spending has been on an upward trend since the mid-1990s. Support to the research sector is, however, still well below the levels needed to address the challenges facing the sector².

The National Agriculture Policy (2018)³ highlights many significant areas for increased investment, including the following of relevance to ACIAR:

- ▶ Reducing the yield gap between research and field-level yields, through
 - (i) using modern breeding technologies to produce stress tolerant and disease and pest resistant crop varieties and
 - (ii) development of implementation of more efficient production systems, input utilisation and production technologies
- ▶ diversifying crops within systems, with an increasing emphasis on high value crops
- ▶ improving livelihoods of populations in coastal and low-lying regions by addressing water logging and salinity issues especially through research on improved crops varieties and farming technologies
- ▶ strengthening the efficiency and effectiveness of conservation agriculture
- ▶ developing crop varieties and technologies targeted towards the hill areas

Achieving this will also require a focus on sustainable utilisation of arable land adaptation to a changing climate and policies to support a vibrant agribusiness sector leading to effective input supply systems (including seed supply)⁴.

Within this context, Australia and Bangladesh share some common challenges and, hence, research capabilities, especially in cropping systems under adverse conditions including salinity and drought. The two countries also share common research interests in sustainable agricultural intensification and diversification, mechanisation and precision agriculture.

2. G-J Stads (2019) "Resource Allocation for Agricultural Research in South Asia: Trends, Challenges, and Policy Implications" In SAARC Regional Expert Consultation Meeting 16-18 July 2019, Dhaka, Bangladesh (APAARI, 2019)

3. National Agriculture Policy 2018. Ministry of Agriculture. Government of the People's Republic of Bangladesh

4. Ibid

ACIAR and Bangladesh

The Australian Centre for International Agricultural Research (ACIAR) has supported research collaboration with Bangladesh since the mid-1990s, focused on productivity of dry winter (rabi) crops like pulses, wheat, maize and watermelon in the rice fallows. The program has recently shifted focus 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 specific biophysical challenges of Bangladesh pulse production systems, conservation agriculture technologies and related mechanisation, saline land management and adaptation to climate change. ACIAR-supported programs in Bangladesh have focused on the undulating and sloping lands of the 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 in light of the country's high vulnerability to the impacts of climate change underpin the priorities for ACIAR support.

In 2015, ACIAR signed a memorandum of understanding (MoU) with the Krishi Gobeshona Foundation (KGF) of Bangladesh. The principle underpinning that agreement was that international collaboration is critical in finding solutions to problems related to agricultural productivity in Bangladesh. The aim of the agreement was to enable collaboration directly with institutions within the National Agricultural Research System, universities, non-governmental organisations (NGOs) and the private sector directly with co-investments from Australia and Bangladesh. This MoU was refreshed and renewed in 2021.

ACIAR and the Government of Bangladesh are now considering mechanisms which would enable ACIAR and other Australian institutions to sign direct research partnership arrangements with Bangladesh government institutions.

Some highlights of ACIAR-funded research themes in 2020 are as follows:

► Crop research

Research partnerships under the Crops Research Program have been a strong focus since the mid 1990s. The research collaboration has supported the development of improved lentil and pea varieties. About 20% of the lentil area in Bangladesh (~40,000 ha) is now improved varieties developed through this collaboration. A current project 'Sustainable and Resilient Farming Systems Intensification (SRFSI) co-funded by the Sustainable Development Investment Portfolio (SDIP) of Australia's Department of Foreign Affairs and Trade (DFAT), has built partnerships for sharing knowledge and research activities in the Eastern Gangetic Plains (EGP) of Bangladesh, India and Nepal. The value and adoptability of conservation agriculture-based sustainable intensification (CASI) technologies has been confirmed.



In a follow-on phase, the focus is on scaling-out and facilitating regional cooperation in the integrated management of water, food and energy resources. A complementary policy focused project is supporting the improvement of policies and institutions related to sustainable intensification and food, energy and water security.

Research under the Crops Research Program continued in the early 2000s with collaborations on grain legumes, especially chickpeas. An integrated disease management package was developed for controlling the chickpea disease, *Ascochyta* blight. Researchers also identified resistance to *Botrytis* grey mould in lentil. The research program continued with the introduction of short duration pulses into rice-based cropping systems in north-western Bangladesh. ACIAR supported the formation of an international network on mungbean improvement, with partners from India, Bangladesh, Myanmar and Australia, and coordinated by the World Vegetable Center. Mungbean breeders from the partner countries are gaining access to better germplasm and the network has attracted interest from other countries. A project in the coastal zone of Bangladesh aims to use pulses and salinity-tolerant wheat and fodder legumes to improve the dry winter season cropping. Research under this research program has also invested on improved production of cereal crops such as wheat and maize. Currently, ACIAR is also supporting an early response to the emerging threat of wheat blast disease in Bangladesh.

▶ Water research

The ACIAR Water Research Program complements the other ACIAR research programs in Bangladesh, with a strong focus on increasing cropping intensity and productivity in the dry/rabi season through integrated soil, water and crop management. It has focused on nutrient and irrigation management for sustainable rice-wheat cropping systems. It has contributed to an expanding area of rabi-season cropping in southern Bangladesh. Wheat was introduced with a single irrigation, available from ponds or canals early in the season. A regional study on 'Developing multi-scale climate change adaptation strategies for farming communities' identified locally-relevant adaptation strategies, demonstrating the effectiveness of integrating social, biophysical and modelling research within a participatory framework. A cropping systems APSIM-ORYZA model was used to simulate the impact of salinity and climate change on rice. Significant capacity was developed in Bangladesh in cropping systems modelling to promote food security and the sustainable use of water resources. Under this research program there has been an effort to provide policy options to promote socially inclusive and environmentally sustainable agricultural intensification.

The thematic area has also worked in north-western Bangladesh on increasing production of chickpeas and lentils. Conservation agriculture technologies were used to test small-scale machinery, including a multi-crop planter that was developed from the program. Another initiative focused on accelerating adoption of CASI and resulted in the formation of the Bangladesh Conservation Agriculture Farmers and Service Providers Association (BCAFSPA) to disseminate CASI technologies and safe use of herbicides.

▶ **Strengthening research linkages**

Given the common agricultural production challenges of many countries in South Asia, ACIAR has also played a key role in strengthening research linkages between Bangladesh and other countries, particularly India (Bihar and West Bengal states) and Nepal (eastern Terai region) having similarity in biophysical parameters and agroecological settings.

▶ **Capacity Building**

The ACIAR Capacity Building program continues to support individuals and institutions in Bangladesh to enhance scientific research capability, management, policy and governance. The program facilitates post-graduate and in-service training, and supports project-based capacity building.



A 10-year strategy for research collaboration

Based on the strong platform of research collaboration between the two countries since the mid 1990s and the recognition of the increasing complexity of challenges and opportunities in the agriculture sector, it was agreed to affirm our shared commitment to a long term research partnership into the future with a new strategy for research collaboration 2021-2030. A 10-year strategy enables the possibility of longer-term and flexible programs that respond to the complex challenges of issues such as climate change, which require sustained research collaboration and, often, trans-disciplinary approaches. It also enables a recalibration of the relationship that can affirm the changing nature of the partnerships and the role ACIAR plays in catalysing regional collaboration. This strategy acknowledges how the relationship between ACIAR and Bangladesh has evolved, becoming a strong co-invested partnership. It affirms how both Bangladesh and ACIAR seek to further strengthen the nature of that relationship.

This new strategy for research collaboration also affirms the importance of the contribution of ACIAR to regional collaboration. South Asia has the highest concentration of poor people in the world, with more than 500 million people living in extreme poverty. Half of the population of the region depends on agriculture for their livelihoods. Agriculture remains the key driver of economic growth in most countries and is under threat from a declining natural resource base, especially soils and water, and climate change. This operating environment brings into focus a number of features for ACIAR.

Understanding and addressing the impacts of climate change on food systems and livelihood security is an increasing priority for partner countries in the region.

Developing sustainable and equitable water management systems at the farm, community and institutional level is an ongoing priority for partner countries in South Asia.

Intensifying cropping systems, climate resilience, and soil and water management issues continue to be a priority of partner countries, and a focus of ACIAR collaborations in the region.

Research priorities 2021–2030

In 2019–20, through a series of in-country consultations between ACIAR and a wide range of partner agencies and individuals, ACIAR and Bangladesh confirmed the ongoing relevance of the research priorities described above. This strategy outlines the agreed priorities for research collaboration between ACIAR and Bangladesh over the period 2021–2030 and reaffirms the importance of building research capacity through research projects addressing these priorities, including through post-graduate study opportunities. The agreed priorities that can be considered in the collaboration include:

- ▶ 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:
 - quantity (scarcity, groundwater and waterlogging)
 - quality (salinity)
- ▶ soil fertility and soil management
- ▶ markets, diversification and agricultural value chains
- ▶ agricultural mechanisation.



Geographic foci

The geographic foci for implementing these research priorities will remain the north and north-west and the southern coastal zone. Specifically, the following research themes are suggested for the two regions:

North and north-west Bangladesh

- Farming systems research on agronomy, conservation agriculture, improving water use efficiency and mechanisation for small holder farmers
- Breeding using molecular techniques (for example marker-assisted breeding and double haploid production) to develop crop varieties in wheat, maize and pulses which fit into a profitable farming system and helps in diversification of the system
- Water management focusing on dry season irrigation and sustainable surface water and groundwater use
- Soil salinity and fertility management
- Diversifying farming systems towards higher value crops (especially pulses) and animal/livestock production

South coastal Bangladesh

- Management of saltwater intrusion and climate change proofing of crop production
- Surface and groundwater management
- Soil salinity and fertility management
- Community level irrigation water management
- Crop varietal development linked to new farming systems

Cross sector priorities

Cutting across the research priorities on page 9, ACIAR and Bangladesh affirm a shared commitment to:

- Focus on the needs, engagement and delivery of opportunities for women, across all aspects of the research program. Both women and men play a central role in the farming, food and health, and natural resource management systems of low- and medium-income countries. But women's contribution is often undervalued or unrecognised—and they are often disproportionately affected by poverty. In 2017, ACIAR introduced its Gender Equity Policy and Strategy 2017–22. The ACIAR internal Gender Committee will review the implementation of the strategy across all regions, with a view to redeveloping/refreshing the strategy for a new term based on learning and experience.
- Take opportunities to convert research outcomes to policy support.
- Seek to work with diverse partners through value chain research to support the development of markets and promote diversification and intensification of agriculture and entrepreneurship in agriculture.
- Integrate biophysical, social, economic and policy research to address the complex challenges of climate change, resource management and poverty.



Strategy and partnership management

Being a 10-year strategy, ACIAR and the Bangladesh institutional partners including Bangladesh Agricultural Research Council will meet annually to review the continuing relevance of the strategy, recalibrate specific priorities if needed, assess achievements and evaluate the health of the partnerships.

Through this strategy, ACIAR and Bangladesh acknowledge the strong and enduring partnerships that have been created through the previous Australia–Bangladesh research collaboration. They also highlight the importance of sustaining those partnerships that are best matched to the priorities outlined above. The parties however also emphasise that the challenges facing the Bangladesh agriculture sector and rural livelihoods are increasingly complex and will require new and innovative partnerships, especially with the commercial private sector. Collaborative research with advanced agricultural research institutes has the advantage of building capacity of the individual professionals and answering production constraints as well helping in institution building including germplasm exchange.

The ACIAR Outreach program aims to increase the understanding of stakeholders and the Australian public of the impact of Australia's investments in research through ACIAR. Many platforms and channels are used to ensure that audiences in Australia and our partner countries can access, understand and use the outputs of ACIAR-supported projects and programs. ACIAR will apply all the resources of its Outreach program to support this strategy and the Bangladesh partners in promoting the achievements of the partnership.



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